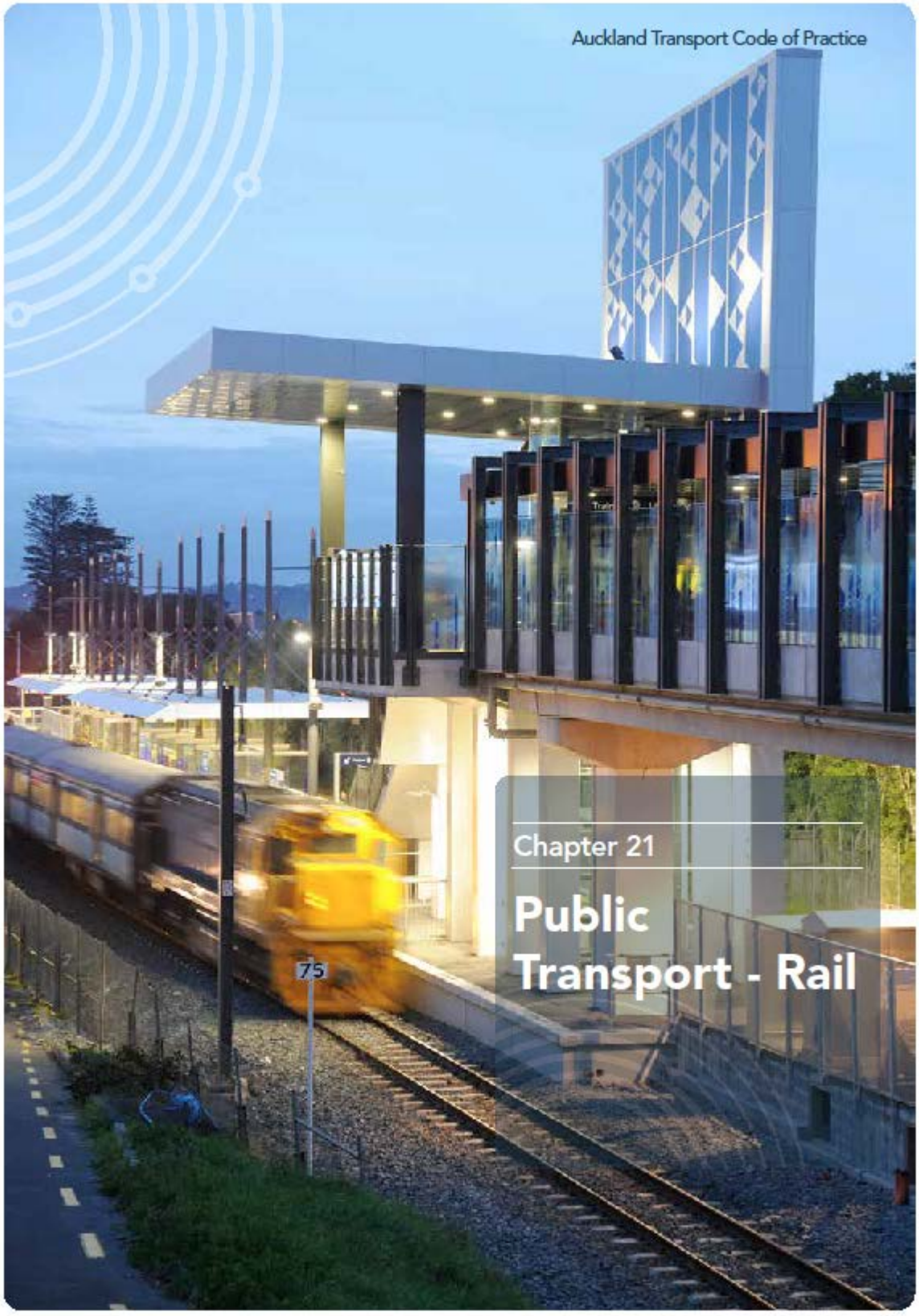

Auckland Transport
An Auckland Council Organisation

21 Public Transport – Rail

21.1 Introduction

21.1.1 Purpose

This chapter is to be used by all persons involved in the planning, design, documentation and procurement of new stations, as well as upgrade work on existing stations in the Auckland Region, for Auckland Transport (AT).

Compliance with these guidelines is necessary, however, compliance does not constitute acceptance of any proposal, or compliance with legislative requirements.

This chapter outlines the general principles and processes for stations relating to:

- Site planning
- Urban Design Issues
- Environmental Sustainable Design (ESD) Issues
- Crime Prevention Through Environmental Design (CPTED)
- Station Design Elements
- Methodology for Branding, Theming and Signage
- Finishes and Specifications for Stations
- Legislative Framework

This chapter is based on the use of the 'Common Elements' Specifications and Drawings for station upgrades. It is not prescriptive, and requires intelligent implementation of standards and principles by designers and project managers. AT would particularly welcome feedback from users on any aspects that prove difficult to apply, require improvement or clarification, or that may lead to unintended outcomes so that these can be constantly improved and updated.

21.1.1 Rail in Auckland

Auckland Transport

AT does not operate services, but contracts with qualified service providers for the services specified in its Plans.

AT owns the rail rolling stock which is made available to the rail operator for day-to-day use.

AT leases the stations from KiwiRail, and owns and maintains the "above rail" infrastructure (e.g. shelters, lighting, signage, PA and CCTV). In line with this AT has developed some of the "below track" infrastructure such as platforms and bridges.

KiwiRail

The New Zealand Railways Corporation trades under the name KiwiRail. They are both the owner of the rail corridor and the rail safety authority. As owner of the rail corridor KiwiRail is

responsible for maintenance and upgrading of all structures, track and signaling. At present KiwiRail is undertaking two major upgrades of the Auckland network. These are under the 'Developing Auckland's Rail Network' (DART) programme and Auckland Electrification Project (AEP)

21.1.1.1 Building Acts, Building Codes and Standards

All designs and work must comply with the following legislation and if there is a conflict with this guide the statutory act will take precedence:

- Resource Management Act
- NZ Building Act
- NZ Building Code
- NZ Railways Act

Where necessary the team will need to assess the type of development, consider the impact of proposed works, and obtain approvals from the various service providers, and territorial authorities.

Other New Zealand and Australian Standards should be adopted for non-rail station specific requirements as they relate to the particular type and element of the building works in accordance the above legislation. In particular, attention is drawn to the following documents:

- NZS 4121:2001 Design for Access and Mobility – buildings and associated facilities
- Railway Safety and Corridor Management Act

Note: This is not an exhaustive list of Acts, Standards and Codes and it remains the responsibility of the consultant team to ensure all relevant legislation is complied with.

21.1.1.2 Auckland Council

The Auckland Rail Network stretches across Auckland Region, encompassing the former Territorial Authorities:

- Auckland City
- Manukau City
- Waitakere City
- Papakura District
- Rodney District
- Franklin District

Each of these areas communities needs to be engaged as a stakeholder for work on stations. It is essential that any consultant commissioned to work on AT stations develops a relationship with the stakeholders concerned from the beginning of the project. Aside from the legislative relationship it is AT's philosophy to work in partnership with various stakeholders within these areas in developing the Rail Network and the stations themselves.

In addition to applying for building consents, an outline plan of works (OPW) will be required for works within the designated rail corridor. Works outside the rail corridor may require Resource Consent. Depending on the scale of the works AT partners and stakeholders within Auckland Council will look favourably on having Peer Reviews and a PS2 certificate provided for structural, vertical transportation and fire design. Designers must make adequate time allowances in the programme for complying with these and other Auckland Council requirements.

21.1.2 Background

This chapter is a guide for assisting in the implementation of design commissions for consultants engaged by AT. It should be the basis for the design for station upgrades and other improvements. For major new stations it should be used to guide the design principles and act as an 'Aide Memoir'. It is based on previous documentation prepared by ARTA, AC and AT in upgrading and developing the stations of the Auckland Rail Network. This chapter, which is an updated version of the Station Design Guide supersedes all of the previous prepared documentation of the aforementioned organisations. It gives an overview of the principles and factors influencing station design, and an elemental breakdown of station components and services to be provided, describing them and their requirements.

21.1.3 Station Design Principles and Process

21.1.3.1 Functions of a Rail Station

The rail network provides for the movement of people between key origins and destinations. In terms of its role in the wider transport network, the function of the rail network is primarily a commuter-based operation dealing with the highest demand corridors.

The rail station is the public interface of the rail system. It is the place where customers access and exit the system. The most important function of a rail station is the safe and efficient movement of people to and from the rail system, and should be one of the principle influences in the design of the station.

Station function is defined by the individual demands placed on each station. Each station is different in terms of the facilities required to ensure that it can deliver its required function. In some cases, park and ride may be a significant demand of users of a station, whereas in others pedestrian or bus transfer demands may be significant factors. The design of the station will need to be responsive to the functional needs of each station.

In some cases, rail stations are located in retail and/or residential urban areas and have a high degree of interface with the surrounding land uses. In such cases, as a principle, the station should be designed as sensitively as possible and provide a positive enhancement to the existing urban fabric, however the transportation functions of a rail station are always the primary consideration.

21.1.3.2 Key Drivers

In approaching the design of rail stations, there are four key drivers which have guided the development of standards in this chapter. It is important that designers of rail stations use these key drivers as guiding principles when undertaking design of all elements of stations.

Safety

Safety has two distinct areas. Safety of the station environment relates to avoiding hazards such as trip hazards, overhead line electrification safety, obstructions and avoidance of conflicts between pedestrians and vehicles (road and rail). Safety also relates to personal security of the user (CPTED). This has implications for station design in terms of sight lines, lighting, avoiding hidden areas, provision of CCTV and design for passive surveillance.

Functionality

Rail stations are transport focused facilities. The main role of a station is the movement of people to and from trains. Functionality means designing for the specific transportation functions required of the station. This means designing for the appropriate provision of parking, drop off areas, bus facilities and pedestrian facilities sized to meet the expected demands.

Operationability

Rail stations exist within an operational rail environment. Structures must be designed to allow for the operational needs of the railway. In terms of station design, this relates to ensuring that the design does not inhibit the ability of the trains to run on time by affecting dwell times. This also relates to driver visibility and signal sight lines, structural and electrical clearances and platform heights to ensure that the operation of the railway is not inhibited.

Maintainability

Rail stations are frequently the targets of heavy vandalism. While new stations are designed to increase passive surveillance and include CCTV and improved lighting, it is accepted that vandalism will continue to occur. Stations also require regular cleaning and removal of litter. Stations need to be designed to make cleaning and maintenance as easy and as safe as possible. This means using robust materials and adopting design solutions that enable easy access for cleaning equipment.

Standardising of design or provision of similar proprietary equipment shall be considered where possible. This reduces the need to maintain a wide range of parts/components. Particularly when the design or installed equipment is the same as those which have proven to be reliable and are used in other locations.

In addition to the above key drivers, the principle that solutions should be cost effective in capital terms and minimise ongoing operational costs applies to all aspects of station design.

21.1.3.3 General Planning

The primary functions of the Auckland rail system are to:

- Provide safe and reliable transport for patrons at reasonable cost
- Provide a viable alternative to the private car and to encourage a reduction in its use
- Integrate with and support other public and private transport systems and routes.

The station is the primary entry point to the rail system. It is the point where rail users:

- Board (and alight from) trains
- Obtain information
- Transfer to and from other methods of transport

Station users will arrive as:

- Pedestrian and cycle users
- Inter-model public transport transfers
- Drivers and passengers of private vehicles

The overall appearance of AT's stations should be bright, clean, efficient and consistent with a modern railway.

21.1.3.4 Station Locations

In most cases, station locations will be outside the scope of this Design Guide. Where decisions regarding location are required, close consultation with AT, relevant stakeholders and the surrounding community will be required to determine a location which allows the functional and operational needs of the station to be met.

21.1.3.5 Electrification

All change, modifications and upgrades to stations in the Auckland Network must take into account the presence of the overhead electrification system. All station structures must be appropriately earthed and bonded and these bonds maintained by KiwiRail. Moving station structures or adding new structures may require changes to the bonding arrangements to ensure electrical safety in the case of an incident. Similarly, the placement of all platform furniture needs to take into account climbability to limit risks of unauthorised access to live equipment.

Please consult AT Rail Improvements (Major Projects) where the impact of proposed design changes on electrification safety is unclear, and always supply updated as-builts following *any* change, modification or upgrades on stations within the Auckland Electrified Area (Swanson to Papakura).

21.2 Design Philosophy Principles

21.2.1 Urban Design

21.2.1.1 Urban Design Principles

Each rail station forms part of a rail network and part of a community. The design principles in this chapter provide a balance between the need for the station to be a readily identifiable part of a passenger transport network and the local community. This is also important in the context of capital costs and ongoing operational costs which in general are higher with a greater level of individuality among stations.

While it is desirable to have standardised station planning, layout and design, this is not always possible because of the variety of environmental and physical conditions and constraints that result from varying station locations. The planning and design of each station should recognise and accommodate any constraints, and should utilise the physical and

topographic conditions to maximise the station's operational, functional and construction effectiveness.

The transportation function(s) and operational requirements of a station are the highest priority consideration in station design. However, as far as possible, station design and precinct planning should also incorporate urban design principles including:

- Locating stations as close as possible to town centres
- Design strategies for maximising integration with the surrounding urban fabric
- Design strategies for minimising negative urban impacts, for instance the effect of lighting on neighbourhood environment

Where possible visual corridors to the station should be established as well as links to other transport links. The station should be made clearly visible from the surrounding area in a manner appropriate to the local area community. The architectural concept for new stations should reflect their context and become recognisable and accepted by users within the local and wider catchment areas as their transit station.

The concept should demonstrate a high degree of resonance with the scale and form of its immediate surroundings while providing a focus for the public transport component of the local urban area. It must create an architectural form that is appropriate as a public transport building within the context of its local setting.

The developed concept should consider the heritage value and history of the site and surrounding area, possess positive social attributes and serve to enhance the identity of the rail public transport system to the community. Linking into existing pedestrian and vehicle networks to provide fast and easy access into and out of the station is vital for the station to function efficiently. The station design must be able to be expanded by future additions without major re-planning or major functional/structural alteration.

21.2.1.2 Urban Design Panel (UDP)

The design of remodelled or new stations may be subject to review by an Urban Design Panel depending on the scale and location of the station. Currently only some TAs have such bodies established to review designs submitted for the Outline Plan of Works (OPW) and provide recommendations on the look and feel of the design within the local setting. While the recommendations of the UDP are non-binding, the TA's planners have been known to take these suggestions and make them a condition precedent of issuing the OPW. Time and resources should be allocated to undertake this process and the resulting inclusion of the UDP recommendations.

21.2.1.3 Urban Design Protocol

Refer to *ATCOP Chapter 22 Section 22.2.1.3* which outlines this Protocol.

21.2.2 Environmental Sustainable Design (ESD)

21.2.2.1 Environmental Sustainable Design Principles

These set out the environmental sustainable design principles associated with works involved in the rail network. The design of stations should aim to mitigate adverse

environmental impact and promote sustainable methodology in terms of its design, construction, and maintainability over its lifetime. Stations should be designed in context with the surrounding urban and natural environment to minimise impact while designing to a level appropriate to the scale and nature of the rail network. Materials should be considered carefully and preference for renewable and sustainable resources selected where appropriate, with consideration also made to their durability, and maintainability. Audio and visual impact should accordingly be designed to minimise impact relative to the surrounding environment without compromising the functional requirements of the rail network. Station components should ideally be standardised as much as possible to take benefit of efficiencies and economies of mass production.

Key considerations are:

- Design – environmental impact and sustainability
- Materials – renewable sources, durability, maintainability
- Construction – minimising environmental impact, maximising standardised elements, efficiencies and economies
- Permeability – water collection and run off
- Lighting – light spill, levels, typology - efficiency
- Audio – sound spill
- Access – designs that encourage passengers to walk, cycle, and even car pool

21.2.3 Crime Prevention Through Environmental Design (CPTED)

21.2.3.1 CPTED Principles

Designing to Crime Prevention Through Environmental Design (CPTED) principles aims to provide a safe and secure environment within the rail network through the implementation of crime prevention through environmental design. Careful environmental design can help make places less susceptible to crime and enable people to feel more comfortable outdoors. The design of the stations and access within the rail network and the surrounding environs and the arrangement of streets, parks and other outdoor spaces can influence the opportunity for crime and the level of fear of crime. CPTED is one important strategy to achieve this.

Stakeholders consulted could include Police, AC Community Safety Team and AT Public Transport Operations (PT Ops) Station Management team. All parties should seek to meet at the same time to provide robustness in the process.

21.2.3.2 The Four Strategies of CPTED

Refer to *ATCOP Chapter 22 Section 22.2.3.2* which outlines the Four Strategies of CPTED.

21.2.3.3 CPTED Implementation

Station environs due to their nature are susceptible to issues of crime and should be designed with consideration to:

- Natural surveillance – “see and be seen” – people are usually less likely to commit crime if they are (or think they may be) being watched. Conversely people are likely to feel safer if they think someone is looking out for them.
- Ensuring there are clear sightlines along routes – avoiding sudden corners or blind bends along pedestrian or cyclist routes. Ensuring that planting does not grow to obscure the view or provide hiding places for offenders.
- Providing good standards of lighting – choosing lighting that illuminates pedestrian areas as well as roads and trains. Providing consistently placed, high quality lighting which will not conflict with planting or create areas of shadow.
- Ensuring there is plenty of activity – Designing pedestrian/ cycling routes to ensure that they will be well used to prevent them becoming isolated and unsafe. Designing pedestrian routes so that they run alongside vehicular routes and are highly visible. Encouraging a mix of uses so that space is used throughout the day and the evening.
- Avoiding potential entrapment situations – people will feel vulnerable in situations where they could be trapped in a space with a potential attacker. These sorts of spaces include: pedestrian/ cycling routes which run through underpasses, tunnels or cuttings alongside limited access roads, or between properties with high sided walls where there is no means of escape. Provide alternative pedestrian/ cycling routes so people do not have to take unsafe routes. Clear signage can be used to warn people of potential entrapment spots.
- Keeping up good appearance – Places which are run down and neglected tend to feel less safe. Regular maintenance of buildings and garden area along with the removal of graffiti and litter all help to make people feel more comfortable in outdoor spaces.
- Clear ownership – people have a proprietary interest in their own property. Where there is no clear ownership of space, offenders can be indistinguishable from legitimate users. Damage to property is less likely if it is clear who owns it, therefore communal or “left over spaces” which no-one assumes ownership are best avoided.
- Not everywhere can be safe – it would be impossible to make everywhere feel safe and the experience of our environment would likely be poorer if we did. Some areas will be “off limits” particularly at night. People who do not feel safe in these areas should be able to choose not to go there and have access to an alternative safe route.

21.2.4 Heritage Buildings

21.2.4.1 Heritage Buildings

The heritage values of a station should be considered as part of a comprehensive urban design assessment taking into account heritage values, urban design and CPTED principles. The future management of heritage buildings and decisions on whether they should be retained or relocated should occur on a case-by-case basis as determined through comprehensive assessment. Consultation should be undertaken with stakeholders (KiwiRail and AC), NZ Historic Places Trust (if appropriate), owners/occupiers and any relevant local preservation groups. Future options should be developed as part of the design process for the appropriate station and should be evaluated using a range of criteria including:

- Heritage value and listing

- Current and potential use (including commercial activities)
- Community and social value
- Safety and security (including CPTED principles)
- Relationship with rail corridor and operations
- Structural condition, safety and ongoing maintenance requirements
- Funding arrangements for upgrade/restoration and on-going maintenance.

Other infrastructure provided at the station, such as shelters, seating and ticketing machines should be designed to integrate with the heritage character of the station where it exists and will remain.

Where a heritage building has been scheduled in a District Plan or listed with NZ Historic Places Trust, decisions for its use or relocation should consider the values sought to be protected. Use of the building for station purposes must also consider whether CPTED and sustainability principles can be met, and whether equivalent levels of amenity and service can be provided for passengers as at other stations. Potential future use and upgrades of the station and network (including electrification) where these may have an impact on the building should also be included in the assessment.

21.2.5 Enhanced Scope

21.2.5.1 Enhanced Scope Proposals

This chapter provides standards based on the former 'Design Guide' for rail stations that the Auckland Council, AT and stakeholders have agreed to. It is the view of these organisations that these standards represent an appropriate scale and quality of facility for the Auckland Rail Network. The standards in this chapter have been reviewed in terms of their cost implications and are considered affordable in terms of the Region's anticipated expenditure levels on stations as a component of a wider upgrade of the rail network. The standards set in this chapter also reflect the operational requirements of the railway and the functional requirements of rail stations to meet the needs of users.

Where another party, for example a Council Controlled Organisation (CCO) or a private developer seeks to vary from the standards adopted in this chapter, this can be considered at the discretion of AT and who must approve any such designs.

The standards should not be varied to reduce scale, quality or construction standards or to affect any stated priorities, however enhancements may be considered.

In such cases, the standards in the Design Guide should be adhered to as far as practicable and be used as a minimum provision. In the adoption of alternative materials and designs, proposals should be guided by the demands of the railway environment and principles outlined in this Design Guide.

The Design Guide specifies a level of provision which the region has agreed is appropriate and the Auckland Transport will fund to this level. Any increase in scale, quality design standards or use of alternative materials will be funded by the proposer to the extent that it imposes additional costs. This funding will relate to:

- Additional design costs

- Additional construction costs
- Additional maintenance and cleaning costs
- Additional renewals costs

Operationally and functionally related elements of the Design Guide will not be varied in a manner which, in the view of AT, adversely affects the operation of the railway or functionality for passengers.

In each case proposed, it will be necessary for AT and the proposer to enter into a Cost Allocation Agreement to determine the extra-over costs of variations from specifications in this Design Guide.

21.2.6 Holistic Design

21.2.6.1 Future proofing

As the design of a remodelled or new station evolves, due care must be taken to not preclude further enhancements, changes in patronage or services. At present the design must meet the service levels specified to some future date. But that design should make provision for increases in services and an increase in the level of amenities provided. The design should reflect the module concept adopted by AT in terms of structures, but also make allowances for future systems such as 'Integrated Ticketing' automated gates.

21.2.6.2 Constructability

All elements of the proposed design must be subject to a review of the ease of construction within a live railway and urban environment. The design should allow for off-site fabrication and pre-cast elements that will minimise the on-site activities. The use of non-standard elements or unusual construction techniques should be avoided and only included when authorised by AT, supported by a technical submission. The design must meet KiwiRail's safety and clearance criteria both as a finished product and during the construction phase. Any parts of the design that affect safe and efficient running of the rail network, e.g. possible obstruction of signal sighting, close proximity to overhead live equipment, must be reviewed and agreed with KiwiRail during the design phase.

21.2.6.3 Asset Management

The designer must consider the long term asset management implications of their design. It is imperative that the designer take into consideration as a minimum the boundaries of the Rail Corridor, interfaces with AC and KiwiRail and ongoing maintenance responsibilities. The designer should review the developed design with AT's Asset Management Team and receive their concurrence prior to proceeding to Detailed Design phase. The designer shall review the maintainability issues of any proposed design, to assure that all parties are made aware of maintenance and operations issues resulting from the design and material selections. This should include future supplies of fittings and parts, site access, etc.

21.2.7 Common Elements Specifications and Drawings

The designer must refer to AT's 'Common Elements Specifications and Drawings' as the basis for all upgrades and renewal works on the AT Network. These are 'live documents', therefore it is important that the consultant views the most up to date copy. Refer to the online hyperlinks of Appendices 21D and 21E for the current versions of these documents.

21.3 Functional Design Principles

21.3.1 Access

The entry point to the station is the focal point, visually and literally from the surrounding area and station environs. It should be recognisable and enable users to orient themselves quickly, directing them to and from the station platform and all other parts of the station environs.

21.3.1.1 Modal Access Hierarchy Policy

Connectivity and accessibility to the community it serves is one of the most important aspects of a station's design. In accessing stations, people often have to cross rail lines and vehicle corridors and as a result safety is an important consideration in access design. In order to make rail travel as attractive to customers as possible, access within the precinct and to the station must be safe, convenient and designed to meet the particular needs of a station and the surrounding urban fabric. If the access to existing stations is not 'easily recognisable' then additional signage should be provided to both approaches and entrances. While AT wants to make the stations easy to use, the design must ensure that they are not considered public space or a public right of way.

Provision for access can be prioritised into a modal hierarchy. The access hierarchy determines the proximity and level of amenity of access to the station and facilities, and is the key component in considering the planning layout of a station.

The general principles of the access hierarchy are to provide pedestrian, cycle and bus users with shorter distances, higher convenience and higher comfort levels than private car users. Short term (drop off) and accessible parking is provided a higher priority than long term parking.

Park and ride is generally the furthest from the station platform, however in some cases park and ride is a very important driver of demand. As a guide, no person using a park and ride facility should have to walk further than 300m to the inbound platform.

This policy sets out the access hierarchy in descending order of proximity to the station as follows:

Pedestrian and Cycle

Bus Users

Private Car Users - drop off

taxis

park & ride

Access to the station precinct needs to be as direct, easy and comfortable as possible. Access should utilise and exploit existing routes and connections as much as possible. The station precinct is regarded as a pedestrian area, therefore the safety, convenience and comfort of pedestrian access is of primary importance. Formal pedestrian crossings, paths and signage are to be used to denote and protect pedestrians' rights of way. Stations also

need to provide enabled access to users travelling with, for example, pushchairs, luggage and mobility scooters.

The design and planning of pedestrian, cycle and vehicle access, circulation and parking within the station precinct are to be in accordance with the principles of the access hierarchy. If possible, local area pedestrian cycle routes should be made to connect directly to the internal station precinct pedestrian routes without crossing vehicle access routes.

Integration with other transport methods and systems is a fundamental aspect of the station design. To encourage use of the rail system it is important that integration is as seamless as possible and the transfer is short, convenient and comfortable.

Where required, specialised traffic engineering consultants should be engaged to review the configuration of internal road systems and connections to main feeder roads during the concept design stage to verify that the proposed scheme complies with all relevant codes and standards and TA/NZ Transport Agency requirements.

An Integrated Transport Assessment, as per AT guidelines and to meet the requirements of the Regional Policy Statement and district plans, should be undertaken to support the OPW and any consenting requirements.

21.3.1.2 Disabled Access and Universal Access Provisions

Refer to Appendix 21H AT's Universal Access Guidelines.

Stations need to provide access for disabled persons to and within the precinct. This should include tactile strips, ramps, special signage. Access routes shall include 'Decision Point Tactile Strips' at kerb crossings, at the top and bottom of stairs and ramps and on platforms to assist the visually impaired. This should also include tactile print on handrails (to guide and direct passengers), Fare Payment Devices and in lifts etc. (see Appendix 21A - General Finishes Schedule).

Primary access routes should be designed to meet the access requirements of people with disabilities. Access routes should be designed in such a way as to provide safe and easy access for disabled users in a manner appropriate to the specific considerations of the site and station requirements. Accessible routes should be clearly identified and conveniently located as much as practicable. A minimum of one accessible route per platform is required.

All station designs shall fully comply with NZS 4121:2001 Design for Access and Mobility – Buildings and Associated Facilities and also with Appendix 21H AT's Universal Access Guidelines.

Consultation with the following organisations should be undertaken for new and upgraded stations.

- CCS Disability Action (0800 227 2255) at www.ccsdisabilityaction.org.nz
- Blind Foundation (0800 243333) at http://www.blindfoundation.org.nz
- Deaf Association

And any other organisations considered appropriate for the particular facility being designed.

21.3.1.3 Grade Separation

Access to each station should be assessed on a station-by-station basis, and should take into account safety, amenity, design and maintenance. Grade separated pedestrian access to platforms should be considered where ever possible specifically where level crossing access is undesirable.

The composition of grade separated access should be designed considering the specific parameters of the site, the functional requirements, and visual amenity in context with the surrounding community and urban fabric. Components should cater for future electrification and generally be designed in line with these guidelines:

21.3.1.3.1 Stairs

Stairs where provided must comply with the requirements for accessible stairs in the NZ Building Code, key points to note are:

- Where any stairway width exceeds 4.0m it must also have an intermediate handrail provided at the centre of the stairway.
- Stair nosings must be non-slip and visually differentiated. Luminance-contrasting (usually yellow) permanent-colour tactile inserts should be used, with concealed screw fasteners. Nosings should be 50-75mm wide with a 25-50mm vertical face. Painted nosings should not be used.
- Incorporate 'decision point tactile strips' at top and bottom to assist visually impaired users.
- The surfaces must be non-slip in accordance with Appendix 21A - General Finishes Schedule.
- The lower part of stairwells is to be designed to prevent use of the vicinity as a public toilet area.

Stair Construction

- Ensure cross falls for drainage as required.
- Handrails are to be galvanised steel with unpainted galvanised balustrades as a minimum standard. Alternatively, stainless steel rails with painted galvanised balustrades.
- Include protective screening from overhead lines where applicable.
- Finishes are in accordance with Appendix 21A - General Finishes Schedule.

21.3.1.3.2 Ramps

Ramps should be considered where possible in lieu of escalators and lifts as this will reduce maintenance costs, reduce vandalism, and a Building Warrant of Fitness (BWOF) may not be required.

Ramps where provided must comply with the requirements for accessible ramps in the NZ Building Code, key points to note are:

- Incorporate 'decision point tactile strips' at top and bottom to assist visually impaired users.
- Provide tactile strips with braille on handrail ends to assist with directional information.

- The surfaces must be non-slip in accordance with Appendix 21A - General Finishes Schedule.

Ramp Construction

- Ensure cross falls for drainage as required
- Handrails are to be galvanised steel with unpainted galvanised balustrades. Within stations stainless steel handrails should be considered.
- Include protective screening from overhead lines where applicable.
- Finishes are in accordance with Appendix 21A - General Finishes Schedule.

21.3.1.3.3 Pedestrian Bridges

New pedestrian bridges need to provide easy safe access to and from the platform. Bridges should have appropriate disabled access as outlined above. Future line electrification requires new bridges to provide protection from electrical hazards and to be constructed to allow sufficient clearance for future overhead power for rail.

Bridges must have a clearance dimension between the top of track and the underside of any bridge structure that meets the KiwiRail electrification clearance standards.

Bridge usable deck should be sized to suit volumes of users but generally be a minimum of 2.2m wide.

- Balustrades are generally 1.8m high over the extent of the bridge with no gaps, transitioning to 1.2m for access stairs and ramps; however they must meet the KiwiRail electrification standards.
- Special screening will be required on bridges over the electrified track and this must meet the KiwiRail electrification clearance standards IEC62128-1 2003 Fig.14. These screens are required wherever the overhead live equipment is within 2.25m of the bridge balustrade, and must be of minimum 1.8m in height.
- The path surface must be non-slip in accordance with Appendix 21A - General Finishes Schedule;
- Lighting levels must comply with Section Lighting
- Finishes are in accordance with Appendix 21A - General Finishes Schedule

Pedestrian Bridge Construction

Reinforced concrete is the preferred material for the structure however other materials can be selected on the basis of form, function, whole of life costs and aesthetics.

- Ensure cross falls for drainage as required
- Include protective screening from overhead lines where applicable
- Finishes are in accordance with Appendix 21A - General Finishes Schedule.

Upgraded Pedestrian Bridge

Where an existing pedestrian bridge is to be upgraded the refurbished bridge should comply with the above requirements where possible. Prioritisation for the extent of provision should

be focused primarily on safety related aspects such as non-slip surfaces, handrails, balustrades and provisions for electrification.

21.3.1.3.4 Lifts and Escalators

Lifts or escalators may be required due to the specific considerations of the site or station requirements. These are to be sized to suit the projected station capacity and must comply with the requirements for

- Technical Specification - Tech Spec Escalators Feb 09.DOC
- Technical Specification - Lifts Tech Spec Lifts Feb 09.DOC

Additional requirements for Lifts:

- Should comply with Railway Lift Standard i.e. GM/RT1200
- Should comply with Lift Safety Standard i.e. EN81
- Must not exit onto the platform face
- It needs to be ensured that the lift is correctly specified for intended use and environment e.g. heavy pedestrian flows and potentially corrosive or outdoor environment. Lifts are to have full glass cars and shafts where feasible.
- To have appropriate power saving devices
- Lift to have a good quality and well specified fixed CCTV camera in the car
- All lifts are to have a phone connection for emergencies, which is to be connected back to lift manufacturer's call centre. Lift phones must also have the capacity to enable connection to other lift maintenance service provider's call centre. This is to avoid the costs of components needing to be replaced after the warranty period when a lift is handover by the manufacturer.
- Where possible the lift alarm should also be linked to the security control room (SCR) who will monitor the CCTV in the lift and the facility to enable the SCR to communicate with people in the lift.
- Requirements may include the ability to get standard patient stretchers into lifts where provided and should be large enough for modern mobility scooters. This requirement should be considered in lift car size selection.
- Provide a sump pump or a gravity flow drainage discharge in lift pit, a sump will generally be required in pit floor to facilitate this
- Must have water sensor/detector for lift pit which will provide an alarm back to the SCR, currently located at Britomart
- Avoid rainwater downpipe provision inside lift shaft
- Provide water discharge point to be clearly identifiable and accessible outside the lift shaft (allows for cleaning and testing of sump pump)
- Provide 2 sets of lift priority keys for PT Operations during handover
- Provide sufficient ventilation fans (as per manufacturer's recommendation).
- Provide a power point on ceiling panel in lift car for cleaner's vacuum equipment
- Provide LED lights in new lift cars and lift tower. Where possible lift car lights should switch on automatically where lighting levels fall below what is considered acceptable for industry standards and also what is outlined in this Rail Station Design Guide
- Weatherproof lift structure and entrances. Entrances: Large and wide covered area and a good reverse gradient on floor to reduce the amount of water getting through the lift doors

- Consider the design of lift landing door and car door as this can be affected by water/moisture/rubbish/dirt carried over the door sills
- Appropriate grade of materials are specified for lifts as a number of existing lifts are showing unacceptable levels of rust
- Carry out traffic analysis to determine the correct number of lifts required at each facility or platform
- Allow lift to go to ground in the event of fire and power failure
- Allow lift to shut down automatically (using a timer) after operation hours, but will require safety features in the event there is an occupant inside lift car
- Provide graffiti film on all glass and steel surfaces
- Provide vandal proof / heavy duty call buttons with LED indication light
- Where possible cater for alternative disabled access to and from facilities/platform if lift is out of order (some facilities have only one lift that provides disabled access to and from platforms)
- Provision of full Operation and Maintenance manuals, including details and frequency of planned preventative maintenance.
- Consider REM (Remote Elevator/Escalator Monitoring) to detect faults and automatically make service calls. Allow tracking of lift demand (passenger demand).
- As most lift structures do not get cleaned annually, dirt on internal structure can be seen clearly through the clear glass walls (lift shaft). Consider the use of coloured glass or translucent materials to hide the interior of lift shaft without compromising internal lighting levels. This will also reduce/prevent visibility into lift pits.

Additional requirements for Escalators:

- Should comply with Lift Safety Standard i.e. EN115
- Should be to railway specification – i.e. have 4 to 5 flat treads before and after incline.
- WBe wide enough for one person standing and another passing. Signage on escalator steps encouraging standing users to keep left and free up the right for passing users.
- Weather-proof structure against water/moisture/fog at exposed stations. It needs to be ensured that the escalator is correctly specified for intended use and environment. E.g. heavy pedestrian flows and potentially corrosive or outdoor environment.
- To design appropriate sound insulation (acoustic level) / sound barrier between escalators and neighbouring properties. Mechanical parts do generate constant machine noises during operation (not more than 62dB is acceptable). These noises can be audible during the quiet hours of the night affecting neighbouring residents.
- Provide auto-start sensors that allow escalator to stop when it is not in use.

21.3.1.3.5 Other Accesses

Underpass Crossings

New underpass crossings should be avoided but may be required due to the specific considerations of the site or station requirements. These should be designed in such a way as to provide safe comfortable access for users. Where existing underpasses are to be retained they are to be upgraded where necessary to ensure they are safe and secure with good lighting. If they are to be retained long term, structural changes may be required to

allow more visible entry and exit such as splaying entry/exit walls and the introduction of light wells.

If provision of underpasses cannot be avoided then CCTV cameras should be provided for in the design. Where this is not feasible to have CCTV cameras installed immediately and therefore not included in the original plans for the underpass, ducting to the underpass should still be installed to ensure no cost prohibitive modifications are required at a later date should the need for cameras become necessary.

Level Crossings

It is AT's intention to remove level crossings where possible and accordingly new level crossings should be avoided where possible. Proposed level crossings should be discussed and designed in conjunction with KiwiRail to provide safe access within the rail corridor in context with the surrounding community and environment. Where existing level crossings are to be retained the risk is required to be reduced as low as practicable. One step towards achieving this is the undertaking of a risk assessment, taking into account all factors that affect the risk to members of the public, patrons and the workforce.

Risk assessments are required for new and existing level crossings to assist in the determination of appropriate protection where the risk is not sufficiently controlled.

Where required, provision of additional safeguards may be considered without upgrading the crossing to a more protective type under the follow areas:

- signage
- active warnings and signalling
- smooth road surface and markings
- 90° approach to rail, to avoid scooter, wheelchair or buggy wheels becoming trapped or snagged
- tactile paving
- gated or un-gated pedestrian maze
- Note: Where level crossings are used, the tactile set-out will be similar to those on platforms. Refer to *ATCOP Section 12.9* and to standard NZS 4121:2001 and Mobility Research Centre (09 520 4953) at www.mobilityresearch.co.nz.

21.3.1.4 Vehicular Access

21.3.1.4.1 Principles of Vehicular Access

The Figure 134: Typical Station Modal Access Plan below illustrates the flow and location in principle for modal access to stations.

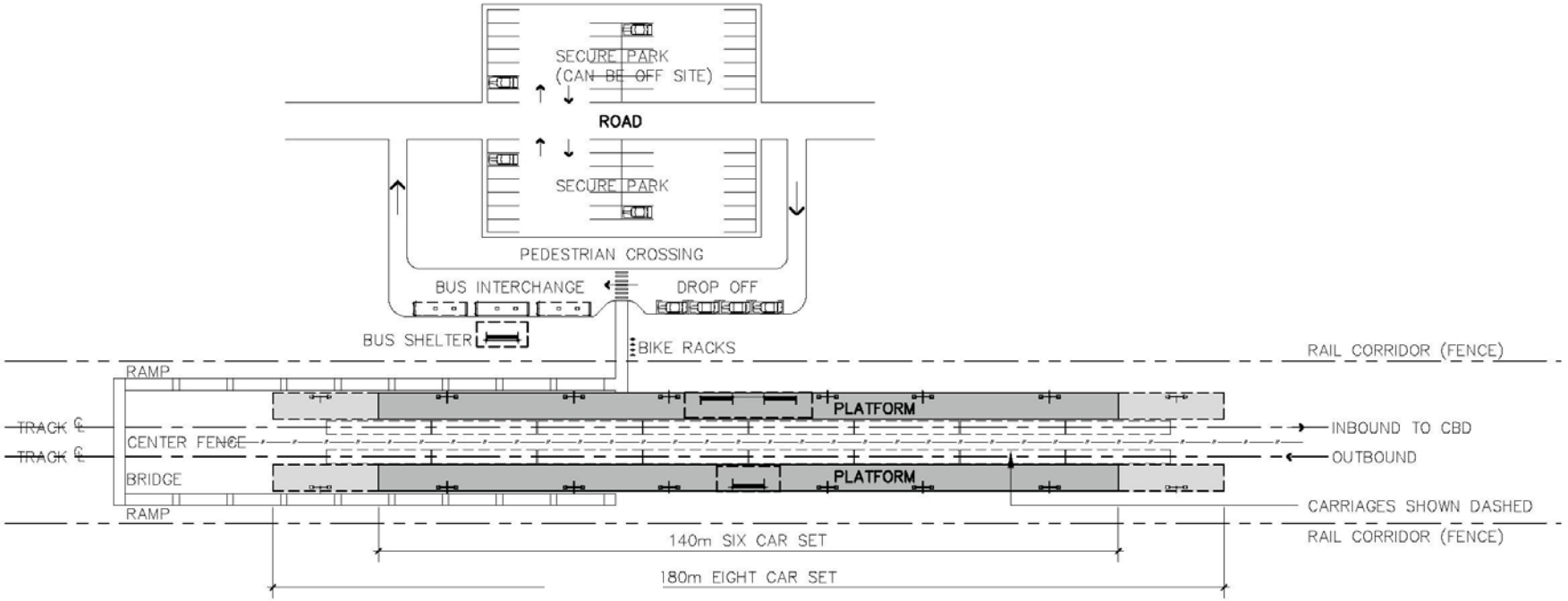

Figure 134: Typical Station Modal Access Plan

Auckland Transport
An Auckland Council Organisation

Note: Individual site constraints may not allow for implementation of vehicle access in this precise manner. However, every effort should be made to adopt these principles so far as possible.

- Car park own entry preferred
- Limited entry/exit points to car parks
- One-way, dedicated circulation for drop-off and bus access
- Drop-off to precede bus stop location in circulation systems
- Secure pedestrian/cycle facilities given priority – locate cycle facilities close to pedestrian route and station – lock up, CCTV, fenced area with code etc. See Cycling under Section 21.3.2.6.

Buses

Bus routes passing a station should be designed so that there is a covered bus stop adjacent to the station entry, with clear signage directing those transferring from the train to the bus and real-time information provided on bus schedules. Where necessary this may be required to be integrated into the local roading network. Larger stations with designated bus interchanges should include set-down and pick-up stops, shelters, covered walkways and seating, designed in accordance with requirements determined by patronage modelling. At interchanges, bus stops should be clearly identified and well-integrated with the station to allow for easy and safe access by children, the elderly, and those with disabilities. Requirements for bus layover, and the provision of RailBuses, should be considered, but need not be within the interchange area.

Minimise bus/pedestrian conflicts by locating bus bays separately from Drop-off zones. Bus bays should be beyond the drop off zone to minimise the use of the bus bay being used illegally for drop-off purposes.

Provide Wayfinding for both bus and train timetable information to facilitate passengers' orientation at the interchange.

Shelters

Bus shelters are generally the responsibility of AT as part of their roading activities; however, as a guideline AT's preference is that if the facility is located on-street an Adshel shelter is the first option, with one shelter per bus stop provided.

If the bus stop is off-street and an Adshel shelter is not possible then the requirements and responsibilities will need to be assessed on an individual station-by-station basis.

The rate for canopies and seating are as per the platform shelter requirements in Section 21.3.2.7 Canopy Module Calculations**.**

Kiss and Ride

Short-term parking, for drop-offs and pick-ups (kiss and ride) are especially important for some stations (e.g. in areas where there is limited on-street parking). In cases where 'kiss and ride' cannot be provided for within the station vicinity it may be appropriate to provide 'kiss & ride' facilities in designated spots on adjacent roads.

Car drop-offs on public roads are generally the responsibility of AT as part of roading activities, however as a guideline AT's preference is that if the facility is located on-street an Adshel shelter is the first option with one shelter per drop-off bay if it is more than six car lengths long. If off-street, only provide shelter if necessary.

Drop-off zones should be clearly signposted as 'P3 Drop Off and Pick Up Only"

Taxis

Unless demand justifies a dedicated taxi rank, pick up and drop off by taxi should occur within the Drop-off facility. As a large proportion of taxi users are disabled or elderly it is preferable for all Drop-off bays to be "accessible". Signage identifying specific bays as taxi waiting areas would be required and directional signage inside and outside the terminal and at the shared bays should be provided.

Note: Taxis have a minimum vertical clearance dimension requirement of 2.4m.

Where dedicated ranks are used, they should be a minimum length of two taxis. The location of the taxi rank should be prominent and accessible to main entry/exit points and have easy road access and egress.

Park & Ride / Long Term Parking

Park and ride facilities play an important role as a gateway to moving commuters away from their car and on to public transport. In areas where it is not feasible to provide efficient public transport, park and ride facilities enable residents to drive to a local station and gain access to the transport network.

The present strategy is to make use of existing available parking or develop on land Auckland Council adjacent to stations when adding kiss and ride, short stay parking or park and ride facilities.

The long term parking facility is generally the lowest on the station patronage hierarchy, and unless site constraints apply, should not interfere with or disrupt bus operations, pedestrians, cyclists or the Drop-off facilities. Some principles to be considered for Park and Ride Facilities are:

- Car parks are to provide adequate pedestrian paths to station entrance and they should minimise pedestrian/vehicle conflict.

- Circulation within the Park and Ride facilities should be direct, easily understood and should not have any dead ends or culs-de-sac longer than 30m unless a turning bay is provided.
- No person should walk more than 300m from a parking space to a platform. The preferred configuration is 90°parking bays with a two way aisle. Any departure from 90° bays must be supported by adequate circulation.
- Parking and access to the roading network shall comply with local territorial authority requirements and accommodate the requirements of casual users if this is anticipated. All car parks must be fenced. Any landscaping within the carpark must be in accordance with this guide in Section 21.3.8.
- CCTV security should be provided by the asset owner.

Stormwater Drainage

Adequate stormwater drainage is required to meet Auckland Council Storm Water Code of Practice, *ATCOP Chapter 17 Road Drainage* and Building Code requirements. Peripheral drainage for car park with falls as required.

Pavement and Seal

Minimum requirement is for pavement formed from granular base-course and sealed preferably with a layer of asphalt. Further guidance can be found in *ATCOP Chapter 16 Road Pavements and Surfacings*.

Kerbs and Channels

Must be to grades and profiles that ensure good surface water collection and discharge. *ATCOP Section 7.7* contains the list of acceptable kerb types and geometry requirements.

Lane Markings

Must conform to the Manual Of Traffic Signs And Markings (MOTSAM) - Part 2**:** Markings for painted lane marking paint for parking bays, direction arrows, speed bumps as necessary or the relevant TCD Manual updates of MOTSAM.

Parking

Wheel stops to car parks if required.

Where there are no wheel stops, footpaths with kerbs only through the car parks need to be designed with regard to vehicle overhang with sufficient width to ensure that the path remains operational with cars parked either side and that sufficient clearance is achieved between underside of car and kerb top.

Finishes are in accordance with Appendix 21A - General Finishes Schedule.

Emergency Vehicles and Access

Requirements include the ability to access an ambulance as near as practicable to the station entry as well as the ability to get standard patient stretchers up ramps or stairs as well as into lifts where provided. This requirement should be considered in lift car size selection.

21.3.2 Platforms and Platform Amenity

21.3.2.1 Station Platform Entry / Exit

Ideally platforms should have the ability to operate with controlled entry points to manage ticketing. In determining the appropriate platform entry provisions due consideration must be given the ability to safely evacuate passengers in an emergency situation. Underground stations must always have at least two independent entry/exit points. Key elements to consider are:

- Permit ticket only access to the platform for the future;
- Station platform entry/exit points will be denoted with the appropriate signage elements and customer information boards as appropriate. Universal accessibility should also be considered e.g. tactile paving, braille, help points, etc.
- Increased security.
- Allow the station to be closed out of hours, by some form of gate or shutter, operated by one person or electronically controlled.
- Entry width dependent on patron numbers and adjustable to peak/off peak demands.
- Emergency egress.

21.3.2.2 Platforms

In many cases, platform locations and configurations are a restriction to the design process for stations either due to the use of an existing platform location or due to the platform location being selected through the infrastructure design process. While the provision of platforms is the responsibility of KiwiRail, the following sets out AT's requirements for platform design and construction.

21.3.2.3 Configuration

The two forms of platform configuration are island and side platform, generally preference is for island platforms due to the reduced construction and maintenance costs associated and improved passenger accessibility in the event of transfer activity occurring at the station. However platform configuration is largely dependent on the specific issues of the site. Whether platforms are island or side depends on a variety of factors relating to the station location including earthworks, track geometry, surrounding road engineering and physical and topographic conditions and constraints. A desired absolute minimum of 4.5m width (for side platforms) and 10m width (for island platforms) may be considered due to site constraints, but any other structures (e.g. lighting mast) must not impede passenger flow. Please refer to Figure 135 Typical Island Platform Layouts and Figure 136 - Typical Side Platform Layouts.

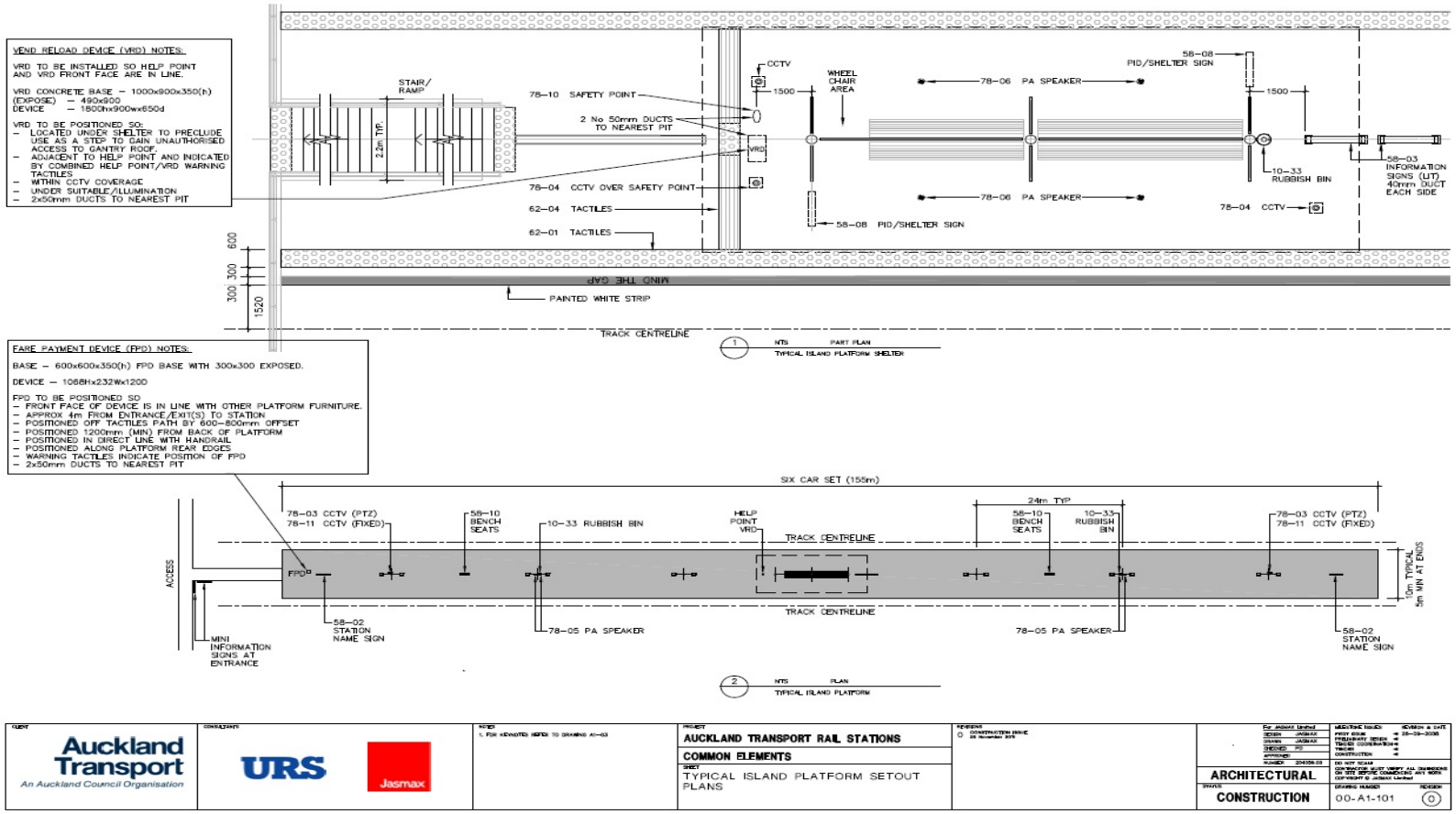

Figure 135: Typical Island Platform Setout Plans

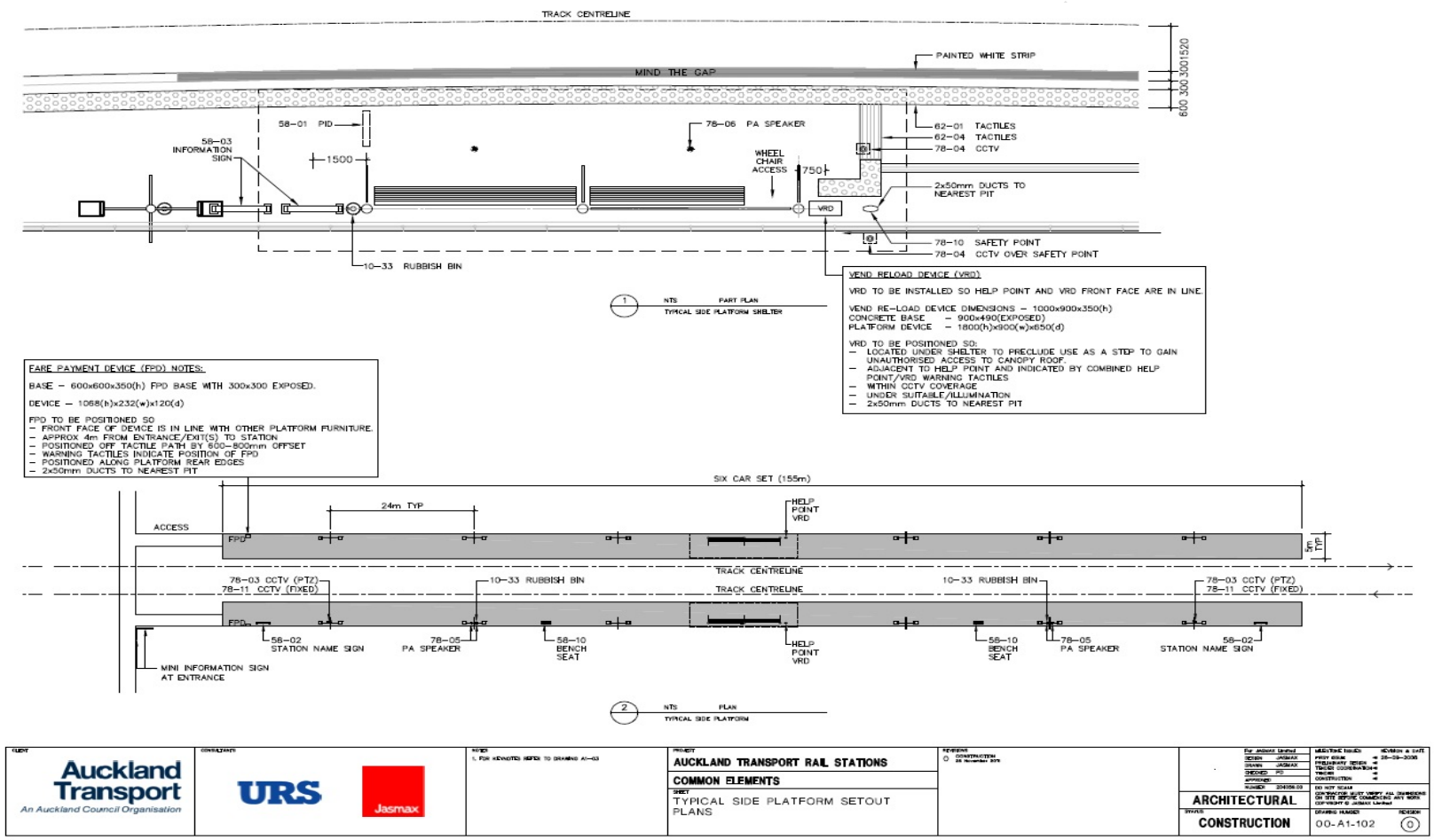

Figure 136: Typical Side Platform Setout Plans

21.3.2.4 Platform Size

The platform length should be appropriate for trains stopping at the station, a full upgrade should provide for 6-car EMU trains (150m). The maximum track gradient through the platform should be 1% (1 in 100), 1 in 80 may be acceptable by agreement with AT. Platform width should ideally be 5m for side platforms (4.5m desired minimum) and 10m for island platforms (6m desired minimum at ends). Any further reduction is by agreement with AT. The platform edge should be set at 1520mm horizontally from track centre line and 750mm vertically from top of rail on straight track. Appropriate allowances for carriage car and vehicle throw should be made on curved track. In order to minimise the step distance between platform and train, track should run parallel with platforms where possible.

Where there is curved track within the platform, the step distance depends on the set-back of the platform (due to vehicle throw) and the rolling stock design (vehicle length, bogie centres & door position). These criteria are not yet known, but calculations carried out using typical rolling stock dimensions indicate that for a horizontal stepping distance of less than 75mm (as required by typical level boarding standards) the radius should be greater than 1,750m where the platform is on the outside of the curve and greater than 600m where the platform is on the inside of the curve. The optimum track alignment at stations should be evaluated and approved, including considerations of the new rolling stock, as part of the station design process. See Figure 137 for Typical Cross Sections.

Where platforms are curved, thought should be given to train manager visibility for 6 car trains and in cases where a manager standing in the middle of the platform cannot see the train doors at one or both platform ends simultaneously, visibility assistance such as platform-mounted mirrors may be required.

Clearances

Refer to Table 85: Track Design Reference Table

Construction

Platform Wall Units are generally pre-cast concrete or insitu wall units specifically designed to profile. Sacrificial platform gap fillers to be universally employed to reduce any platform gaps.

Backfilling

Backfill platform facings with free draining material directly behind the wall and use compacted backfill, to meet engineers design, for the remainder of the void.

Platform Drainage

Surface water is to be directed away from the tracks at a cross fall of 2%, with an absolute minimum of 1.5% and maximum of 3.5%. Island platforms should fall towards the centre of

the platforms and side platforms should fall away from the track and drain over the back of the platforms to public stormwater systems or on site treatment.

Free draining material is to be provided behind the sidings and is to include a drain at the bottom against the wall consisting of either aggregate filled filter baskets or drain coil which is to connect into the stormwater system.

Non-conductive (composite or plastic) drainage covers/grates are required where there is central platform drainage and part/all of the drain is within the electrification 'fall zone'.

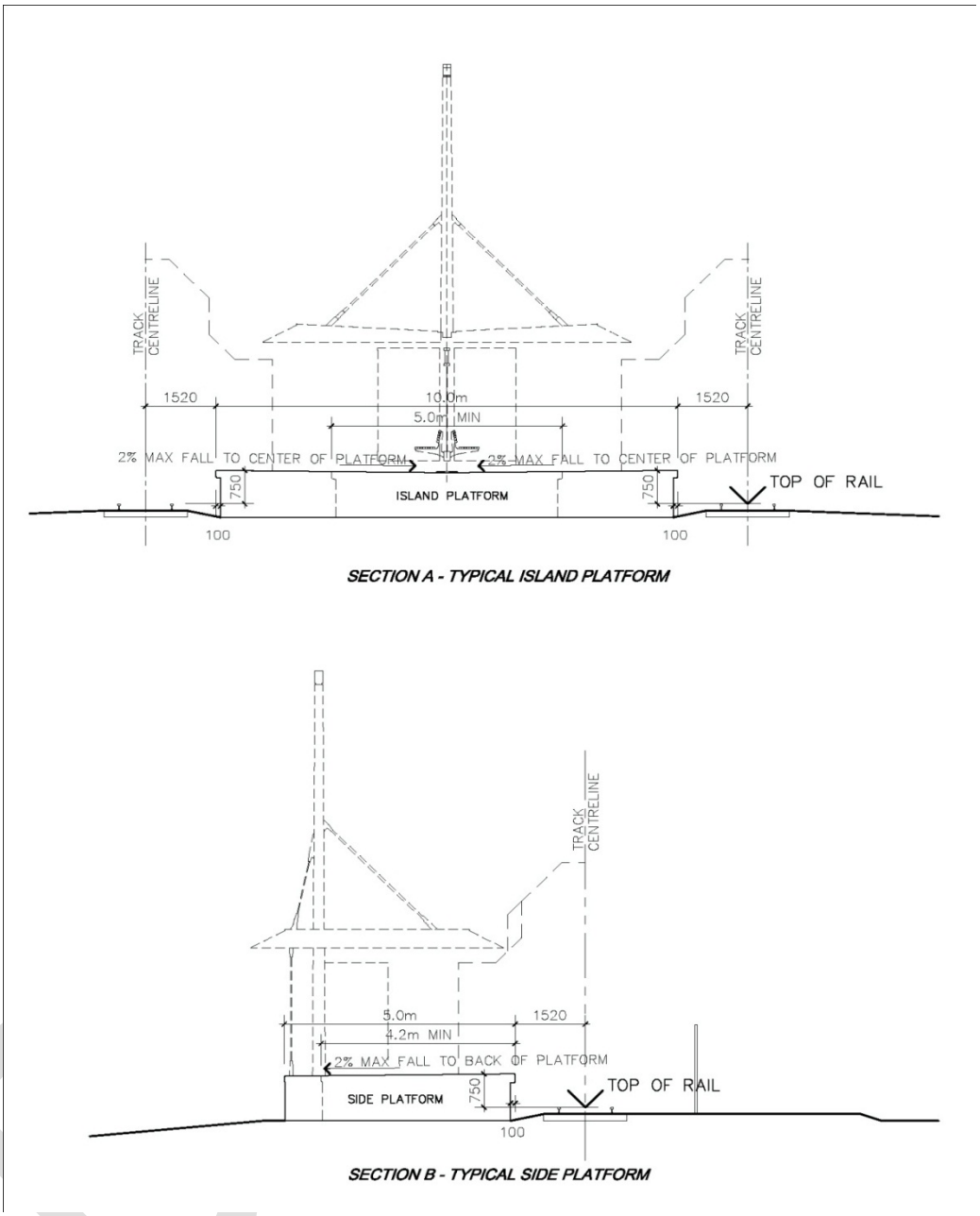

Figure 137:Section A & B - Typical Island and Side Platforms

Table 85: Track Design Reference Table

*NOTE: This is a live document and all designs must be signed off by KiwiRail to ensure it meets all Electrification Standard Clearance and Minimum Standard Clearances. Official minimum standards are available from KiwiRail. T:200 is a guideline only, and should not be taken as an absolute minimum standard without consultation with KiwiRail.

Design Item	Desirable Design Standard	Minimum Guidelines (As per T:200 Handbook)
Vertical Geometry		
Grade	• Maximum for passenger service = 1 in 50 (2%); • Maximum to allow for freight service = 1 in 60 (1.7%)	
Curvature	• Desirable minimum radius = 6,600m; • No vertical curves within horizontal transitions, turnouts, diamonds and platforms; • No vertical curves within switches/turnouts.	
Structure Clearance (when allowing for future electrification of rail network)	• Vertical overhead clearance from rail level outside stations = 5.5m • Vertical overhead clearance from rail level within stations = 6.0m • Track centreline to boundary = 5.0m	STE Engineering - KiwiRail must be consulted when any structure less than 5.5m above railway level is proposed.
Overhead Catenary	• Maximum contact wire gradient relative to rails to be 1 in 300.	
Horizontal Geometry		
Curvature	• Desirable minimum radius 600m • Absolute minimum radius 150m	
Curve transitions	• 35m minimum	Variable - Dependent on detailed design
Switch/turn-out location	• Desirable for no switch/turn-outs within curve transitions	
Parallel Tracks	• Minimum horizontal separation width = 4.0m (Widens to 4.5m separation on a 150m radius curve) • Separation at stations 5.5m to accommodate centre fence if required.	Minimum horizontal separation width = 3.8m (to be increased to compensate for cant and curvature).
Structure/Boundary Clearance	• Desirable track centreline to boundary = 10.0m. • Minimum track centreline to boundary = 6.0m. (Clearances to be discussed with KiwiRail on a case by case basis).	Minimum fixed structure clearance – 2.75m, except for isolated obstructions up to 2m high = 2.60m. For bridge trusses, track signs, signals,

Design Item	Desirable Design Standard	Minimum Guidelines (As per T:200 Handbook)
		temporary scaffolding – 2.30m
Turnout Rate	• 1 in 12 (8.3%) (Diamonds @ 1:7.5)	
Lead Length	• 25m from point of switch to intersection point.	Variable - Dependent on detailed design
Length between switches	• 5m minimum.	Variable - Dependent on detailed design
Stations		
Vertical Grade	• Preferably level boarding across platform • Maximum desirable grade, 1 in 200 (0.5%)	• * Maximum Grade 1 in 100
Platform Height	• 750mm from rail level at 1520mm from centreline on straight track	
Platform Length	• 150m usable + 10m buffer zone for terminus station	• 140m usable + 10m buffer zone for terminus station
Platform Width	• Desirable Island Platform = 10.0m and Desirable Side Platform = 5.0m	• Minimum island platform =8.5m Minimum side platform =4.5m
Curvature	No platforms on horizontal or vertical curves.	Minimum desirable radius = 1750m for platform outside of curve Minimum radius = 600m for platform inside of curve

Notes:

Existing stations may vary from these guidelines

** AT understands that 1 in 200 is KIWIRAIL's desired maximum gradient for new platform.*

21.3.2.5 Amenity Principles

Stations are functional infrastructure that must provide for the safety and comfort of passengers. The main role of a station is to provide for the effective and efficient movement of people to and from the station and train and to provide safety and shelter during waiting periods. Amenity at stations should be functionality focussed, driven from the perspective of the user. New station designs and precinct planning must incorporate user amenity features including:

- safe, convenient and unobstructed access to all parts of the station infrastructure, including between station platform and entry to the railcars
- passenger comfort, including reasonable weather protection from wind and rain
- general security and safety including appropriate levels of lighting
- sufficient logical, clear, understandable, easy to read and well located signage, timetable display board systems and customer information boards
- adequate and well laid out vehicle access, drop off and parking facilities with clear lines of sight and pedestrian access through parking and approach areas
- adoption of good urban design practice and landscaping principles
- adoption of concepts to minimise accidental and wilful damage
- parking layout and landscaping for pedestrian and user comfort
- convenient, safe, and comfortable bus transfer facilities
- easy recognition and high visibility from and to pedestrian access paths through the station precinct.

The exact number of each item to be installed at individual stations is based upon peak patronage numbers and the specific station requirements so that they provide reasonable levels of passenger comfort while ensuring that operating costs are acceptable. Table 86: Guidelines for Facilities at Stations summarises the amenities provided at each station.

- Public Toilet Facilities
- Full cover where possible
- Providing for children, elderly, disabled
- Universal Access Guidelines

Table 86: Guidelines for Facilities at Stations

	RTN Interchange	RTN Major Station	RTN Minor Station
Comfort and Convenience Facilities			
Shelter	x	x	x
Seating	x	x	x
Ticket Machine	x	x	x
Pay Telephone	x	x	
Toilets	x		
Commercial operations	x	x	
Bicycle storage facilities	x	x	x
Information			
Station Name	x	x	x
Direction of Travel	x	x	x
Area route map	x	x	x
Site specific fare information and zone	x	x	x
General fare information and zone map	x	x	x
Stop specific timetable	x	x	x
General timetable	x	x	x
Real-time information	x	x	x
Safety and Security			
Lighting	x	x	x
Video surveillance	x	x	x
Emergency Help point	x	x	x
Tactile surface indicators	x	x	x
Accessible parking bays	x	x	x
Public Address System	x	x	x

The application or guidelines and level of infrastructure provided should be considered as best practice but will be assessed on a case-by-case basis. Similarly the achievement of these guidelines is heavily dependent on adequate funding and the commitment of the different organisations that have responsibility for passenger transport infrastructure design and provision.

For more complete details of requirements please consult Auckland Transport's PT Operations Unit.

21.3.2.5.1 Amenities

Stations are to be provided as a minimum with the following amenities:

- Shelters
- Seats - platform
- Rubbish Bins
- Cycle Racks
- Clock (when PIDS supplied)
- Electricity (240V single phase, vandal proof, IP65)
- Lit Information boards
- CCTV
- Tactile Paving

For more complete details of requirements please consult Auckland Transport's PT Operations Unit.

21.3.2.6 Canopies and Shelters

Canopies and shelters are an important component in the provision of comfort and amenity at stations. Platform shelter is provided predominately for users waiting to board a train. Users alighting from a train do not require shelter on the station platform, unless transferring services. People generally exit the platform immediately after alighting the train.

For side platform stations, the size of the canopy on the inbound and outbound platforms may differ should the station have an imbalanced peak flow. In such cases, a large canopy will be appropriate on the side with the heaviest passenger flow, while a small canopy or shelter will be appropriate on the other side. Island platforms should have a balanced structure the length of which is determined by the platform side with the greatest demand.

The level of shelter to be provided through canopies is determined by the specific requirements of the station in conjunction with peak patronage levels of the station.

Shelter may also be required at a bus interchange depending on demand. In this case, as far as the bus interchange is concerned the passenger is boarding and appropriate shelter requirements will need to be determined in consultation with AT's Public Transport Department's Bus Unit.

Where provided, canopies and shelters should provide reasonable shelter from wind to total width envelope for rain and sun protection given operational constraints. Shelters should adhere to the CPTED principles outlined in Section 21.2.3 of this document and maintain clear sightlines. It is preferable to implement canopies that are spaced well apart as this assists boarding times by spreading users on the platform in a linear manner. This enables more people to access more train doors simultaneously and helps the railway maintain on-time running.

Shelters are targets for heavy vandalism and as a result can incur significant operational costs. Canopy and shelter design should provide a balance between the provision of

reasonable amenity and comfort for users and the provision of robust and maintainable materials and designs.

Areas covered by canopies should be well lit, covered by CCTV, contain a Safety Point and key information such as timetables, network and local area maps, and other relevant customer information and must meet the electrical clearance criteria. Removal and discharge of rain water from the canopies must be well provisioned and coordinated with other types of water treatment.

Gaining access to shelter and canopy roofs is frequently the most common means for unauthorised access to the overhead electrical equipment, risking severe injury and death. Climbability should be reduced to as low as reasonably practical by avoiding locating signs, fences etc. in positions which provide step aids to climbing onto shelters.

Canopies

The canopy is a roof structure providing weather protection. It is orientated to run parallel with the train tracks. There are two types of canopy, the side and island canopy for respective platform configurations. Island canopies are two sided. Side canopies are single sided. Canopies must include electrification safety signage on the roof eaves that is clearly visible to anyone about to gain access to the roof area. Downpipes must not discharge straight onto platforms.

Shelters

Shelters form the screening elements under the canopies and provide protection largely from the sun, wind and wind driven rain. Shelters should generally be located centrally on the station platform provided that access arrangements (bridge landings etc.) allow. Transparent 200mm x 200mm “No Smoking” labels (symbol without words) are to be placed on all glass shelters screens. Opaque labels for non-glass screens are to be agreed with the Operations Team.

Seats

Seats are provided for in the shelter as part of the signature shelter design. Additional platform seating is provided as required based on the needs of the particular station in such a manner that spreads passengers on the platform. This is to be investigated on a project by project basis. There are primarily two types of seats: bench seats with a back and arm rests and bench seats without a back and arm rests. Seats with a back are to be located in shelters only. Seats without a back are used to provide seating while designed to discourage people from sleeping on the seats and should be used in other areas of the platform and within the station precinct.

Seating should be arranged on the platform in a manner that does not obstruct passenger flow and access to information and is integrated with other station elements i.e. location of light poles, advertising signs and bins. For island platforms, seating should be located on the centre line of the platform. For side platforms seating should be located near the back of the platform.

Seats generally comprise a stainless steel frame with a timber back and slat seats or epoxy paint over galvanised steel frames.

Fire risk and loading is to be considered for where timber is used. The timber should be fire retardant treated as required.

Rubbish Bins

Rubbish Bin Finishes are to be in accordance with Appendix 21A - General Finishes Schedule.

Rubbish bins are to be provided on the platforms only as shown on the Common Elements and design drawings. These are to be of a reasonable quality while being robust enough to withstand the rail station environment and are to be securely fixed to the masts or light poles to prevent theft.

Rubbish bins must be in accordance with the details contained in *ATCOP Chapter 6 Street Amenities*.

Recycle bins should be provided where possible, particularly at sites where food and drink vending machines and suppliers are on site.

Cycling

All stations should be designed to encourage use by cyclists. Secure cycle storage and lockers should be provided where possible within the station precinct, particularly at interchange and major stations. Station design should not be responsive to existing patronage level by cyclists, but should aim to attract and promote increased patronage by cyclists. Design should also provide for the inclusion of bike storage at interchange stations in the future.

To encourage cyclists not to carry their bikes onto crowded trains, cycle storage is to be provided either in the form of cycle racks or secure cycle lockers and these are to be installed as close as practical to the pedestrian only access to the inbound platform, with appropriate CCTV coverage. Storage for cyclists may include blue style self-help bike lockers, lockers for personal and cycling gear; and self-help cycle sheds. Security risks associated with provision of cycle lockers and other facilities must be considered within the design to establish the appropriateness of their use.

Refer to *ATCOP Chapter 13 Cycling Infrastructure Design – Section 13.6* for information on the provision of cycle parking and storage in the form of lockable cycle cages and cycle racks etc.

Information Boards

Sufficient numbers of lit information boards are to be provided for the amount of information they are supposed to display. Items to be considered are: system maps, timetable, ticketing information, station safety information and appropriate information relevant to the particular

locality e.g. local map, bus timetables, network announcements, events and interchange information.

Covering note on furniture placement

For side platforms furniture is to be located as far back as practicable and for island platforms furniture should be placed as close as possible to the centre of the platform.

All furniture fixtures should align with each other along the platform, including the shelter posts and light columns etc.

Consideration needs to be given to furniture placement as well as earthing and bonding requirements at stations. Furniture with the overhead wire 'fall zone' require more substantial earth cables. Conductive items within 2.5m of each other frequently require equipotential bonding. By early consideration of furniture placement earthing and bonding requirements may be minimised.

Construction

Design, construction methods and materials must recognise the effect of the rapid transit environment on the life cycle cost of building infrastructure. The development and detailing of the design and the selection of materials should be undertaken with a view to reducing overall life cycle costs. A structural design life of 50 years is required.

Architectural forms and massing proposed for the station design must be such that all areas of the building are accessible and maintainable in a cost-effective manner. A modular shelter system is to be employed. This is to ensure ease of construction and provision for growth in the future without interference with existing train services. As far as practicable, standardised shelter modules should be employed. Due care and diligence should be taken in the design of shelters and their components, more specifically in relation to all internal roof gutters, inaccessible services, or any other elements that would require invasive and costly retrofitting or maintenance. The final design must clearly demonstrate that these objectives can be met through the use of standardised building systems and pre-finished materials without having to rely on specialised techniques and methods, or on purpose-made and/or specially fabricated building components and materials.

Shelters are one of the most vulnerable elements in a train station and are prone to vandalism. Accordingly this element should be constructed to withstand significant force and the associated panels should be easily replaceable / repairable. Panels, whether glass or compressed sheet, should be modular and are to be identical for all stations to enable economic and efficient maintenance programmes to be applied across all stations and are to be of toughened clear glass. Finishes are to be in accordance with Appendix 21A - General Finishes Schedule.

Any departure from the specified materials will require specific agreement from AT.

Notes

- Refer to typical side platform drawing for minimum clearances required to structures
- Canopy width will vary with platform width
- Canopies are to be as wide as possible given clearance constraints
- Construction and Maintenance of the amenities must not interfere with train operations
- No new toilets are to be provided on station platforms due to the security risk and costs associated with their maintenance and the need for water supply, sewerage and drainage. Public toilets, incorporating disabled access and baby change facilities, should be provided within the station precinct or overall transport interchange area. At appropriate stations such as interchanges, unless suitable toilets exist, new toilets should be located adjacent to the bus interchange and/or Park & Ride area, preferably within CCTV coverage. The optimum location for public toilets should be determined in liaison with AC as part of the detailed design for the station and its precinct. Signage should direct station users to public toilets where these are located nearby.
- For automated toilets - motion sensor detectors are to be provided to stop the wash cycle when the toilet is occupied. If sensors are damaged, the programmed water cycle should be cancelled automatically. Where the toilet is occupied the door should unlocked automatically after 15 minutes.
- Public Telephones - these are to be external to station environments, supplied and maintained by telecommunications companies.

Public telephones are not to be located on platforms, but should be located in the station precinct or within the interchange area. It is noted that Help Points (communication points) are to be provided on every platform. The minimum number of Help Points required is one per platform. For safety and amenity - cell phone coverage should be extended to all stations and an effort made to understand how future developments in the area will affect this coverage. Signage should direct station users to the Help Points and where appropriate the nearest telephone.

21.3.2.7 Canopy Module Calculations

Levels of shelter are to be provided at approximately $1m^2$ of covered area for every four (4) passengers waiting for the train using the highest number of peak boarding passengers. This ratio should be reduced for high capacity stations. Current peak boarding information will need to be acquired from AT during the design phase. Disembarking passengers are not considered in the calculation of canopy area.

For Island Platforms which have double-sided canopies, the area provided should be based on the side with the highest number of peak boarding passengers (normally inbound) and a balanced structure provided. For Side Platforms, each platform is calculated separately. The inbound canopy is calculated using the boardings for the peak inbound train, while the outbound canopy is calculated using the boardings for the peak outbound train.

Table 87: Canopy Module Calculations

Peak Boarding's	Number of modules
For Standard Modules	4 x 6m ($24m^2$) = 100 passengers
STN 500 Peak Boarding's	$120m^2$ = 5modules (30m long)
STN 400 Peak Boarding's	$96m^2$ = 4 modules (24m long)
STN 200 Peak Boarding's	$48m^2$ = 2 modules (12m long)
Minimum for all stations	$25m^2$ = 1 module (6m long)

Peak Boarding's information can be obtained from the AT Passenger Transport Operations Team.

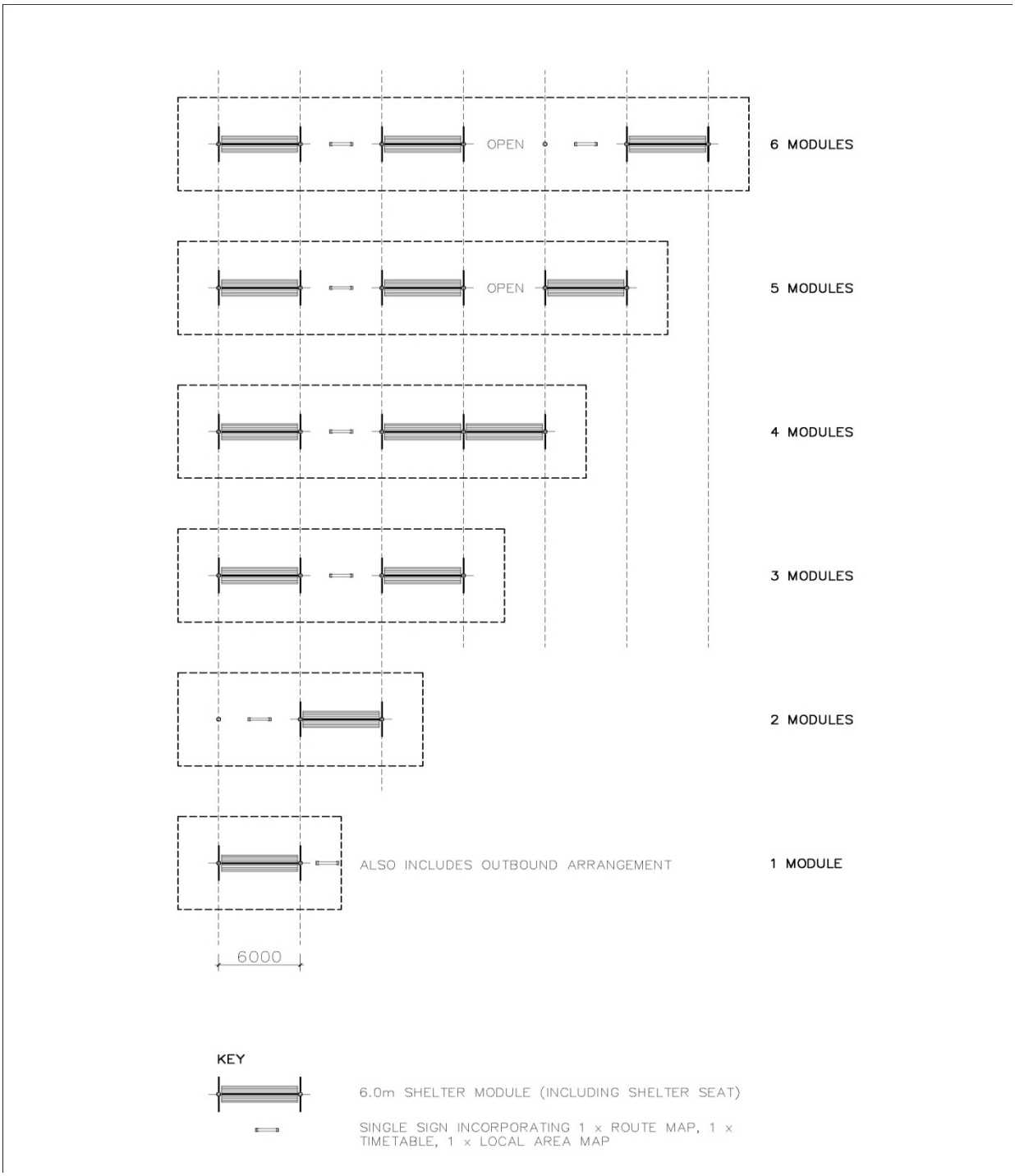

Figure 138: Typical Shelter Arrangement

21.3.2.8 Retail outlets

Retail outlets, particularly at stations with high patronage or the potential for high patronage, can make stations more attractive, safer, add to amenity and draw additional passengers. The station design can allow for appropriate retail kiosks and vending machines to be provided so long as they do not impact on the safe function and operation of the station. Retail outlets may provide opportunities to sell rail tickets as an additional option for passengers and in some circumstances may enhance station integration with surrounding town centres and promote safety through passive surveillance and activity. It should be a condition of any concession granted for retail outlets that the concessionaire will be solely responsible for their setup, supply, monitoring and maintenance of any utility service (water, electricity etc.) and the appropriate disposal of any waste material from their operation (e.g. coffee grinds). They should also contribute to the cost of additional CCTV or other security measures made necessary due to CCTV sight lines being blocked by their installation. Vending machines are also considered appropriate, however, recycling provisions should be considered as part of their installation. Electrical services, phone/data and CCTV circuits need to meet all the isolation and clearance requirements specified by KiwiRail.

21.3.2.9 Advertising

Advertising on stations can add vibrancy and amenity to stations, and may be a useful source of revenue, but must not interfere with the provision of customer information about passenger services. The type and format of advertising should be agreed to by all stakeholders and any decision should be consistent with AT brand values, which can be advised by AT's Marketing Team. Advertising should comply with relevant bylaws and other requirements of AC [AC to advise "other requirements"] and any lease conditions set by KiwiRail. Any costs associated with setup, supply, monitoring and maintenance of advertising material will be the responsibility of the Advertiser.

21.3.3 Services

The design of the Services, including electrical, mechanical and railway related, will vary depending on the particular station and its patronage. A minimum of 3-phase power supply is required at all new stations for lighting and CCTV coverage, while additional requirements at some stations should be considered on a case by case basis.

Rail stations require general building services and railway specific services including but not restricted to:

- Electrical services including lighting (artificial) to all functional areas, pedestrian access ways etc. Station earth cables will require their own separate ducts and will need to run to all conductive station furniture and structures within the overhead line 'fall zone' and affected structures in the equipotential zone.
- Communication and data including passenger information systems such as Passenger Information Display (PID) and public address systems, fire alarm and monitoring, including fibre optic cables. Fibre cables must have Auckland Transport branding. Communication and data cables can often run from Station Earth locations (within the platform environment which is connected to Traction Earth) to areas

supplied by MEN LV [provide full name with abbreviation in brackets when using a particular abbreviation for the first time] circuits. In the event of a fault there is a step and touch potential safety risk to maintenance staff. There is also a reliability risk of damaging circuitry if the separation of circuits and appropriate earthing and bonding is not carried out properly. A particular risk is CCTV cameras in station carparks (often in MEN areas) which feed back to the platform (Station Earth area). Data cables can also bridge out insulating sections in fences or compromise the 2.5m gap requirements between material at MEN Earth and material at Station Earth.

- Security (including CCTV) help points and fire alarm manual call points, which are to be integrated into help points where possible.
- Hydraulic services including water supply and stormwater drainage from platforms, access ways and car parks. Metallic incoming and outgoing water supply, stormwater and sewage services need to have isolating sections at or close to the rail boundary to avoid the risk of step and touch potential transfer in the event of a fault.
- Fare Payment Devices (FPD) and Vending & Reload Devices (VRD).
- Power points for cleaners in a lockable stainless steel enclosure at no greater than 60m intervals. No power point is to be located more than 30m from any end of the station or platform.

21.3.3.1 Interface with Railway Infrastructure Services

Railway infrastructure services including communications, signalling and overhead electrification all run inside the rail corridor and through the station precinct. The station planning and design must consider these items to avoid conflict and enable connection to them and provide the protection and separations necessary for safety, operational and maintenance purposes. Refer to KiwiRail for all overhead electrification and interface issues and services.

Train Stop Points

Train stop points are to be identified by vertical plane stop point markers at appropriate positions along the platform. Types of markers and positions are to be agreed with the rail service provider and AT's PT Operations Unit.

Cable ducts and trenches

There are a number of key railway service routes, including fibre optic cable that serve to hold the communication and data cables serving all train signalling, passenger information and security systems.

These services generally run parallel to the rail tracks. In addition, there is a Vodafone/ Telstra Clear cable along the corridor at most stations. Other infrastructure owners who may have services in the vicinity of stations are, for example, Telecom, electricity, gas, water and stormwater service suppliers.

These services run the length of the rail system and pass through the stations and in some cases (communications) loop into the stations.

Consideration needs to be given to these services and their routes through and into the stations, as well as provision of cable routes for other operators.

New ducts installed must have draw tape or the equivalent installed. Where fibre optic cabling is installed this must include trace wire as fibre optic cables will not produce a signal suitable for locating. Fibre optic cables should be sleeved within a subduct for added protection.

21.3.3.2 Electrical Services

The following electrical services items must be considered and discussed with the AT Project Manager to determine the level of implementation depending on station patronage.

Supply Integrity (for Major Stations)

Should the main power supply to the station fail, essential services such as egress / security lighting, security services (CCTV etc.), passenger displays and PA systems are to be supplied by an appropriately sized UPS [provide full name with abbreviation in brackets when using a particular abbreviation for the first time] with a minimum capacity of 2 hours battery life.

A mobile generator supply point is to be provided near the station entrance and it is possible to connect [to be better worded] a mobile generator to the main switchboard to keep essential services supplied. The generator may be placed at the entrance to the station as and when required. It must be connected via a bolted connection via a secure pillar box (Montrose Box) located at the entrance. The location of any proposed mobile generator must allow for the following:

- Transport of the generator to the site with the minimum disruption to train services and without isolating the 25kV traction Overhead Line Equipment (OLE)
- Ability to install the cables from the generator to the main switchboard without undue risk of the cables being damaged by members of the public – to avoid creating both a safety and reliability risk
- The length of cable run should be such that a reasonably sized cable can be used and the resulting volts drop to the main switchboard will allow adequate voltage onto electrical fittings supplied from the switchboard
- The location of the generator allows for ≥2.5m clearance between the generator itself and any conductive material connected to the general mass of earth outside the Station Earth. This is because the generator will rise up to the Station Earth voltage under fault and needs to be separated physically from the MEN and general mass of earth

Rail Electrification

The station will form an electrical island that is earthed to the Station Primary Earth Terminal (PET). The PET will be connected to the Railway Line/Traction Earth upon railway line electrification. The design needs to isolate the station power from the external supply

through a Kiwirail approved isolation transformer. Adequate physical clearance (≥2.5m) needs to be maintained between any exposed conductive material connected to the Station Earth and any exposed conductive material connected to the general mass of earth (MEN Earth). KiwiRail has different earthing and bonding arrangements for the isolating transformer depending on whether it is outside the Station Earth confines or within it.

Electrification Infrastructure

Table 88: Station Assets Relating to Electrification*:*

Category	Item	Description	Location
6.6.1 Traction	6.6.2 OLE Gantry	6.6.3 Supporting structure of the overhead line. Either Portal or cantilevered	6.6.4 Rail corridor and some station platforms
6.6.5 Traction	6.6.6 Overhead Line Equipment (OLE)	6.6.7 Earth, catenary and contact wires. To be treated as live.	6.6.8 OLE Gantry
6.6.9 Screening	6.6.10 Screens	6.6.11 1.8m vertical and horizontal screens installed on bridges and other raised structures close to the rail corridor.	6.6.12 Rail corridor and some station platforms
6.6.13 Earthing and Bonding	6.6.14 Primary Earth Terminal (PET)	6.6.15 KiwiRail access only. If tampered with, station earthing could be compromised. Connects to traction earth (rail, OLE earth wire)	6.6.16 Stations, usually off platform.
6.6.17 Earthing and Bonding	6.6.18 Isolation Transformer	6.6.19 Isolates station electrical supply from surrounding area. Can be used to electrically disconnect all station supply	6.6.20 Stations, usually off platform near electrical point of supply

Category	Item	Description	Location
6.6.21 Earthing and Bonding	6.6.22 Earth Bonds	6.6.23 Conductive furniture on platforms need to be bonded to ensure they are earthed appropriately, with either 50mm2 or 25mm2 bonds depending on location and risk.	6.6.24 Station and environs
6.6.25 Earthing and Bonding	6.6.26 Guard Conductors	6.6.27 Conductor on surface connected to traction earth and intended to conduct a fault away from underlying structures.	6.6.28 Station and environs
6.6.29 Earthing and Bonding	6.6.30 Isolation Sections	6.6.31 Non-conductive isolations intended to isolate the station from surrounding structures. Usually wooden fence sections.	6.6.32 Station and environs
6.6.33 Earthing and Bonding	6.6.34 Isolation Air Gaps	6.6.35 50mm gaps either side of a 2.5m section of fence to isolate the station from surrounding structures.	6.6.36 Station and environs

Proximity of structures to OLE

Consideration of proximity to Overhead Line Equipment (OLE) should be made during the design phase of any upgrade. Should the placement of lights, CCTV etc. require encroachment on the Minimum Approach Distance (MAD) for maintenance work, then an electrical isolation may be required at the station before work can commence. The MAD are:

- Personnel with hand tools: 2m

- Vehicles/Plant: 4m
- Scaffolding: 8m

If maintenance can be comfortably managed without encroaching within these distances a KiwiRail Electrical Permit to Work will not normally be necessary.

Maintainability

Fittings and structures should be designed to be maintainable at minimum cost and disruption to the rail network. Access for maintenance providers and their plant needs to be factored in such that they can get equipment to site without necessarily crossing tracks or requiring the OLE power to be cut off. Designer should note that certain tools and equipment are banned from the OHEPZ (Over Head Electrical Power Zone). These include ladders with metal stiles, metal tape measures etc. Certain work practices will require closer scrutiny to determine whether safety might be compromised. The use of water blasters and hoses is restricted.

Climbability

Station furniture and structures must be placed in such a way that it does not provide an aid for unauthorised public access to the OLE.

The most common risk area is station furniture placed in close proximity to shelters and canopies that might provide a step aid to climbing onto the shelter/canopy roof, as in many cases an individual standing on a shelter or canopy roof close to the platform edge will be within the MAD of 2m.

The following serves as a guide to furniture placement such as fencing, timetable signage, and HOP equipment. Where this is not possible, a site-specific risk assessment will be required. Climbability risks should be reduced to as low as reasonably practical.

Table 89: Furniture Placement Guide

Location	Distance
Item outside of canopy coverage	1.8m minimum from top of item to roof edge
Item within canopy coverage	1.2m minimum from top of item to roof edge or at least 0.5m in from roof edge.

1.8m minimum from top of item to roof edge

1.2m minimum from top of item to roof edge or at least 0.5m in from roof edge.

Placing items beneath rungs designed to aid roof access or running directly under the roof edge should be avoided

Earthing and Bonding

All metal/conductive material is to be appropriately earthed and bonded for electrification. KiwiRail must review and approve the design for all earthing and bonding. Earthing must comply with the Electrical Regulations, EN 50122-1 “Railway Applications – Fixed Installations, Part 1: Protective Provisions Relating to Electrical Safety and Earthing”, AS/NZS3000 “Wiring Rules” and ECP35. Bonding must comply with AS/NZS3000.

Each station’s earthing as-built(s) will need to be referred to for all station electrical works and any works involving installing or relocating station furniture, since in many cases bonds will need to be disconnected and new ducts run to the new location. This will potentially have a significant effect on minor works such as relocating a station seat. When considering the location of the new/relocated station furniture bear in mind that:

- Any exposed conductive item within the 'fall zone' of the overhead wire will need to be bonded to the traction earth Primary Earth Terminal (PET) cabinet with a 50mm^2 earth cable.
- Any other conductive item in the station precinct will need to be bonded against equipotential ('touch') voltages with a 25mm^2 earth cable connecting to the station Montrose Box earth unless the item is isolated by more than 2.5m distance from any other conductive structure. In the latter case, no earth bond is required.
- There are occasional exceptions for devices that cannot accommodate the larger cables, such as FPDs[provide full name with abbreviation in brackets when using a particular abbreviation for the first time]. These exceptions need to be specifically agreed to by KiwiRail.
- If an item is to be mounted to an already-earthed station item, e.g. mounted on a light mast, no additional earthing is required provided that there is a conductive (e.g. metal to metal) connection between the earthed item and the mounted item of at least 50mm2 surface area. This contact area needs to be free of insulating material such as paint in order to be acceptable.

No earth cables should share ducts with other power or data cables due to the risk of a fault current damaging the power or data cables. In many cases, this will mean making allowances for additional earthing-specific station ducts.

All new bonds will become a KiwiRail asset and they will need to confirm that the work has been completed to the appropriate standard, likely via an updated asbuilt, electrical Certificate of Compliance and possible site visit.

Procedure for Undertaking Works following Rail Electrification

Before undertaking works that involve moving station furniture or removing earth bonds, the works must be approved by KiwiRail.

1. Where the works are significant, e.g. a station upgrade, the design should be reviewed by a KiwiRail approved designer to ensure electrical safety is maintained. Where the works are minor, e.g. relocation of a single bonded station sign or an unbonded sign to a location that may require bonding, the proposal should be referred to KiwiRail for comment and approval.
2. Station electrical work should be undertaken by a KiwiRail-approved contractor, a continuity test conducted and certified by a Certificate of Compliance.
3. 2.5m clearances to any exposed metalwork at other ground potentials must be maintained (i.e. if the alteration is to Station earth connected equipment, it must not be re-located to <2.5m from equipment connected to the MEN or general mass of earth.
4. Upon completion, electrical and earthing asbuilts should be updated and supplied to KiwiRail, along with the Certificate of Compliance.

Due to the electrical safety risks, these steps must be followed. KiwiRail will conduct periodic inspections of stations to assure electrical safety compliance, but any identified broken bonds or other electrically-unsafe items should be reported to KiwiRail immediately.

Low Voltage Distribution (for Major Stations)

The main distribution board is to be located in a dedicated room close to the transformer room on the same platform. Sub distribution boards will be located in services cupboards, as required, shortening cable runs. Mechanical Services Switchboards should be located in the LV switchroom. Dedicated UPSs for small power services (i.e. ticketing terminals) will be housed in the same switchroom. A bolted connection for the mobile generator should be provided to the station to provide emergency power to the main switchboard. A manual changeover switch should be provided in the main switchboard for manual changeover between the generator or mains supply. See earlier notes for more information on this.

Low Voltage Distribution (for Minor Stations)

The main distribution board should be located within a securely locked Montrose cabinet located within CCTV coverage.

Extra Low Voltage Distribution (for Major Stations)

Dedicated rooms will be provided for security, fire, ticketing, data, PABX, PA, passenger information systems, signalling and other services. UPSs that will provide a minimum of one hour battery autonomy to essential services will be co-located in these rooms.

Essential Services (for Major Stations)

The UPS's will provide continuity of supply to essential services during power interruptions. With battery autonomy of at least 2 hours, this is considered to be sufficient to allow the return of normal mains supply or for the provision of a mobile generator connection within one hour by approval from AT.

Essential services are considered to include life safety such as emergency egress lighting, CCTV and communications as well as business continuity services such as passenger information displays, and ticketing.

Emergency Lighting UPS (for Major Stations)

The design must comply with AS/NZS 2293 "Emergency Evacuation Lighting for Buildings" for centralised systems, the Emergency Lighting UPSs are located in dedicated fire rated rooms along with their own distribution boards and fire rated cables. UPS should provide ideally 2 hours lighting but minimum 1 hour (by approval from AT operations team).

Mechanical Ventilation UPS (for Major Stations)

Where required a suitably sized UPS should be installed for support of mechanical ventilation during power outages.

Services Reticulation

Services are to be coordinated in central combined trenches where possible with clearly marked access points in practical locations. Future proofing and access to services will be key criteria in the design and installation of services at rail stations. Note that HV must be separated from LV. KiwiRail to be coordinated with to determine what they require for Control signals.

21.3.3.3 Lighting

Lighting is an important component of station and precinct design. Adequate lighting of railway stations and access is essential to creating an environment which is safe and comfortable to use. Adequate lighting is also essential for effective CCTV operation.

Standards used in this Design Guide are based on international best practice for rail stations. Lighting design is a specialised field and specialist advice should be sought as part of any design process.

In principle, lighting needs to take account of the following factors:

- Lighting levels need to be uniform and any changes in lighting levels should be gradual to aid visually impaired.
- Consideration should be taken when transitioning to generally reduced lighting levels of the surrounding environment
- Glare from artificial and natural sources needs to be minimised
- The effect of surface materials and colours on lighting levels
- Prevention of and resistance to vandalism when locating and choosing light fittings
- Maintenance requirements and procedures, with safety given a priority
- Station lighting should not have lights shining directly into train drivers' eyes
- Station lighting should not conflict with signal lighting or the warning lights of other adjacent transport modes. "White light", which allows shapes, sizes, and colours to retain their natural appearance, is required.
- The use of green and red lights is not acceptable within the station precinct
- In residential areas care should be taken to minimise overspill onto residential properties
- Stations should be well lit after dark until the end of daily operations, from then lighting levels should be of a level that ensures the effectiveness of CCTV cameras
- Automatic control of lights should be explored with a central command from Britomart such as CBUS and integrating this with existing systems at Britomart.
- Lighting should not prevent clear visibility of PIDs and safe CCTV camera use (24 hours)
- An outdoor rated LED Lamp is supported on the mast by spars and restrained by tensions stays 6300mm above ground level
- Light poles are to have a post mounted luminaire
- All light fittings to have protective grilles to prevent vandalism.

- Platform lights to masts and poles are to be as per Appendix 21A - General Finishes Schedule of this guide

Lighting should be subject to a review at each location to establish any site specific requirements.

URS completed a review of station lighting levels in February 2013 and Figure 139 below sets out their recommendations on lighting level requirements:

Application (Location of Station or number or passengers)	Maintained illuminance (average over the task area[2])	Unified glare rating limit	Minimum uniformity	CIE Colour Rendering Index	Illuminance diversity E_{min}/E_{max}
	E_{task} lux	UGR	U_o	R_a	U_d
Tracks in Station areas (minimum) Avoid glare for drivers	10	45	0.25	20	>1/8
Platform edge	20	45	0.5	20 or 40	>1/5
	A minimum illuminance of 6 lux measured vertically at a point 1.0m above the platform surface and perpendicular to the platform edge, along the extent of the platform length to which the driver views.				
Open Platform Stations					
Suburban / medium	30	45	0.40	20	>1/5
Urban[1] / large	50	45	0.40	20	>1/5
Covered Platforms					
Suburban / medium and regional	50	45	0.40	40	>1/5
Urban[1] / large and regional centres	100	45	0.50	40	>1/5
Other areas					
Platform approaches: (external) bridges, paths and ramps	As platform lighting levels for primary approaches, Secondary access paths may have reduced lighting levels down to AS/NZS 1158 lighting requirements, without sudden transitions.				
Platform entrances: includes ramps, stairs and passenger walkways	E of 150 lux at without sudden transitions.				
Under covered shelters in open platforms	E of 150 lux at 1.5 m above finished platform level in the shelter. E of 100 lux at finished platform level, No sudden transitions.				
At ticket machines and timetables	A total E of 150 lux at 1.5 m above finished platform level, as a combination of external and self-illumination.				

- [1]Also applies to passenger stations in areas/buildings of prestige, historic nature, high crime risk or special events, such as sports, commercial or retail complexes.
- [2] Task areas are as stated below:

	Surrounding area (Etask)	Background area (50% Etask)
Platform		
Width	from yellow line/tactile to edge, including yellow tactile	from edge to far side of track
Length	yellow tactile	from yellow tactile to end of platform or physical barrier
Platform edge		
Width	From edge to first track	Width of tracks to far side of track
length	within 3.5 to 3.0m outside of platform ends	from Surrounding area to platform ends

Figure 139: Lighting Levels

21.3.3.4 Communications

21.3.3.4.1 Public Address System (PAS)

A public address system should be designed in order to broadcast/announce messages to passengers. In addition the public address system is to be used as an additional security feature to control specific incidents by talking to would-be offenders. Speakers should be installed as high as possible, but at a minimum height of 4m. to protect these from vandalism and theft.

Functional Requirements

The functional requirements for the public address system include:

- Capable of being audible at any part of the station platforms;
- Uniform distribution of sound;
- Capable of transmitting background music as well as commercial and public advertising;
- Capable of local paging with a secure wireless microphone interlinked to a preamplifier at the station PA rack (Consult with AT to evaluate suitability);
- Speakers remotely controlled from the Britomart Surveillance Control Room to all platforms
- Sensors that can adjust the volume to meet the background noise effects

Equipment

All the local controller equipment is to be housed in one location at the Security Equipment Room generally located at the platform end.

Protection against damage and theft are prime considerations when choosing a loudspeaker, as well as corrosion, UV protection and weather protection.

Cylindrical Acoustic Radiators model (CAR6060) or similar are to be considered. These speakers have been used in the Akoranga Busway Station and Newmarket Station. The speakers consist of a linear loudspeaker with a sectoral radiation pattern of 120° along the

entire length of the speaker. The construction is entirely stainless steel and incorporates a built in conduit compartment, with IP53 environmental protection.

On the platforms a nominal spacing of around 7 metres is recommended between linear speakers.

Pole mounted speakers should be angled down to assist in minimising undesirable sound spillage in the neighbouring community.

Hearing Assistance System

The hearing assistance system will aid passengers with a hearing impairment. The loop or loops range in size from 10m² to 250m² (the size of a platform).

21.3.3.4.2 Passenger Information Display (PID)

Allowance is to be made to ensure that structures and buildings are constructed with suitable ducting (50mm) minimum to allow for PID system to be widely used in the future. Therefore appropriate locations and space should be identified during the design phase to accommodate implementation as discussed below. Data and power cables are to run in separate ducts to minimise electrical interference between both services. PIDs should be installed to provide a minimum clearance of 2.4m between the underside of the PID and pavement. PIDS displays can generally be viewed up to a distance of 30m. As a minimum, a 155m long platform will have 2 PIDs installed for each platform face (if continuous shelter or more than one canopy), with provision for a third PID in future if required. If there is only one canopy, then only 1 x PID per platform face is required.

The PIDs must be double sided (display on both sides) and the number of PID and their locations to be agreed with the AT PT operations team.

PA announcements to passengers should be reflected on the PID signs and allowed for in the design.

21.3.3.5 Hydraulic Services

21.3.3.5.1 Water Supply

At stations where staff facilities are provided or where the supply of water is required as part of the train operations, or other needs as agreed with AT, the following standards will apply.

Water supplies must be designed and installed to meet the requirements of the New Zealand Building Code Section G12 Water supplies 2004 (NZBC-G12) and any subsequent amendments, and with AT's requirements.

Where required, AS/NZS 3500.1 Plumbing and Drainage Part 1: Water Services must be used as an acceptable solution to NZBC-G12.

The requirements for local and site backflow prevention must be assessed with regards to the requirements of NZBC-G12 and any additional AT requirements.

A meter must be installed in accordance with AT's requirements.

21.3.3.5.2 Water Connection

A pressure reducing valve set will control site reticulation to 300 - 350 kPa(g). A minimum of 200 kPa(g) and a maximum of 300 kPa(g) will be available at fixtures.

A quality water strainer must be provided.

21.3.3.5.3 Domestic Hot Water Supply

Electric type mains pressure valve vented hot water cylinders shall be provided at each point of hot water demand.

Storage temperatures must be maintained above 60°C to prevent growth of Legionella bacterium. Supplies to sanitary fixtures used by disabled persons must be tempered to 45°C. Supplies to other sanitary fixtures must be tempered to 55°C. Supplies to cleaners sinks must be un-tempered.

21.3.3.5.4 Sanitary Drainage

Sanitary drainage must be designed to meet the requirements of the New Zealand Building Code Section G13 Foul Water 2001 (NZBC-G13) and any subsequent amendments, and with AT's requirements.

Where required AS/NZS 3500.2 Plumbing and Drainage Part 2: Sanitary Plumbing and Drainage must be used as an acceptable solution to NZBC-G13.

21.3.3.5.5 Drainage Connection

Station sanitary drainage must be connected to below ground sanitary drainage that is connects to existing connections.

Generally, drains shall be uPVC construction.

21.3.3.5.6 Facilities Provided

- Fixture drainage as required.
- One floor waste gully per wet area to facilitate floor cleaning.
- One "pop-top" secure overflow relief gully outside each wet area.
- Inspection openings / rodding points where drains are above ground.
- Secure inspection openings or secure manholes at each site drain bend.

21.3.3.5.7 Fire Protection Services

The provision of fire protection services is to be considered on an individual station basis, depending on the physical size and patronage levels. AC must be consulted on the requirements for fire protection on a local basis. [To be confirmed that this is still to operate through AC.]

If it is determined that a Fire Safety Strategy is required, then a specialist Fire Engineer needs to be consulted. In most cases AC requires a Peer Review to be performed on the Fire Strategy before being submitted for approval. Consideration must also be given to the capacity of the Britomart Control Centre and operational procedures. [To be confirmed that this is still to operate through AC.]

PT Operations is to specify who is to undertake fire alarm monitoring.

Where there are hydrants it is likely that an in ground hydrant is no longer acceptable and hydrants need to be supplied with uprights above the ground. In this instance outlets off the uprights will likely need to be provided at 45° to the upright.

This should be confirmed with the fire engineer to ensure current regulations are met, including NZ Building Standards. Where up-stand hydrants are used outlets should face down a platform to ensure that these do not jut out into the walking path.

21.3.4 Security

Stations are, by their nature, separated from the urban fabric surrounding them, and have intermittent activity patterns ranging from no activity during shutdown hours to very intense activity during peak hour times. The design of the station environment, must address the user's sense of security and personal safety. This is particularly important at stations that are more isolated. Stations are inherently planned and designed as transitory spaces, with a tendency to back on to surrounding areas rather than address them. The disadvantage of this approach is that this creates "out of the way" areas conducive to anti-social behaviour.

Passive/natural surveillance is an effect created by having areas where there is regular activity fronting onto or overlooking areas of little or infrequent activity. Planning and design of the station precincts, where possible, should take this approach.

General Principles

- Clearly visible approaches to the platform are needed, to enable passengers to see others and assess the location. Opportunities should be created for people to make decisions, and take avoidance action if thought necessary.
- Eliminate all possible entrapment or concealment spots, along access routes to the platforms, at the waiting areas and platforms themselves. This can be done by physically blocking off areas e.g. fencing or walls under stairs or around columns. Provide CCTV coverage where this is not achievable.
- Maximise visibility at the entrance and exit to the stairs, lifts and pedestrian overpasses and underpasses, by ensuring frames, pillars, walls etc. do not obstruct sight lines.
- Any buildings or structures within the station, such as a kiosk, should be designed and located so as not to block sightlines or cause physical obstructions.
- Any signage on the platform over 50cm^2 should be mounted in line with the station to ensure it does not obscure CCTV camera views, including Adshel Advertising boards, Information Boards, platform/shelter station signage.
- No temporary signage such as posters and pamphlets should be attached to glass shelter walls at any time (legitimate posters should be located inside the Information Boards).
- Entrances and exits should be clearly visible, at prominent positions, and designed to allow users to see ahead before passing through.

- Designated waiting areas on platforms may be helpful, to concentrate activity, and maximise efficient coverage by CCTV. Information about train services and timetables should be clearly visible and readable.
- Help points must be provided and located in visually prominent and accessible positions. Particular consideration should be given to the access route passengers will take after dark. Signs indicating the locations of the help points should be clearly displayed. Clearly visible and signed CCTV should be provided at the safety points, as part of the overall video monitoring system for the station.
- The station should be securely fenced with visually permeable fencing where passive or natural surveillance from adjacent activities is possible. Secure fencing will control access, and bring people into the station along the pedestrian access routes, concentrating activity. The access routes should be wide, with no entrapment spots, well lit, and landscaped with ground cover
- Drop-off/pick-up spots should be close to and clearly visible from the entrance to the station, with good lighting, and appropriate canopy covering and landscaping.

PT Operations must be included in the early stages of design for security.

21.3.4.1 CCTV

All stations are to be provided with Closed Circuit Television Surveillance (CCTV). CCTV locations will be station specific and as per the Security Consultants and Surveillance Staff recommendations for individual stations.

There is a network of CCTV cameras including Pan Tilt Zoom (PTZ) and Fixed cameras providing general and specific observation as required. There is general coverage of the platforms and lift car. A minimum of one fixed dome camera should be provided inside the lift car and outside. Early engagement must be made with the AT PT Operations Station Management team to determine the locations and type (Fixed/PTZ) required at each station.

A minimum of one fixed dome camera should be provided per shelter bay in a position to ensure sight lines are not obstructed by shelter screens.

All cameras are to have low light performance designed to provide good pictures at all times including at night under artificial illumination. When light levels fall even lower, the cameras will auto transition from colour to black & white for improved night viewing. Cameras are typically high impact vandal resistant small dome type and PTZ cameras allow auto-positioning to preset positions related to Help Point activation as desired and automatic auto-pan over designated coverage areas.

Manual control override of auto positioning on PTZ cameras is available from the Britomart Surveillance Control Room

There are to be local Digital Video Recorders (DVR) and network interface devices at the stations, with remote access from the Britomart Surveillance Control Room.

Viewing and playback is available within the Britomart Control Room for all cameras. All camera images are recorded on a DVR which record constantly), and at agreed frame rates – typically three images per second on normal cameras and five images per second cameras covering Help Points Images will be stored for approximately 10 - 14 days (dependent upon number of cameras attached to the and stored images will be overwritten on a first recorded first overwritten basis.

In the event that images are required for archiving, these may be recovered at Britomart by uploading or by recording to DVD locally. Should longer storage be required, this is achievable by larger hard drive capacity.

On stairs the CCTV cameras are to be placed on the masts or light poles. The cameras are to be mounted at a minimum of 6m above walking level except when there is a restriction due to being located under canopies.

To help prevent vandalism and theft of the cameras, nothing should be attached to the same pole used to mount a camera that might be used as a hand hold / foot hold such as signs, seats, fences or rubbish bins. Where lights share same pole these should be fitted above the camera. In this instance poles should be a minimum of 6m in height.

Vending & Reload Devices (VRD) must have a dedicated fixed camera provided for continuous surveillance.

CCTV cameras (PTZ) must be provided at the top of each stairwell, which will enable a good range of surveillance for those coming up the stairs and to track direction of departure.

21.3.4.2 Access Control (for Major Stations)

Doors designated for controlled access are to be fitted with proximity access control card readers which will allow access only to those persons with access cards that are programmed into the system to allow that card at that time on that day through the door.

Automatic doors are to be controllable and fitted with access control.

Britomart Surveillance Control Room should have the ability to over-ride the local system to lock/unlock any controlled door if required. There will be monitoring of all controlled and some designated doors together with status of the battery back-up / UPS.

Options for after-hours access to doors by authorised personnel (i.e. security patrol or cleaners) is as follows:

(a) Proximity access card.
(b) Request to Britomart Control by mobile phone with verification by local cameras.
(c) In an emergency, contact with Britomart via a Help Point and remote release.

21.3.4.3 Information Zone

For convenient and easy use by rail users this should be in a location protected from wind and rain. Information display cases should be provided at each station for a system map,

timetable, station safety information, ticketing information and appropriate information relevant to the particular locality, e.g. local map, bus timetables, network announcements, events and interchange information. The display cases should be mounted under cover where possible, illuminated and regularly maintained to ensure that they are not vandalised, although care should be taken to ensure that they do not provide a climbing aid onto shelter or canopy roofs to gain access to the overhead electrification equipment. The information in the cases will be supplied and maintained by AT, in conjunction with the operator and TAs.

The number of information boards per platform is to be a minimum of 8 x A0 spaces per island platform, and 6 x A0 spaces per side platform. This needs to be complemented by the additional of two A0 spaces on station entrances if the station entrance is a distance from the platform area.

21.3.4.4 Emergency Help Points

Help Points are to be strategically located at various positions within the station including within lifts and walkways to enable any person in duress or under threat to go to a Help Point and contact the Britomart Surveillance Control Room. The system must be compatible with the Britomart System.

The Help Points are to be vandal resistant emergency help points with push to call intercom units, linked to the Britomart Surveillance Control Room (via audio two way contact). Units are to be painted rather than using protective film.

On activation of a help point a pre-programmed PTZ camera must automatically zooms onto that point. Certain Help Points have designated individual camera coverage to provide a continuous surveillance area for the Blue Light Zone around that Safety Help Point.

Help Point intercom units are die cast, vandal, vibration and vermin resistant, complete with water sealed housing.

In major stations a duress / hold-up alarm button is located in the ticket office which is enunciated at Britomart as a hold-up so they can view the live CCTV images and alert Police.

Locations of help points must be identified in consultation with PT Operations.

21.3.5 Wayfinding, Signage and Information

21.3.5.1 Wayfinding Principles

Refer to Appendix 20B and to *ATCOP Chapter 6 Street Amenities* for important information on Wayfinding.

Wayfinding signage and information provision are among the most important aspects of a rail station. The ability for people to easily find the station and plan a trip as well as exit the station in the direction of their desired destination is fundamental to the function of a rail station. Signage is also critical in terms of consistency across all passenger transport modes. One of the key goals of the region is to develop an integrated passenger transport system in

which people can access buses, ferries and trains easily. Clear, logical circulation areas and pedestrian routes should be designed so far as practical.

Underpinning Wayfinding is the ability to successfully communicate the message to the user. To do this, first identify who 'the user' is. This requires looking beyond the obvious visitor and also taking account of the international audience, the elderly, the children and the disabled. There might be users arriving at night or other environmental conditions that might affect the successful communication of information. Users approaching from a busy main road might require larger elevated information that allows enough time to make an informed decision. Maintaining clear sightlines and avoiding visual clutter is important.

Provision of way finding must be developed with the AT Passenger Operations team and where located within the road corridor this must be done in consultation with the AT Road Network team to agree positions and design as appropriate.

21.3.5.2 Tactiles

The use of tactiles is the primary means of Wayfinding for visually impaired people, and should be designed in such a way as to allow safe, direct access through the rail network. Refer to *ATCOP Section 12.9 Tactile Ground Surface Indicators (TGSIs)* and visual aids, which should be used as the first source for AT's approach and standards related to tactiles.

Additionally, the following publications also contain best practise standards that have been established by AT and KIWIRAIL

- NZTA - RTS 14: Guidelines for facilities for blind and vision- impaired pedestrians
- Joint Australian /NZ Standard AS/NZS 1428.4 Design for access and mobility
- NZTA - Pedestrian Planning and Design Guide
- AT Universal Access Design Guidelines

Designs should also be undertaken in a manner to avoid the adverse placement of service covers - as failing to do so usually results in tactile paving being cut and thereby reducing its effectiveness and increasing maintenance issues. Therefore new cover positions should be designed to fall outside of areas where there is tactile paving. If required, consideration needs to be given to have existing covers relocated.

Please refer to Appendix 21A - General Finishes Schedule for the details of AT's Tactiles.

21.3.5.3 Branding

The MAXX brand has been superseded by the AT brand, which is currently being developed by AT.

As partners we must consistently deliver on the core brand values:

- Customers first
- Safe
- Efficient (saves time)
- Reliable

- Frequent
- Convenient and more relaxing than your car
- Affordable
- All for one
- One look, one voice and one service standard
- The whole journey

21.3.5.4 Theming

The application of theming seeks to unify the infrastructure and services of the Regional Public Transport Network.

Theming seeks to address unification and network identity through the design and planning of the Rapid Transit Network Stations and their components.

The guiding principles for theming include:

- A consistent visual identity to stations on the Regional Transport Network
- Expression of local character within an identifiable regional system
- Community safety focus with maximised user visibility
- Cost-effective, robust and easily maintained materials
- Key architectural elements articulated as a themed 'kit of parts', including signage, rubbish bins, seats
- Stations may be given a community identity, that express the essence of place in the Auckland Region

The extent of application of the kit of parts remains flexible, as a prescriptive approach is not appropriate. Local community consultation is required for each project to determine whether and to what extent local character is required. The design must be functional and in keeping with the image and requirements of a rail station. AT does not necessarily oppose the use of dissimilar designs at different stations provided the design meets the functional and performance criteria set out in this Design Guide and all stakeholders support the design.

Where possible particularly for smaller stations designers should refer to the AT Common Elements Specifications and Drawings.

21.3.6 Real Time Information System for Rail

Real time tracking of trains linked to passenger information displays (PIDs) is implemented at stations. The design of new or upgraded stations should allow for structural supports and may require ducting for PID installation. The precise design of communications to these PIDs must be determined in conjunction with IT.

The Real Time Passenger Information Display system is linked to a train tracking system that will identify the location of any train on the network geospatially, the direction the train is travelling, its unique service descriptor (identifying the service it is operating) and will monitor the progress of the train as its moves along the network. This information is used to update the display signs at the stations further along the route with the estimated minutes before the

service will arrive at the station. Displays will show "Next Train", destination, the scheduled arrival time and the minutes before it is expected. Similar information will be displayed for the next (xx) trains departures from the same location. Any special messages, such as delays or information about replacement buses, will also be communicated through the system.

To ensure a consistent and common message format, it is intended that in the future the system will also be linked to displays and public address systems on board trains. All systems are and will be capable of manual override as required.

21.3.7 Ticketing and Staffing

21.3.7.1 Ticketing

Station design should be tailored to enable and maximise ticketing facilities as much as practicable. This will depend on the specific considerations of the site, number of access routes, and associated safety issues. Where ever possible access routes should be restricted in number and designed in such a way as to enable patrons to be channelled into designated ticketing areas. An allowance should be made for possible lock down of the station during periods of non-operation. It is envisioned that AT will implement an integrated ticketing system in the next few years. The design of new or upgraded stations should allow for structural supports and ducting for future installation.

21.3.7.2 Integrated Ticketing

Integrated ticketing allows a customer to travel with a single smartcard in order to pay fares. Customers load their smartcard with products which will allow them to travel on any public transport service in the Auckland Region regardless of mode or operator.

Smartcards can be purchased at selected retail locations, or ordered over the phone and the internet. The cards can also be topped-up via these channels, as well as vending and reload devices (VRD) located at all railway stations, or on-board buses using bus driver consoles (BDC).

In order to pay fares, a customer will either present their smartcard to a fare payment device (FPD) located on-board buses, rail stations, and ferry wharves; or an electronic gate (EG) at major rail stations in order to "tag on", at which point a default fare will be deducted from the card. At the conclusion of the leg performed, the passenger will again present the card to an FPD or EG, to "tag off" at which point the system will calculate the difference between the actual fare for the travel since the last "tag on" and the default fare already deducted and either credit or deduct value from the card for the actual travel.

FPDs will be located at the entry/exit points of rail stations, at the front/rear doors of buses and at the entry/exit points at ferry wharves. EGs will be located at Britomart and Newmarket rail stations, and will be installed at other locations at a later date. There will be revenue management officers throughout the network to randomly check that all passengers have tagged on, or are in possession of a valid ticket prior to performing their travel.

21.3.7.3 Staffing

Generally stations will not be staffed, however a staff presence will be provided at major interchanges (e.g. Britomart, Newmarket and other stations to be upgraded as required with consideration to the level of amenities) and at other operationally strategic locations (e.g. Papakura). Other stations, particularly at terminals of the core network, may serve as 'bookon/bookoff' locations in which case limited facilities may be required for these purposes. The scope of any staff facilities is to be assessed on a case by case basis through discussion with the rail operators and AT and the need to provide such facilities does not alter the standards set out in other sections of this document. The need for the provision of customer information and Asset Management will also need to be considered in assessing the station staffing needs.

21.3.8 Landscaping and Public Artworks

The design intent of station landscaping requires that all areas of the precinct are treated with quality soft and hard landscaping elements that creates a low maintenance and cost effective, landscape treatment while:

- adding amenity to the station precinct;
- enhancing pedestrian use of and passage through the precinct;
- avoiding creating security concerns;
- enhancing the approach to the precinct and the station building from the surrounding area;
- Provide screening to private property where required;
- clearly defining complimentary paths for people, cycles, personal small wheel vehicles, and vehicles;
- avoiding obscuring CCTV systems;
- avoiding encroachments into the electrical exclusion zone, bearing in mind size and form of plants when full grown;
- where appropriate creating a site specific theme to reflect the surrounding area;
- including a high quality, low maintenance, hardy plant selection or lawn.

Crime Prevention Through Environmental Design Principles (CPTED) should be considered in the landscaping of station precincts, as inappropriate planting can create security problems. Heights of planting are important within the precinct, particularly the parking areas. In general, low ground cover should be used to allow clear lines of vision. Height of planting and their future growth should be considered to avoid obstructing lighting and/or CCTV cameras and they can be maintained without impacting on rail service operation or passenger movements.

21.3.8.1 Planting

In general, landscaping should improve the amenity of a station without comprising the safe and easy use of a station by users. Clear lines of sight, clearance to overhead electrification equipment and access across the station are required to ensure this. Native species

requiring little or no maintenance for ease of long term care should be selected. Therefore, landscaping design will need to have the following qualities:

- Gardens located away from paths to prevent litter collection in the beds and water collection on the paths
- Species should be low level native plants with a mature height no higher than 1m
- Canopy trees will not be considered as they interrupt lines of sight and may conflict with the future electrification of lines
- Platforms are to be kept free of planting

Landscaping to the following areas should be minimal and provide low maintenance ground cover only:

- Rail corridor
- Transition land between station elements
- Carpark berms
- Land with a non-specific use adjacent to paths
- Any other areas on a station by station basis

21.3.8.2 Fencing

It is important that rail stations are designed to ensure that users only utilise formal access ways provided, for example, at-grade crossings and pedestrian bridges. Stations should be designed so that as far as possible, these accesses are located in a manner that encourages use. It is still necessary however to completely fence the station environment to ensure that users have no option other than to use the formal crossing points provided for both safety and revenue protection.

Fencing, or barriers, are also required at platform ends to ensure that people do not walk off the ends of platforms and at the perimeter of car parking facilities. Fencing types and heights are specified in this Design Guide.

All stations require fencing within the station precinct. The extent of fencing outside the station precinct will be decided by AT on a station by station basis with KIWIRAIL and other stakeholders. Fencing will be as specified for the stations where a security fence with 'safeguard' panel has been selected. Fences are to be constructed from galvanised mild steel. For additional security 'sharks teeth' may be added. Refer General Finishes Schedule for fence heights.

Fencing is to be approved by KiwiRail around locations where there is earthing and bonding to ensure provision for electrical isolation from the surrounding areas (e.g. replacement of a metal fence panel with non-conductive wood, GRP or vinyl, or minimum 'air gap' separation of 50mm either side of a 2.5m fence section).

Table 90 Fence Heights

Fence Heights	Height (m)
Rail Corridor Boundary	1.8
Carpark	1.2
End of Platform and Platform Balustrade	1.2
Level Crossing	1.2
Gated stations will see an increased range in height for fencing	1.2 to 1.8

21.3.9 Maintenance

21.3.9.1 Life cycle costs

In the implementation of this Design Guide, thought must be given to the overall 'Life Cycle Costs' of the proposed design. As the existing stations are upgraded or new stations added, the costs of operating and maintaining must be given due consideration in both the design and selection of materials and finishes.

21.3.9.2 Maintenance and Maintainability

Consideration should be made in the design of stations regarding issues of maintenance and ongoing maintainability. Station elements should be suitably designed and of durable materials appropriate to the nature of the environment to minimise maintenance costs. Consideration should also be made in terms of accessibility and services required for ongoing maintenance of the rail network, with storage facilities provided as required. The design should also look to avoiding dust and dirt trap areas.

Consideration must be given to access to maintain station platforms, facilities and rail operational equipment such as signalling equipment, cabling, overhead line equipment (OLE) etc. Minimum access requirements are as follows:

- Vehicles must be able to get to at least the edge of the rail corridor with suitable access to the point of service to suit the planned maintenance activity;
- Equipment such as vacuum cleaners and water blasters must be able to access platforms. Equipment sizes will vary on a station by station basis. Determine required width for access during pre-design phase.
    - Consideration must be given to the need for emergency vehicles to be able to access the station area.

Access considerations need to take into account some stations are located below ground level.

"Maintainability in design" shall be required to be demonstrated at each stage of the design development process in a 'Maintainability Report' which seeks to demonstrate that the planned design, will simplify and ease the maintenance process and shall be reviewed with and agreed with the primary stakeholder.

Sites that require a BWOF also require somewhere for its A4 certificate to be viewed by the public, while minimising the access by vandals. Stations will ideally have store facilities for the station's compliance manual, which is required to be signed daily to record regulatory daily checks.

21.3.10 Station Finishes

21.3.10.1 Finishes

The material, fixtures and General Finishes Schedule is compiled to provide technical guidelines for all new station works to ensure the consistent use of materials and finishes at all stations. Finishes are in accordance with Appendix 21A - General Finishes Schedule .

The intent is to develop the rail stations in consistent finishes that are safe as well as economical and durable to install and maintain. The finishes proposed will also serve to reflect the AT brand [to be clarified further when new AT branding details are fully available].

The finishes and materials noted in this document are a guide to achieve the best possible results for the rail stations environment in terms of identity, functionality, and customer satisfaction. Final selections must incorporate common sense solutions to specific circumstances and requirements that will enhance the station image while at the same time fulfilling the following basic requirements:

- Ease of repair and replacement
- Durability
- Safety and security

21.3.10.2 Objectives

The finishes to the stations are also to incorporate features that deter vandalism, are slip-resistant and assist with safety and orientation.

Finishes are to provide a bright, welcoming, secure and clean environment for users and are to meet the requirements of the NZ Building Code and all relevant NZ or Australian Standards (where there is no NZ standard).

This schedule provides direction only for the implementation of the most appropriate finish for a particular building element. The onus lies with the designer, Architect, document provider, building or maintenance personnel to select a finish that is most appropriate and that meets all relevant codes and standards. All finishes are to be signed off by the AT Project Manager in consultation with relevant stakeholders.

Specification and Preparation

Due to the specific and individual character of each building, the designer, architect, document provider, builder or maintenance person is responsible for liaising with the finish product manufacturer to ensure that the product is adequately specified in the works contract document and drawings, as well as correctly applied/installed on site. They are also to ensure that suitable preparation of surfaces has been specified and undertaken in

accordance with the finish product manufacturer's recommendations. All materials and workmanship shall comply with recognised NZ and international standards.

Vandalism

While all recommended finishes in this document are deemed to be suitable for high volume traffic and have been nominated based on the criteria set out above, for stations with high exposure to vandalism, all available alternative finishes shall be reviewed and discussed with the Project Manager and other stakeholders.

Graffiti guard must be applied to surfaces at risk of graffiti to a height of 2.4m.

Appendix 21A - General Finishes Schedule

These are minimum standards required for the common elements, for suburban rail station structures, and form the basis for the designed look and feel of all other railway stations developments.

This Schedule is to be read in conjunction with the Common Elements Drawings and Specifications.

Element		Material	Finish	Notes
1.0 SITE GENERALLY				
Paving	Road works	Asphalt	40mm thick	Black
	Bus lanes/bays	Asphalt, concrete to turning areas	40mm thick	Black
	Taxi rank	Asphalt	40mm thick	Black
	Kiss 'n' Ride & Long Term Parking	Asphalt	40mm thick	Black
	Pedestrian	Insitu concrete	U5 Finish	Non slip
	Speed humps	Asphalt	40mm thick	
Line Marking		Paint	Waterborne or thermoplastic	Non slip
Kerbing	Kerbing	Insitu concrete	Barrier kerb to bus bays, semi-mountable kerb elsewhere	
	Kerb ramp	Insitu concrete	No sealer	
Fencing	Car parks (long term)	Hurricane High Tensile Pool Fence	1200 high galvanised	Galvanised Steel finish
	Rail Corridor	Hurricane High Tensile Pool Fence	1500 high galvanised	Galvanised Steel finish
	Secure parking		1200 high galvanised	Galvanised Steel finish
	End of Platforms & Level Crossings	Hurricane High Tensile Pool Fence	1200 high galvanised	Galvanised Steel finish
	Gates	To match fencing	Galvanised Steel finish	4 metre clear opening for maintenance gates to car parks

Element		Material	Finish	Notes
Handrails	Bespoke Stations	Stainless Steel	Brushed	Design to discourage sitting, climbing and placing objects on.
	Stations	Steel	Hop dip galvanised	Design to discourage sitting, climbing and placing objects on.
	Baslustrade - Infill Panels	Steel	Hot dip Galvanised	
	End of Platform	Steel	Hot dip Galvanised	
Retaining Walls		Keystone	Split face	Clear anti-graffiti coating if at risk
Tree wells		Cast iron		Only if required to existing trees
Bollards		Steel filled with concrete	150mm CHS with purpose made cap – hot dip galvanised	Drop down type where required
Bicycle	Bicycle Rails	Steel	75mm hot dip galvanised	
Bins		Stainless	Polished	Refer street furniture specs in common elements
2.0 PEDESTRIAN BRIDGES / RAMPS/STAIRS				
Surface Finish		Insitu concrete	U5 Finish	Non slip. Minimum slip resistance of 0.5.
Structure		Concrete *		
Soffit		Concrete *		
Handrails & Balustrades		Galvanised steel		All as for site generally
3.0 CANOPIES				
Structures		Steel	All Hot dip galvanised Paint	"Architectural" quality of fabrication and welding required. Single length sections to be nominated
	Sheeting	Metal Profile Roof	ColorCote ZRX finish	Pacific White

Element		Material	Finish	Notes
	Flashings & Cappings	To match roofing		0.55 BMT minimum
	Roof Fixings	Strictly in accordance with Manufacturer's instruction		
Roofing	Gutters	Stainless Steel	Hot dip galvanised Paint	Std polish no. 2B finish
	Downpipes	uPVC		
	Purlins	Galvanised light gauge steel or mild steel RHS	Hot dip galvanised Paint	
	Roofing Mesh	Galvanised steel		To be plastic coated
Soffit Linings		Compressed fibre cement 9mm thick	M9010 - White	Specific approval required for soffit linings. No perforations allowed
4.0 SHELTERS				
Glazing		12mm heat soaked toughened glass with plastic film	Clear	All glass panes are to be identical in size. Glass etching protection film XtraZone (Code: GSL R12100X) or similar approved.
Glazing Framing	Frames	Hot rolled steel sections, Ali track	Paint finish	No frameless glazing. Use gaskets not silicone
Solid Screens		9mm compressed sheet	Painted Powdercoat	Set in glass framing system
Fixings Generally		Galvanised or zinc plated as minimum		
Lighting Masts	Refer Sec. 6711	Steel	All Hot dip galvanised Paint	Resene Armadillo 2GR10
Light Poles		Steel	All Hot dip galvanised Paint	RAL 9007 Grey Aluminium
5.0 PLATFORMS				
Abutment		Pre-cast or insitu	Fairface cone. F5	

Element		Material	Finish	Notes
Walls		concrete	Clear anti-graffiti coating	
Platform Fronts		Pre-cast concrete, exposed aggregate top strip 300mm wide	Paint, White non slip with "Mind the Gap" markings in black	No anti-graffiti.
Paving	Paving General	Asphalt	20mm (40mm thick by 1.0m wide in tactile areas)	Black
	Paving General	Concrete	150mm Thick	Exposed Aggregate
	Paving Inlays	Concrete or clay paver inlays	400mm wide strips, 80mm thick flush with asphalt	
	Tactile Studs	Proprietary tactile (warning/leading)	Punched or drilled and must be fixed to hole and surface with 2 part epoxy.	Yellow (must be non-fade and non-slip, with proven specifications)
	Tactiles Pavers	Proprietary tactile (warning/leading)	15-20mm thick. Set flush into asphalt.	Yellow (must be non-fade and non-slip, with proven specifications)
Pit Covers		Galvanised steel	Asphalt filled	Lockable. No inserts
Track Access Stairs		Concrete	Exposed U5 aggregate broomed finish	
Fencing		Hurricane high tensile pool fence	Galvanised	
6.0 ANTI-GRAFFITI COATINGS				
Exposed surfaces		'*Graffitifree*' tm clear graffiti guard (or similar) + Film to all glazing	Paint over with an undercoat, then 2 coats of Resene Lumbersider "Double Concrete" paint	Clear finish. Should be applied to the entire surface of all elements up to 2500mm above floor level (AFL) and areas otherwise seen to be accessible. + Glass etching

Element		Material	Finish	Notes
		up to 2500mm.		protection film XtraZone (Code: GSL R12100X) or similar approved.

* Or other as specifically approved.

Appendix 21B - Wayfinding & Signage Guide

Link will be provided – currently being rebranded and formatted.

Appendix 21C - Enclosed Stations Guide

Will probably be omitted – legacy of ARTA Rail Station Design Guide.

Appendix 21D - Specifications for Common Elements: Standard Materials & Workmanship

(PDF 1.10MB)

To be used in conjunction with the Common Elements Drawings in Appendix 5.

Appendix 21E - Common Elements Register (PDF 272KB) and Drawings (PDF 11MB)

Appendix 21F - Draft Park and Ride Strategy

Will probably be omitted – legacy of ARTA Rail Station Design Guide.

Appendix 21G - AT Brand Style Guide

Link will be provided – currently being rebranded.

Appendix 21H - Universal Access Guidelines (PDF 136KB), Checklist (PDF 238KB) and Auditing Sheet (PDF 243KB)