



• EDINBURGH •
THE CITY OF EDINBURGH COUNCIL

EDINBURGH TRAM DESIGN MANUAL



APPROVED 1 DECEMBER 2005 (AMENDED 12 JANUARY 2006)

愛丁堡電車設計手冊

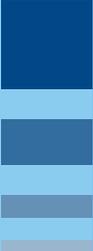
এডিনবরা ট্রাম পরিকল্পনা সম্বন্ধে লিখিত বর্ণনা

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CCTV	Closed Circuit Television	NPV	Net Present Value - the value of an investment based on an analysis of all life cycle costs and revenues adjusted to reflect present day prices. A positive net present value demonstrates that the investment will be profitable and the higher the figure, the more profitable it will be.
CEC	City of Edinburgh Council	OLE	Overhead Line Equipment ie wires and insulators, support poles and fixings to buildings to support wires.
DDA	Disability Discrimination Act	S75 Agreement	A legal agreement under s75 of the Town and Country Planning (Scotland) Act 1997 between a land/property owner and the Planning Authority to restrict the use of land/property or make a contribution of some kind.
LOD	Limit of Deviation – Area within which the tram project may be constructed – as defined in the Parliamentary Plans lodged with the Tram Bills	tie	Transport Initiatives Edinburgh Limited
LLAU	Limit of Land to be Acquired or Used- Area which can be used temporarily or permanently for specified purposes connected with the tram project (eg temporary construction compounds) but not for the tram tracks – as defined in the Parliamentary Plans lodged with the Bills.	TSAO	Tram System Aspirational Objectives - these are the Council's aspirations for the type of tram system that will be delivered
LTS	Local Transport Strategy 2004-2007 as approved by the City Council in March 2004		



Part 2

Detailed Design Requirements

5(a) Tram Identity

5(b) Tramway Alignment and Integration

5(a). TRAM IDENTITY

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- 5.1 This chapter sets out Detailed Design Requirements for the Tram system. The requirements are framed as guidance and as a detailed checklist and these will be used primarily in the design and procurement process. Elements within the design of the tram system, such as tram stops, depots and structures will require a greater level of site specific consideration. Statements have been prepared for all of the major structures. These conclude with a series of objectives to be considered in developing the design proposal. A further level of review will be required through the Design Working Group to establish more site specific design statements. These design statements will also be considered for other elements of the tram system.

TRAMS

GUIDANCE

- 5.2 It is expected that the trams bought to operate the Edinburgh Tram System will be variants of existing manufacturer's designs. It is desirable that a proven design is used to maximise reliability and value for money. There are a number of areas of the tram design that may nevertheless be customised to the particular requirements of the Edinburgh Tram System and allow a distinctive tram to be produced. This will be vital to ensure that the tram chosen meets the aspiration of being instantly recognisable as the Edinburgh Tram, and is of a quality appropriate for Scotland's capital city.
- 5.3 The range of customisation available will vary between manufacturers, and part of the procurement process will be to identify the specific elements of the design that may be customised and the potential range of choice that may be available. Once the contract has been let, there will be a clear programme within which the decisions must be made in order to allow manufacture to progress to the requirements of the project.
- 5.4 Selection of the tram to be supplied should also take account of issues of quality in construction, finishing and detailing as parts of the evaluation criteria.

Other Relevant Documents

The design of trams should be consistent with the following guidance:

- Development Quality Guideline on Access to the Built Environment
- HMRI Railway Safety Principles and Guidance Part 2, Section G, Tramways (Revised 2005)
- Rail Vehicle Accessibility Regulations 2000

DESIGN GUIDANCE CHECKLIST

- 5.5
- General form and appearance to reflect system identity - timeless, distinctive and elegant.
 - Conceal equipment mounted on the roof when viewed from the front and side
 - Window area to be maximised
 - Clear view through interior including the rear wall of the drivers cabs
 - Passenger information displays (exterior and interior) to make best use of contemporary technology to assist both regular travellers and visitors, and minimise intrusion
 - Livery and internal colour scheme should comply with Graphic Identity Checklist
 - Interior fittings and detailing to use high-quality materials, easy to clean and resistant to wear and vandalism and conceal fixings where possible
 - Display of advertisements should comply with Graphic Identity Checklist
 - Details of entry/egress and circulation should comply with Access for All Checklist



TRAM STOPS

GUIDANCE

- 5.5 Fundamental to the success of the tram stops will be their ability to be instantly recognisable as part of the tram system without becoming visually obtrusive, and to enhance rather than detract from Edinburgh's public realm.
- 5.6 The detailed siting of tram stops should relate well to locations of high trip generators and interchanges with other transport modes. Where possible, walking distances should be minimised to entrances of large generators of potential users.
- 5.7 Treating all the elements required at a tram stop as a single design exercise will result in a more coherent and visually composed design solution.
- 5.8 Consideration is given to the following aspects below
 - Fit to Context
 - Platforms
 - Shelters and Canopies
 - Lighting
 - Security
 - Information
 - Ancillary Elements

Other Relevant Documents

The design of tram stops should be consistent with the emerging guidance on “Edinburgh Standards for Streets”.

Other relevant Council guidance is contained in the Development Quality Guidelines on:

- Access to the Built Environment
- Advertisements and Sponsorship
- Setting of Listed Buildings

The guidance and requirements of the following are applicable:

- HMRI RSPG, Part 2, Section G, Tramways
- The Department for Transport Inclusive Mobility Guide to Best Practice on Access to Pedestrian and Transport Infrastructure

It is also useful to take note of the Strategic Rail Authority document: Train and Station Services for Disabled Passengers, A Code of Practice (March 2005), although this is not directly applicable to tramways.

Consideration should also be given to:

- Conservation Area Character Appraisals
- The World Heritage Trust Management Plan
- The Memorandum of Guidance for Listed Buildings and Conservation Areas

TRAM STOPS (CONT.)

DESIGN GUIDANCE AND CHECKLIST

Fit to Context

- 5.9 Tram stop locations need to be planned with due consideration of the following:
- existing views
 - destinations
 - key buildings (i.e. listed buildings)
 - pedestrian and traffic patterns
 - accessibility
- 5.10 In some instances, where there are important vistas, groups of buildings or street layouts such as crescents within the World Heritage Site, the precise location of the proposed tram stop will be critical and priority will have to be given to heritage issues. In other locations, economic or environmental issues may be more important.
- The siting of proposed tram stops must fit within Edinburgh's streetscape.
 - Tram stops must relate positively to their existing and planned context.
 - Tram stops should be located conveniently for users and be clearly visible.
 - Tram stops must not detract from key public spaces or impede pedestrian circulation.
 - Key views or vistas must not be interrupted.
 - All tram stops must seek to integrate with other transport modes.
 - All components required at the tram stop should be designed to be visually coherent.
 - A modular design solution of consistent detailing should be adopted.

Platforms

- 5.11 The tram platforms are raised to allow level access to the tram. Good quality design detailing is required to ensure that the platform becomes a positive feature within the public realm. In general terms, the dimensions of the tram platforms will be determined by the choice of the tram vehicle, the particular location and the level of pedestrian activity.



5.12 Tram platforms should be designed as unobtrusive extensions of the footway, wherever possible. Platforms should be designed so that handrails are not required.

5.13 Access to platforms should be as easy as possible for all users. Careful consideration should be given to materials and how these are used.

- Minimum dimensions will be influenced by the final specification of the tram vehicle.
 - Platforms should be of an appropriate area to accommodate the expected patronage.
 - The platform height must be set to ensure level access into the tram but be as low as possible.
 - Ramps up to platform levels must be designed as an integral part of the streetscape, avoiding trip hazards.
 - Consideration should be given to lowering the track through tram stops to avoid raising the footway height for platforms where this could conflict with adjacent threshold levels or with the visual identity of the street.
 - Platforms must be accessible by all users of the tram system.
 - Abrupt changes in level, steps and railings should be avoided.
 - Access to tram stops should be direct, avoiding lengthy detours.
 - At grade access across tram lines should be provided at strategic points relating to tram stop locations.
 - Platform surface and edging should comply with the “Edinburgh Standards for Streets” document.
 - Materials used should be in accordance with the provisions of the “Edinburgh Standards for Streets”.
 - A high standard of detailing is required to ensure that all parts of the platform fit together visually and that joints and changes of material line through.
 - Tactile and visual contrast materials should be used in accordance with HMRI and DDA requirements and DfT Guidance but be implemented in such a way that they do not create unsubtle contrasts or visual confusion.
 - Changes in colour or coursing should be used to delineate boundaries, edges or highlight features.
 - Where access covers are integrated into the platform surface they should be orientated parallel to the front edge of platform, with recessed covers and paving infill, laid out to maintain the overall pattern of the platform surface.
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TRAM STOPS (CONT.)

- The module size /scale of proposed paving must reflect its context.
- Street furniture, tactile paving, crossings, covers etc. should be orientated to avoid awkward junctions and cuts.
- Consideration should be given to incorporating as an edge coping a monolithic block the full height of the platform such that there is no horizontal joint visible in the front face of the platform.
- Platform edges in the World Heritage Site and conservation areas must be of natural stone unless specifically agreed otherwise by the planning authority.
- Need for railings should be kept to a minimum.
- If handrails are required, consideration must be given to their integration with seats and other equipment, reducing visual and physical clutter.
- Handrails should be rounded/curved with no sharp edges.
- Design should emphasise transparency and reduce visual impact.
- All railings (including guardrails at pedestrian crossings, where required) must be of high design quality, robust, vandal-resistant and be fully co-ordinated with the tram system 'kit of parts'.

Shelters and Canopies

- 5.14 The tram shelters will be the most visible part of the tram stops and an important focal point. Consequently their design, detailing and subsequent maintenance will influence more strongly than any other single element how the tram system is perceived.
- 5.15 Each location must be assessed individually in terms of its suitability as a site for a shelter or a canopy. The architectural setting of important buildings, the urban quality of building groupings and existing vistas through the townscape should not be compromised.
- 5.16 Shelters should accommodate a wide variety of functions, such as:
- Ticket machines
 - Seating
 - Litterbins
 - Passenger information
 - Equipment cabinets
 - Signing / Advertising
 - Lighting
 - PA System



5.17 It is not anticipated that a multi-functional shelter incorporating all the above features will be appropriate at every location. The final siting and design of a shelter will be dictated by balancing a number of criteria including availability of space, hierarchy of location, engineering and economic factors.

- A shelter or canopy should be provided on each platform of every stop.
 - Shelters must be carefully located to address fully their urban context.
 - A family of designs for shelters and canopies should be agreed, with design variations for different character zones and amount of space available.
 - Shelters and canopies should be sufficiently transparent to allow visibility in and out, should incorporate appropriate lighting, and should seek to enhance the streetscene.
 - Shelter dimensions should be kept to a minimum to provide a light and elegant structure, but still sufficient to reduce the impact of wind and driven rain and to protect the anticipated number of waiting passengers.
 - Stop nameplates should be considered as an integral part of the shelter design.
 - Provision must be made for the blind and partially sighted.
 - Commercial advertising may be appropriate in certain locations (see Graphic Identity and Signage sections).
 - Particular attention should be paid to the design of the roof, panels and fittings to ensure adaptability of design and robustness.
 - The approaching tram vehicle should be clearly visible from both seated and standing positions within the shelter or canopy.
 - Lower edges should follow platform gradient with consistent gap.
 - All surfaces must be easily cleanable. All fixings are to be concealed and vandal-proof but accessible for maintenance.
 - All clear panels should be of toughened glass and any glazed panel adjacent to a road should incorporate a horizontal rail (to protect people from falling through gap when glazing is broken or missing).
 - Water run-off system should not be vulnerable to blockage and rainwater discharge should be remote from the access openings.
 - Seating should incorporate provisions for prams and wheelchair users, but should not dominate the length of the shelter.
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TRAM STOPS (CONT.)

- Seats should not be located so as to impede the circulation of passengers/ pedestrians.
- Seats should be convenient for all ambulant users, including some with backrests and some with armrests.
- Seating surfaces should be of a material comfortable to use in winter, and unable to collect or retain liquid.
- Seats should be easily cleanable, robust and fireproof.
- In the design of every tram stop shelter consideration should be given to the incorporation of appropriate passenger information systems comprising display panels, Real Time Information and public address system.
- A Public Address (PA) system is required at all tram stops.
- The PA system should be mounted discreetly out of sight.
- The PA system should be clearly audible and intelligible to all passengers (except those with hearing difficulties) in shelters and on platforms under all weather conditions.
- Sufficient speaker points should be installed for the volume at the loudest point to be comfortable to passengers at that point and such that, in residential areas, the volume is low enough not to cause a nuisance, especially at night.
- At stops other than Park and Ride sites, the PA system should only be used for emergency, security and severe disruption announcements. General public announcements and advertising are not permitted.

Lighting

- 5.18 The lighting of shelters and their immediate surroundings will be crucial in making passengers feel safe whilst enhancing their ability to read transport information panels.
- 5.19 It is important that an ambient illumination of the shelter and stop area is achieved, which may incorporate light sources at several heights, including ground level, intermediate, and lighting from structures overhead. The use of multiple spotlights should be avoided due to the visual clutter they create and the added maintenance of numerous lighting fixtures.



5.20 Lighting can be incorporated into the overall design of the shelter, such as:

- lighting situated within perforated columns and beams (ease of maintenance should always be considered);
- lighting attached to the roof structure or surrounding street furniture;
- low lighting incorporated in bollards and railings; and
- recessed lighting used to denote the stop perimeters, or structural /design features of the shelter.

5.21 Lighting should be provided to all waiting areas and access routes, to the front edges of platforms, to passenger information systems and to any identifiable hazard points, sufficient to provide safety, comfort and practicality for passengers.

- Lighting levels should be provided during all hours of poor light, including when the service is not operational. The use of motion sensors could allow increased lighting levels when movement is sensed.
- Lighting provision should typically be independent of other light sources in the vicinity (street lighting, shop fronts, etc.). However, other sources can contribute and can be considered as an opportunity to reduce clutter providing that such alternative sources can be suitably controlled and maintained.
- The lighting colour must enable good colour rendition.
- Glare must be avoided for passengers, tram drivers and road vehicle users.
- Legibility of display panels should not be impaired by reflected light.
- Nuisance light spillage for local residents and night-sky pollution must be avoided.
- All equipment must be vandal-resistant, robust and easily cleaned and maintained.



TRAM STOPS (CONT.)

Security

- 5.22 A safe environment is a necessary condition for the system to be successful and to be an enjoyable travel experience. All parts of the tram stop have to be unobscured. It must be obvious that security is provided.
- 5.23 Security aspects addressed are CCTV, Emergency Call Point, and Visibility, as follows.
- Security should be provided in a manner such that it is obvious but integral with the ‘kit of parts’. The security equipment must not detract from the aesthetic integrity of the overall station design. For example, dome-type CCTV cameras are preferred, as these are identifiable but reasonably discreet.
 - All crossing points, platforms (including within shelters) and any other areas where passengers might reasonably be considered vulnerable must be visible from the control centre by CCTV link.
 - Camera numbers and locations should be such that all areas are visible even when newly planted trees have matured. For example, dome-type CCTV cameras are preferred, as these are identifiable but reasonably discreet.
 - Each platform must have an emergency call point for direct communication with the control centre.
 - Emergency call points must be positioned in a consistent location.
 - The location of at least the nearest emergency call point must be visible from anywhere on the platform.
 - Shelters with front panels must have more than one entrance (an escape route).
 - Passengers approaching a shelter entrance must be visible to those inside the shelter.



Information

- 5.24 Information panels and advertising if appropriate should not dominate the design of the shelters or impinge upon the light and elegant design ethos. Care must be taken to ensure that large panels do not block views, posing a security threat. For more information on advertising, refer to section on Graphic Identity.
- Advertising should not block views.
 - Advertising and logos should be restricted in accordance with current planning guidance.

Ancillary Elements

- 5.25 The number of ancillary elements such as seating and litterbins, and their disposition should seek to avoid overprovision and clutter. (Cabinets and equipment are considered in the section on Trackside Equipment.)
- All tram stop components should be kept to a minimum in both size and number, minimising both visual and physical clutter from the street scene.
 - Stops and their associated elements should be designed as multi-functional modules. For example, the shelter or canopy can provide not only shelter and seating space but also house ancillary elements such as litterbins, lighting, information and space for advertising. Bollards may also provide secondary seating and incorporate lighting to further reduce clutter.
 - Litterbins must be of a high quality design, consistent with the other elements of the stop. They could be fixed to the shelter posts or lighting columns or integrated with either seating or handrails to alleviate clutter at the stop.
 - Litterbins are to be vermin-proof when closed, have a closed top unsuitable for standing objects on top, and to have easily cleanable surfaces inside and out.
 - Kiosks and ancillary functions are only appropriate where there are high pedestrian flows and sufficient space, reinforcing the hierarchy of stops.

TRACKSIDE EQUIPMENT

GUIDANCE

- 5.26 It is important to understand the range of trackside equipment which is required for the Tram system. This section seeks to give a clear idea of the range of equipment which will be necessary, and how the cumulative impact of the equipment can be kept to a minimum. The avoidance of clutter through the sharing of facilities for equipment must be fully considered in all cases and in all parts of the city. Where proposed, equipment will be designed to be unobtrusive – modern and elegant design of these small elements will assist greatly in engendering a positive image of the Tram.

Other Relevant Documents

The design of trackside equipment should be consistent with the emerging guidance on “Edinburgh Standards for Streets”.

Consideration should also be given to:

- Conservation Area Character Appraisals
- The World Heritage Trust Management Plan
- The Memorandum of Guidance for Listed Buildings and Conservation Areas

DESIGN GUIDANCE AND CHECKLIST - SUBSTATIONS

- 5.27 Substations - primarily for the supply of traction power to the system - are required at intervals of around 2-3km along the route. Locations have been identified on the plans submitted at part of the Bills for each Line. Depending on the final traction power system design it may not be necessary for all the identified sites to be used in practice.

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- 5.28 Each substation is a fully-enclosed, usually rectangular building. All cabling to and from the building will be ducted underground. Suitable vehicular access is required to the building for installation and subsequent, albeit rare, replacement of heavy equipment. Related parking for maintenance staff is required close to the building. Doorways to the building are required for personnel access, usually separately for staff of the tramway maintainer and the DNO, and for (infrequent) exchange of heavy equipment. The security of maintenance staff entering and leaving the building at all hours must be protected.
- 5.29 The general dimensions of the building are likely to be similar for all the substations, with the exception of that within a depot site which is likely to be larger as additional equipment is required at this location.
- 5.30 Due to internal heat generation, it is necessary to provide for ventilation of the building interior. Depending on the size of the building relative to the equipment contained within, it may be necessary to provide mechanical ventilation equipment with suitable louvered apertures to permit airflow.
- 5.31 It is possible to place substations underground although this is expensive in first cost, and also potentially, for maintenance. The plan area required is likely to be larger than for a building on the surface. It is also possible to place a substation within an existing or new building in a suitable location. In both cases, suitable equivalent access and ventilation requirements must be provided.
- Wherever reasonably practicable substations should be designed into an existing or proposed building.
 - Within the World Heritage Site, greater priority must be given to the sympathetic siting of the structure. Where reasonably practicable, partial or total submergence of the substation should be pursued.
 - If a new building is required, it should be sited to reflect and integrate with the surrounding townscape or landscape
 - Substation buildings should be as small as safety requirements dictate but large enough to accommodate all equipment
 - Security fences or other enclosures will not normally be permitted.

TRACKSIDE EQUIPMENT (CONT.)

DESIGN GUIDANCE AND CHECKLIST - TRACKSIDE CABINETS:

- 5.32 In summary, essential trackside cabinets not associated with tramstops will be situated on top of an access chamber in the chain of cable ducts and will be placed on a plinth which can be made flush with the ground, if it is level locally. Cabinets often have doors both front and back and space must therefore be left or created to allow safe maintenance access with the doors opened.
- 5.33 In principle, equipment can be placed underground in suitable enclosures, although these are not available as standard and a special factory-made unit would be essential in this application. Capital and maintenance costs would increase and access arrangements (including the location) would have to allow safe maintenance to be carried out at any time.

Traffic Signalled Junctions

- 5.34 By far the largest number of cabinets will be those related to traffic signal controlled junctions. There will normally be one cabinet for the actual controller for each junction that will replace the existing cabinet (where present), and be to the same roads design requirements. There will also be one cabinet for communications equipment related to the tram location and priority demands into the traffic controller. Different maintenance responsibilities favour a separate cabinet, as well as the standard nature of the traffic signal controller cabinets. It is highly desirable for safety reasons that the cabinets are in a position where maintenance staff can directly observe the operations of the signals controlled. A typical size for the communications cabinet is 1200mm high x 1000mm wide x 400mm deep.



OLE Isolators

- 5.35 The OLE is divided into electrical sections that can be individually switched on and off. This allows part of the network to be shut down due to an emergency or for planned work. Such sectioning locations are related to the track layout, in particular near junctions and emergency crossovers (reference should be made to the Network Diagram, when it becomes available). Where a substation is located near a sectioning point, the associated switchgear will be located within the substation building. Otherwise a trackside cabinet is required to contain the switchgear. There are particular requirements for these cabinets due to the higher voltage found within. The size depends on the number of switches required and a modular design is usually used. A typical trackside isolator cabinet is 1800mm high x 2000mm wide x 800mm deep.

Point Control

- 5.36 At each location where there are points that are motorised or are fitted with indicators (reference should be made to the Network Diagram, when it becomes available), a cabinet is required for the control. The principal locations on street are at Haymarket (possibly), York Place, North St Andrew Street (possibly) and Ocean Terminal. Points at a single location should be able to be controlled from a single cabinet. There may however be a requirement for an additional cabinet for an auxiliary power supply. However, alternative packaging arrangements are likely to be possible, changing the shape of the resulting cabinet. Where the points are motorised, the cabinet must be placed such that, during maintenance, there is clear view of the points from the cabinet, in the interests of safety. A typical points' control cabinet is 1500mm high x 800mm wide x 600mm deep.

Point Heating

- 5.37 At each location where there are points that are fitted with heating (reference should be made to the Network Diagram, when it becomes available) to prevent freezing in cold conditions, a cabinet is required for the control of the heaters. All the heaters at a particular location will be controlled from the single cabinet. A further cabinet may be required to provide the auxiliary power supply to the heaters. It should be possible to integrate these cabinets into one, A typical size for a double junction is 1200mm high x 1800mm wide x 400mm deep. However, alternative packaging arrangements are likely to be possible, changing the shape of the resulting cabinet.

TRACKSIDE EQUIPMENT (CONT.)

Tram Signalling Controls

- 5.38 At a few locations, additional tramway-only signalling may be required, with associated control cabinets. The most likely locations are at the junctions on the main line providing access to the depot(s). At present, there are no other locations positively identified. These would probably be similar to traffic signal controller cabinets and would be additional to the point control/indication and heating cabinets at the same locations. It is possible that they could be located inside the depot perimeter fencing, although this would depend on the local layout and the distance between the junction and the depot perimeter.
- 5.39 There might also be isolated requirements for trackside cabinets for additional auxiliary power supplies or for communications equipment. These would however be very much the exception, if required at all.
- 5.40 The Checklist for assessing the design of all trackside cabinets is as follows.
- Consideration should be given to incorporating trackside cabinets into an existing or proposed building.
 - The possibility of enclosing a cabinet within a building will need to be negotiated by the Planning Authority when determining planning applications and may need to be secured by a legal agreement (such as a s75 agreement).
 - Within the World Heritage Site the preference is for all cabinets to be located underground or otherwise concealed, unless technical or safety requirements dictate otherwise.
 - If acceptable on-street, cabinet dimensions should be as small as safety requirements permit and large enough to contain all equipment.
 - Design and colour of cabinets will be consistent with the requirement of the “Edinburgh Standards for Streets”.

DESIGN GUIDANCE AND CHECKLIST - DUCTS, TROUGHING AND ACCESS CHAMBERS IN OFF-STREET LOCATIONS:

- 5.41 In order to run cabling throughout the tramway route, either buried ducting or surface troughing is required. Equivalent provisions are required on structures along the route. Access is required along the routes by the provision of chambers with surface mounted covers at intervals. These will coincide with trackside cabinet locations and intermediately, at intervals appropriate to the type of cabling. Certain types of cabling may be direct-buried but this is not the preferred solution and access chambers are still generally required.
- 5.42 Such cabling is required for a variety of functions. These include traction power supply strengthening, control and monitoring of the traction power supply and other functions, communications with tramstops and trackside equipment, and local auxiliary power supply distribution.
- 5.43 Surface-mounted troughing is not preferred from a security and maintenance viewpoint, but has a lower cost than ducting. However, making the lids of surface mounted troughing secure is likely to lessen the difference in cost. Access chambers will also be simpler with surface mounted troughing.
- 5.44 Troughing could be mounted on posts, as alongside railways, but this is unlikely. Troughing may also be either surface-mounted or inset flush with the ground. The approach would be dependant on the location.
- 5.45 The amount of trackside cabling may be lessened by adoption of wireless technology for communications and this is currently under investigation. At this stage, however, it is very unlikely that all cabling requirements can be eliminated.
- The detailed design and treatment of these elements must minimise any protrusion above ground, and be incorporated fully into hard or soft landscape treatments.
 - Detailed design must also ensure that no hazard to safety or pedestrian or cycle circulation is likely to result.

TRACKSIDE EQUIPMENT (CONT.)

DESIGN GUIDANCE AND CHECKLIST - TRAM SIGNALS

- 5.46 Trams have their own signalling with trackside signals mounted on poles. The casing of the signal head is essentially the same as one of the three as one of the three lamps forming a standard traffic light, but with the format being a set of white lights forming a bar or other-shaped aspect. Where co-located with a set of traffic lights, they can be placed to the side or above the standard signal head, similar to a filter arrow traffic signal. A single aspect will be placed with each traffic signal on the relevant approach to any traffic-signalled junction. This would include any signalled pedestrian crossings, for instance. Certain locations may require an additional aspect for visibility, as with traffic signals. All existing traffic signalled junctions along the line of route are likely to be retained and probably some more added, depending on the safety and other considerations at particular locations. These may include locations where the segregated tramway crosses a road (NB this is treated as a traffic-signalled junction and not as a railway-type level crossing).
- 5.47 Additional signal heads are required on the approach to any facing points showing the safe position of the point mechanisms.
- 5.48 It is possible that there may be other signals required at junction locations away from the street.
- 5.49 The precise location of all signals relative to the point mechanism or the stop line at traffic signalled junctions is very important.
- Signals should only be provided where necessary
 - Clutter should be avoided by sharing signal poles wherever possible
 - There is a preference for simple vertical poles
 - Gantry signals should be avoided
 - Design and positioning of signals will be consistent with provisions to be contained in the Edinburgh Standards for Streets

MAJOR STRUCTURES

GUIDANCE

5.50 Major new structures are likely to include

- A8 crossing point under the Gogar Roundabout
- Line 2 depot access road bridge
- New bridges over railway at Edinburgh Park and Stenhouse
- Murrayfield viaduct
- Haymarket viaduct
- Starbank walkway
- Lindsay Road retaining wall and grade structure
- Lower Granton Road retaining wall to maintain access to Granton Harbour eastern breakwater
- Crewe Toll retaining wall and grade structure
- Coltbridge retaining wall

5.51 Major extensions to structures are likely to include

- Extension of bridges at Roseburn, Balgreen, Craigleith Drive, St George's School and Groathill Road South
- Coltbridge retaining wall
- Extension of Coltbridge viaduct
- Balbirnie Place underpass
- Balbirnie Place embankment

Initial planning statements have been provided for each of these and are contained in Appendices 7 and 8. Other statements will be produced if additional structures are required.

Other Relevant Documents

The design of structures should be consistent with the emerging guidance on “Edinburgh Standards for Streets”.

Reference should be made to the Council’s Development Quality Guideline on Community Safety.

Reference should also be made to the relevant Environmental Statement.

Consideration should also be given to:

Conservation Area Character Appraisals

The World Heritage Trust Management Plan

The Memorandum of Guidance for Listed Buildings and Conservation Areas

DESIGN GUIDANCE CHECKLIST

- The design of major new structures and extensions to existing major structures needs to take account of the structure-specific statements and be accompanied by design statements to demonstrate this.
- All design statements should be agreed by the Planning Authority and other interested parties (such as land owners) prior to the commencement of detailed design work.
- The design of overhead line equipment and trackside equipment needs to take into account and reflect the structure specific requirements (for example the position of poles will need to reflect the overall structure design).
- These statements will take account of the physical context, the planning policy context and the nature of the structure proposed.
- Structures should be designed without dark recesses.
- Materials should be robust, vandal-proof and corrosion-resistant.
- Appropriate lighting should be included within the design.

DEPOTS

GUIDANCE

- 5.53 The choice of depot location has been driven by a number of factors including the size, accessibility, planning status and environmental suitability of potential sites. Following assessment, a preferred site has been identified for each line. The proposed sites are currently a plot within Leith for Line 1 and immediately to the north of Gogar Roundabout for Line 2. If only 1 depot is required, Gogar is the preferred location for reasons relating to townscape and regeneration in the Leith Docks area.
- 5.54 The aim is through a creative and imaginative architectural response to a very specific set of criteria, to design structures that are assets to the city. Appropriate design will reduce the need for screening and other mitigation measures. In addition, where site conditions allow, visual impact may be mitigated by appropriate use of levels in the site relative to its surroundings, and the introduction of landscape screening. To achieve a high-quality design that fulfils the functional requirements and respects its surroundings, the following points should be considered:

Site Layout

- 5.55 Factors affecting site layout include:
- the size of structures,
 - the requirements for efficient tram movement,
 - The level relative to and the links with the tram route,
 - the orientation of site and structures,
 - the relative proportions of the site,
 - the accommodation of all operational facilities, and
 - access for pedestrians and vehicles, and security issues.

Functionality

- 5.56 All depot activities should be facilitated through:
- efficient layout offering minimal impact;
 - compliance with statutory regulations (e.g. building regulations, disabled access etc); and
 - connection with the wider tram network.

DEPOTS (CONT.)

Visual Impact

5.57 Factors affecting visual impact include:

- the building footprint and height;
- massing of elements; materials and finishes (which should be chosen to complement the tram network and context);
- skyline impact;
- external storage areas
- views into and out of each site; and
- landscaping and physical or visual permeability.

Environmental Impact

5.58 Factors affecting environmental impact include:

- noise;
- treatment of lighting;
- softening of hard landscaping; and
- creation of habitat within the constraints of the locality e.g. requirements of the BAA.

Other Relevant Documents

The design of depots should be consistent with the emerging guidance on “Edinburgh Standards for Streets” and “Edinburgh Standards for Sustainable Buildings”.

Reference should also be made to the relevant Environmental Statement.

The Guidance set out in HMRI RSPG Part 2, Section G, Tramways and where applicable Section A Infrastructure (1996) also applies.

DESIGN GUIDANCE CHECKLIST

- 5.59
- Each depot site should provide secure stabling for the fleet.
 - The depot must be accessible by road and in close proximity to public transport links
 - Road access should be provided for the delivery of trams, and for routine access by heavy goods vehicles making deliveries. Road vehicle access must avoid blocking adjacent roads
 - Site layout should relate to surrounding activities and noise-generators as well as functionality and efficiency of use.
 - Depot elements should be orientated to group noise-generating activities as well as functionality and efficiency of use.
 - The depot should be designed as a single entity, bearing in mind all the elements.
 - Depot buildings should be designed as architectural statements.
 - Acceptable boundary noise level is to be agreed with the Council's Department of Environmental and Consumer Services.

Line 1 Considerations

- The site layout suggests grouping building(s) close to existing industrial buildings where possible, for example, near the timber yard building along the southern boundary.
- The depot building(s) should be architecturally sensitive to the surrounding context, particularly to the Constitution Street facade and the gate piers to the port.
- Existing pedestrian links /routes around the port should be enhanced but for safety and security reasons public access through the depot site will not be possible.

Line 2 Considerations

- Planting must be incorporated along the southern and western boundary edges consistent with BAA guidance to prevent birdstrike difficulties – native deciduous species are to be used where possible
- Peripheral screen mounding, in order to reduce landscape and visual impacts should be the preferred design option. This will be sympathetically graded out to tie into surrounding flat agricultural land and should be augmented by native scrub planting.
- Depot buildings are to be constructed to sit as low as possible within the site in order to mitigate adverse landscape and visual impacts and minimise the height of screening required.

SIGNAGE

GUIDANCE

- 5.60 Signs are an important visual component of the tram system. They can be used to reinforce the legibility of the tram system whilst complementing existing signs within Edinburgh. Signs are also important in image-building (see also Graphic Identity Sections) for the tram system and should be both distinctive and instantly recognisable. Signs should be integrated with other elements associated with the tram, minimising clutter.
- 5.61 The legibility of signs can be maximised through the appropriate use of contrasting colour between the lettering and background. Pictograms should be used as part of the signage strategy, increasing accessibility for tourists with limited English, children and those with literacy disadvantages. Pictograms employed by Edinburgh's Tourist Board and meeting the criteria of the International Standards Organisation (ISO) for standardisation will be useful motifs in creating signs that are easily recognised and understood. However graphic modifications may be desirable to create the tram's distinctive identity or to respect a particular site context.
- 5.62 The Council is committed to a reduction of street clutter and this applies particularly to signs. An array of oddly sized and shaped signs not only gives confusing messages for drivers, it reduces the quality of a street scene. Studies of individual streets show that in most streets it is possible to considerably reduce street clutter.
- 5.63 For instance, many traffic signs are not mandatory and may be used at the discretion of the Council. The avoidance of a proliferation of signs and hence street clutter and visual confusion is a positive act to improve road safety. As a result the minimum number and size of signs, consistent with the regulations, should be installed.

Other Relevant Documents

The approach to be taken with regard to signage should be consistent with that taken in the emerging guidance on "Edinburgh Standards for Streets".

Reference should also be made to the Council's Development Quality Guideline:

- Advertisements and Sponsorship

DESIGN GUIDANCE CHECKLIST

- Signs should be designed as an integral part of the tram system, and instantly recognisable.
- Only the minimum number of signs will be permitted and, if justified, signs should be combined with other elements of the tram system.
- Signage should be considered as a whole, including identity, passenger information systems, directional signs and mandatory street signs.
- A generic family of signs should be developed that are clearly part of the tram infrastructure but are also sympathetic to their context.
- Typical signing at a stop may comprise stop names, perhaps illuminated, usually two per platform; direction signs and local map information, real time information displays, destination signs; timetable information and a braille information panel; and the Edinburgh Tram Logo. There may be a disabled boarding point sign although this may not be necessary.
- Signing associated with the tram must not create unnecessary street clutter with preference being given to integral mounting, and should be sited without impeding circulation on paths.
- Signs relating to the tram must be visible by all, in all weather and lighting conditions.
- The scale of signs should relate to their context and content.
- Where the posts of signs are painted a colour other than grey the backs of signs should also be that colour.
- Where signs are fixed back to back, they should ideally be the same size.
- Consideration should be given to fixing signs to walls and railings, especially in residential areas.
- The graphic design of signs should achieve continuity, be legible, and reinforce the timeless design solution being sought throughout the tram system.
- Lettering should have little contrast between horizontal and vertical line weights.
- Recessed/raised light-coloured typefaces on dark backgrounds are preferred to be legible by both sighted and visually impaired people.
- Where bespoke characters are introduced, they should be easily understood and used consistently throughout the tram route.

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- Primary information is to be clearly lit in a style and at a level that coordinates with the 'kit of parts'.
 - As a general rule display panels should not have internal moving parts.
 - Panels should not be located to pose obstruction to visually impaired passengers.
 - Passenger Information Systems should be considered in relation to all signage proposed for the tram, including the mandatory signs.
 - At least one (double-sided) real-time display must be provided at each shelter or platform, positioned to be visible from the main waiting areas.
 - If displays are integral with the shelter they must be legible from furthest point within the shelter and from all seating positions in the shelter.
 - The real time display should be mounted horizontally and be capable of displaying scrolling and static information simultaneously. Upper and lower case lettering must be used (to maximise legibility).
 - The real time display must incorporate the correct time.
 - The display must be legible under all lighting and weather conditions.
 - No advertising will be permitted on real-time display facilities, but public information could be incorporated within the display itself.

GRAPHIC IDENTITY

GUIDANCE

- 5.64 The graphic component of the system design is concerned with typography, the selection of colours and the application of motifs, logos and artwork. How these elements are applied also extends to how the branding is expressed through both the interior fit-out of the trams and the elements that comprise the stops. The creation of a recognisable graphic strategy is crucial in creating a perceived association between tram elements and quality and efficiency.
- 5.65 To achieve a recognisable graphic identity particular consideration should be given to:
- System/Corporate Identity
 - Tram Livery
 - Tram Interiors
 - Ticketing and Stationery
 - Other Information
 - Signing
 - Advertising
 - Uniforms

System/Corporate Identity

- 5.66 Corporate identity should be reinforced visually by the use of a specific logo, distinctive typeface or use of a particular colour. Consideration must be given to existing publications and branding associated with the city before considering a complementary or deliberately contrasting approach/style. Design solutions should be adaptable to varying scales and forms so that corporate identity can be reinforced throughout a wide range of elements from Tram livery and signs through to interior fit-outs and tickets. A timeless and high-quality solution to the graphic design is advocated.

Tram Vehicle Livery

- 5.67 The distinctive branding must be applied to the tram itself so that each tram vehicle is instantly recognisable. A colour palette that respects the indigenous colours of Edinburgh's cityscape is recommended and graphics should reinforce the image of movement in a simple, clear and coherent style. Careful consideration will be given to whether advertising on the exterior of the tram is appropriate.



GRAPHIC IDENTITY (CONT.)

GUIDANCE

Tram Vehicle Interiors

- 5.68 An easily accessible, open, bright and clean interior is paramount to creating a welcoming and safe environment. Interiors need to cater for the city's diverse range of users. Materials must be hardwearing and easily maintainable. Colours used internally should reflect the system identity adopted externally. Consideration should be given to floor coverings, seats, poles and racks, window frames, ceilings and internal lighting. A limited amount of discreet advertising may be considered.

Ticketing and Stationery

- 5.69 Tickets, passes, route plans/maps, timetables and other items should all be instantly recognisable as part of the tram system's associated material. Information should be displayed clearly. Good communication is imperative to the success of the tram. Whilst people will become familiar with the routes of the tram system because of the presence of wires and rails, knowledge of the system's routes and stops needs to be imparted to the users simply, quickly and in an easily understandable way if maximum usage is to be attained.

Advertising

- 5.70 Throughout the tram system, advertising must be very carefully controlled and an advertising strategy should be applied consistently along the tram routes. It should not be seen in a negative light, and consideration should be given to using new technologies in creative advertisement facilities. Commercial advertising should be combined with public information. All external advertising must comply with Council policy guidance.

The preparation of a signage and advertising strategy is recommended to consider the extent of advertising sought.

Refer also to the section on Tram Stops and Signage

Uniforms

- 5.71 The clear, distinctive and discreet colour branding of the system must also extend to the uniforms of tram staff. They should be easily identified by all users.

Other Relevant Documents

Graphic identity design should be consistent with the emerging guidance on “Edinburgh Standards for Streets”.

Refer also to the Council’s Development Quality Guidelines on:

- Art in Public Places
- Advertisement and Sponsorship

DESIGN GUIDANCE CHECKLIST

Overall System/Corporate Identity

- 5.72
- The system identity should be appropriate to Edinburgh’s character.
 - The graphic identity should be clear and instantly recognisable.
 - The graphic identity should create a perceived association with safety and efficiency.
 - System identity should be reinforced visually.
 - Design solutions need to be adaptable to fit a variety of tram system elements.
 - The solution should be of a high quality and timeless in design.
 - Pictograms should be consistent with those used by the ISO and Edinburgh’s tourist board.

Tram Vehicle Livery...

- 5.73
- Graphic design should be incorporated effectively on the tram vehicles.
 - A discreet colour palette should be established.
 - The colour palette should complement materials such as glass, stainless steel and anodised aluminium.
 - Graphic identity/elements should be prominent yet not dominate the surrounding context.



Tram Interiors

- 5.74
- Interiors should be easily accessible, clean, open, and sufficiently illuminated.
 - All potential user groups need to be catered for with clear signage with regard to storage of luggage, cycles, wheelchairs, and prams.
 - Materials used must be robust, hard-wearing and easily maintained to a high level.
 - Colours incorporated should stem from the chosen tram colour palette, reflecting corporate identity.

Tickets and Stationery

- 5.75
- Tickets, route plans/maps and other associated tram stationery must be instantly recognisable.
 - Information on such elements should be clear and accessible by all.

Advertising (See also the section on Signage)

- 5.76
- Advertising throughout the tram route should be restricted and comply with Council policy and guidelines.
 - Advertising should be discreet.
 - Advertising may be incorporated within trams.
 - Adverts used on or close to tram shelters or platforms should not impair visibility.
 - Adverts should not create street clutter, being instead incorporated into existing tram streetscape elements.
 - Adverts on litterbins, multiple shelter panels, and seating should be avoided.
 - Careful consideration will be given to whether adverts on the exterior of the tram will be acceptable.

Uniforms

- 5.77
- Uniforms should be easily recognisable as part of the tram system.
 - A suitable design of uniform should be selected to reinforce the tram identity.
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You can get this document on tape, in Braille, large print and various computer formats if you ask us. Please contact ITS on 0131 242 8181 and quote ref 06060. ITS can also give information on community language translations. You can get more copies of this document by calling David Morgan (Customer Services Team Leader) on 0131 529 3900.

遠設計手冊解說要在愛丁堡電車計劃中遠致優質設計所需要具備的內容、要求及結構。愛丁堡市議會作為「規劃當局」在評估建議書時，會以此為參照，同時，設計手冊在採購過程中是重要的部份。欲查詢本文件的翻譯資料，請致電愛丁堡市議會傳譯及翻譯服務部(ITS)，電話0131 242 8181並說明檔案編號06060。

یہ ڈیزائن مینیل (ہدایت نامہ) ایڈ میرا کے ٹریم کے پراجیکٹ کے میڈیٹا براؤن کے حصول کیلئے اس کے مضمون، اصطلاحات اور طریق عمل کی مجموعہ پیش کرتا ہے۔ یہ ایک ریفرنس پوائنٹ کی طرح کام کرتا ہے جس کے تحت سنی آف ایڈ میرا ٹولس کو بحیثیت پائلٹ قدرتی اجازت کی کمی تجاویز کا جائزہ لیا جائے گا۔ اس کے علاوہ حصول کے طریقہ کار میں کلیئر کی کردار ادا کرتا ہے۔ اپنی کیونٹی میں ہول ہائے وائی ڈائن میں اس دستہ کے ترقی کے حلقہ معنوںات کیلئے برائے مہربانی ایئر پرائیوٹیشن ایڈوائسریٹس سروس (ITS) کو 0131 242 8181 پر ٹیلیفون کریں اور ریفرنس نمبر 06060 کا حوالہ دیں۔

شرح دليل استخدام التصاميم السياقي والمتطلبات والاليات لتحقيق التصاميم ذات التنوعية لجيدة لمشروع فريق إدنبورج، وسيكون نقطة مرجع تقييم على أساسه الطلبات التي يتم رفعها لمجلس بلدية مدينة إدنبورج باعتبارها "سنة التخطيط" كما سينصب دورا مهما في عملية الحصول على المشروبات للمعلومات حول ترجمة هذه الوثيقة إلى لغة جابتك الرجاء الاتصال مكتب خدمة الترجمة الفورية والتحريرية على رقم الهاتف 0131 242 8181 وتكر الإشارة رقم 06060

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Andrew M Holmes
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