

Station Design





Document verification



Station Design
Strategic Planning
NR/GN/CIV/100/02
June 2024

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Verification

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Product (MVP) added

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Foreword



Station Design
Strategic Planning
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From the great railway ‘cathedrals’ of the Victorian era, to the ground-breaking corporate identity work that gave us the ‘double arrow’ logo the railway system in Great Britain has a rich design heritage. At this point in history we reassert these values and seek to create a new legacy of good station design.

To assist this process this document provides guidance to those involved in the early design and commissioning of station works, to give a better understanding of the key factors that influence design outcomes.

The document sets out the role of good design in creating stations that improve passengers’ journeys, integrate within their local communities, and allow for the needs of the future.

The document builds on the guidance offered in Network Rail’s ‘Our principles of Good Design’ which sets out ten core principles, the essential ingredients for good design for a world class railway.



Image 0.1: The NR Design Manual for Medium to Small stations (NR/GN/CIV/200/02) covers the Hub station design and provides an adaptable approach that can be applied to meet the spatial, contextual and capacity needs of stations.

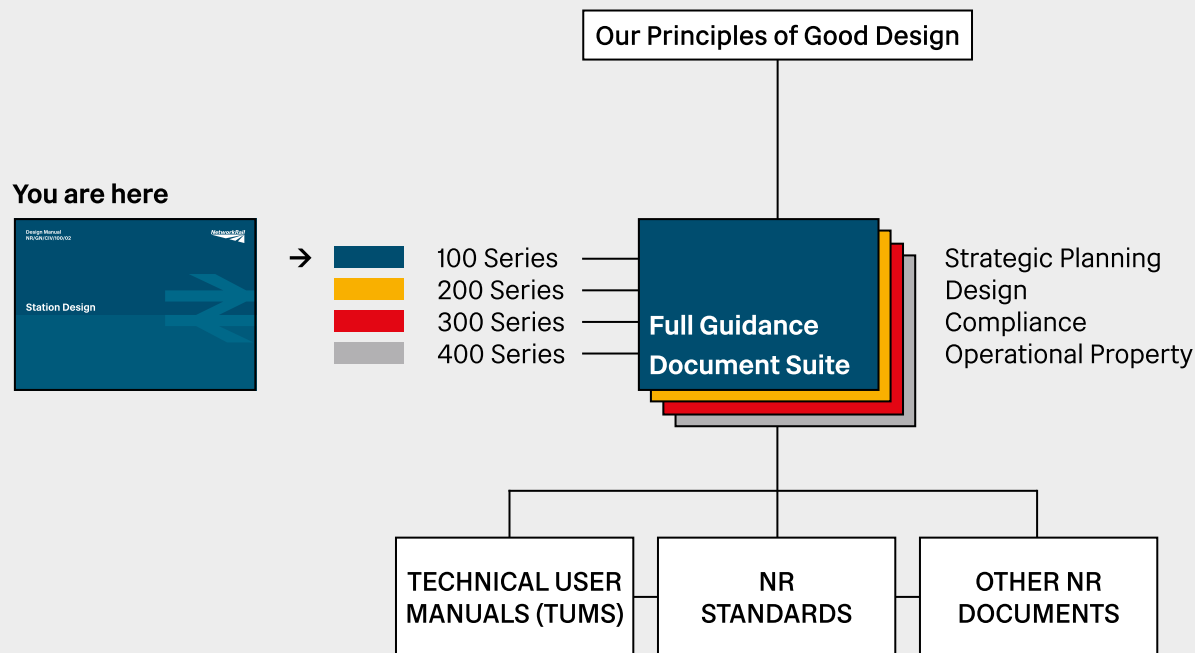
How to use the guidance suite



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The Network Rail Document Suite



References to other documents

- Code of Practice Guidance
- National Standard
- Network Rail document
- European Standard

Example

National Standard

NTSN: Persons with Reduced Mobility ()
Information regarding the level of accessibility of all stations must be freely available. Operating rules shall be made to ensure that information regarding the level of accessibility of all stations is available.

A full list of relevant documents, and other guidance suite documents is contained in the appendix.

Figure 0.1 Network Rail Document Suite Summary

About this document



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The Network Rail Station Design presents Network Rail's requirements for the design of new and existing small and medium Network Rail managed stations.

The intended audience for the Design Guidelines is supporting project teams and design teams involved in defining, preparing, and delivering station projects.

The Design Guidelines & Specifications are contained in a single document divided over six sections.



Section 1 Introduction

Introduces the document, and identifies how the Network Rail Principles of Good Design can be applied to station design.



Section 2 Project Definition

Covers the context, processes and approvals for a station design project. Different approaches for investing in a station are covered, and the PACE process is set out.



Section 3 Station Planning

Sets out key considerations for a station project, including capacity, inclusive design and sustainability.



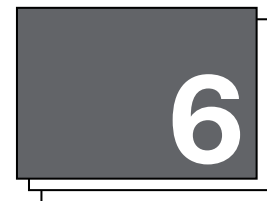
Section 4 Station Elements

Describes a journey from the station public realm through to the platforms and staff facilities, providing design advice and good practice.



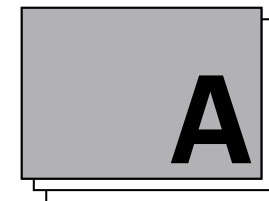
Section 5 Project Execution

Covers details for planning and carrying out a project, defining project BIM requirements and carrying out a Post Occupancy Evaluation.



Section 6 Design Considerations Toolkit

The Toolkit provides a series of considerations for project teams. These are mapped against the Network Rail Principles of Good Design, and covered by PACE stage.



Section A–C

- Definitions
- Applicable legislation, standards, and guidance
- Image Credits
- Station Categories Classification
- Case Studies

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Hint and tips

To quickly navigate this document click on any of the sections or titles on this page.

To return to the contents page you can click on the Double Arrow symbol.



Image 0.2
Paddington station
Taxi Rank



Station Design
Introduction



1.1 Purpose of this Document



1.1.1 Purpose of this Document

This document offers high level guidance aimed at the Sponsors, designers, and planners of new railway station infrastructure in the UK. It outlines not just the factors determining physical space within stations but other components that need to be considered to achieve world class station design.

The document therefore references other guidance, standards and applicable legislation and acts as a signpost to other parts of the Network Rail guidance suite. References are provided throughout to the guidance suite, and suggests where these documents can further assist.

Railway projects are subject to the procedures of the PACE (Project Acceleration in a Controlled Environment) process, and this guidance helps users to navigate this process.

Key design considerations are set out and aligned to the PACE stages in Section 6 of this document as a design considerations toolkit: a practical checklist of action for anyone embarking on new station works in the UK.



Refer to Appendix A for a list of the full NR Guidance Document Suite

Refer to Design Considerations Toolkit for mapping of NR Guidance Documents against relevant PACE project stages



Image 1.1: HUB Station - Approach to a small rural station

1.1 Purpose of this Document



1.1.2 Who is the document aimed at?

This document is primarily aimed at supporting project teams and design teams defining, preparing and delivering station projects. It also defines the key components of a station and station journey, to help Sponsors develop quality criteria for the project, and help design teams develop their proposals to address the key requirements and objectives of a station and its contextual design, as well as Network Rail's principles of good design. Refer to image 1.2 which shows which sections are most applicable to each user group.

The following gives an overview of the key document users:

Design/Project teams:

- Project sponsors
- Project managers
- Architects, Urban Designers and Engineers
- Viability and market consultants
- Cost consultants and Economists
- Sustainability consultants
- Planners

Project stakeholders:

- Public Authorities and Public Bodies (governmental organisations that carry out tasks in the public interest such as Network Rail, the Greater London Authority, the Department for Transport)
- Local Authorities (County Councils, District Council, Metropolitan Districts, London Boroughs)
- Transport Authorities
- Station Operators
- Asset Managers
- Train Operating Companies

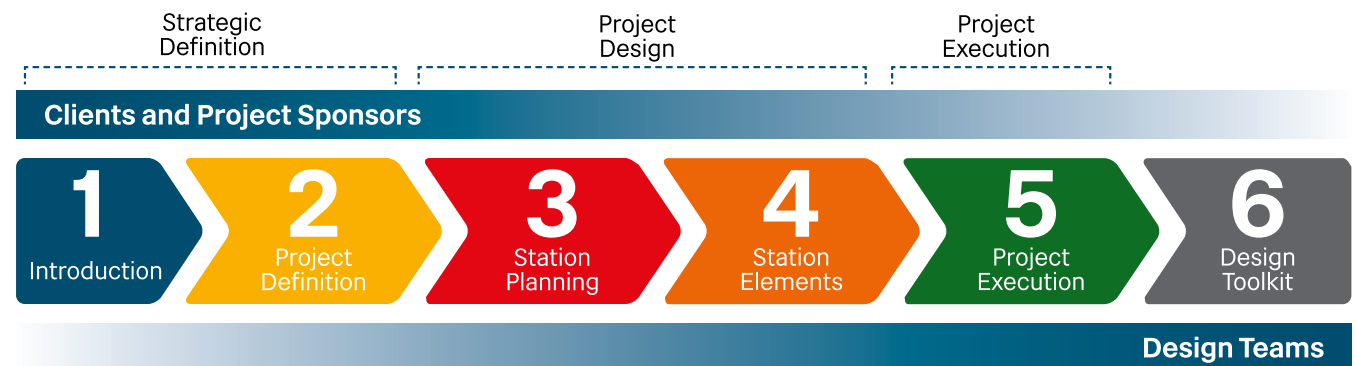


Image 1.2:
Who is the
document for?

This guidance in this document is focused on the passenger journey and experience when using stations. The document aims to provide a holistic overview of the different elements that contribute to successful, sustainable well designed stations.

Many of the topics discussed in this manual are covered comprehensively in dedicated documents within the NR Design Manual suite. This document provides references throughout to the design manual suite, and explains where these documents can further assist.

This document is designed to compliment the Design Manual for Medium to Small Stations, and reference is made to this document and the key HUB station themes.

Appendix A provides reference to the full suite of Design Manuals.

NR Guidance Suite Reference

Masterplanning at Stations
[NR/GN/CIV/100/07](#)

Investment in Stations
[NR/GN/CIV/100/08](#)

Implementation Strategy for Medium to Small Stations
[NR/GN/CIV/100/09](#)

Design Manual for Medium to Small Stations
[NR/GN/CIV/200/02](#)



Image 1.3:
York station

1.3 Our Principles of Good Design



Our Principles of Good Design identify ten key principles that enable Network Rail to provide a world class service



Identity

Consistent good design will allow the UK rail network to renew its reputation for innovative, high quality design for a new generation of 21st century stations. Stations should be developed in a way which provides delight, value for money and a high-quality experience to the user. We should take every opportunity to enhance the sustainability of our buildings. This will help our property to become easily identified as part of the high quality Network Rail landscape.



Passengers

Good design helps to maximise capacity while at the same time making the network a better and more accessible place for passengers. The design of good station environments facilitates the safe and efficient flow of passengers at all times.



Community focused

People, communities and businesses are placed at the heart of the decision process. Local community requirements are balanced with project and national rail infrastructure needs. The social demographics of the local area are understood and the station is developed in a way which elevates local people's quality of experience.



Collaborative

Projects are developed around an open dialogue with people, communities and businesses that can contribute and feed in through mutually beneficial ideas. Stations are developed through an iterative design process which is collaborative at every stage. Opportunities for investment are explored and stakeholders from the wider area are engaged in the design process.



Inclusive

Inclusive design places people at the heart of the design process. Stations are to be designed in a manner which allows people to use them in an equal way and reduces barriers to access and participation, making them welcome and popular. Due consideration is given to the most vulnerable users of the station to allow the design to develop in accordance with their requirements.



Connected

Development of the station should seek to improve interfaces with other forms of transport and simplify journeys. The railway should reach out into the wider area, making connections with the local community. The use of public transport should be promoted, and the station should contribute socially and to the local environment.



Contextual

Railway stations form part of a local area's physical identity and should be developed in a way that is consistent with the local context and culture. The civic quality and character of the existing environment should be enhanced through the development of railway projects.



Enhancing Heritage

Stations are to be designed and developed to strengthen the historical heart of the network by responding to the character of their heritage and social context. The rich existing heritage of Britain's railway infrastructure is to be respected and developed in a sympathetic manner. New design solutions should aspire to be long lasting in a way which adds value to the narrative of railway design in Britain.



Innovative

Innovative solutions should be explored wherever they have the potential to offer improvement. Stations should be designed in a way which considers the whole life cycle of the project to minimise waste and provide future flexibility. The maintenance requirements of the station are to be considered at the earliest design stages and sustainable solutions considered as an intrinsic part of the design.



Environment

Station design should consider the impact on both the natural environment and neighbours, and to consider how this can be minimised. Steps should be taken to minimise energy usage and embodied energy. Preference should be given at station for cycling and other methods of public transport. Design should consider the future and changes to the climate.

Station Design
Project Definition

2



Image 2.1
London Bridge station
paid area concourse



2.1 The Station as a Place



2.1.1 The Role of the Station

Stations play a key role in their local environments, and they provide a continual civic function and provide a consistent civic presence, at a time when high streets are declining, and other civic facilities such as libraries have been gradually decreasing.

Stations are used by a wider audience than those travelling, and increasingly can provide a great non-travel role.

This manual outlines several ways that stations can be better integrated to their local environments, and better meet their needs. This includes:

- Identifying community needs, and providing facilities and opportunities
- Increased engagement and collaboration with local stakeholders
- Focusing on how the station location, entrances and facilities can be best sited for the local environment, rather than driven by rail operations
- Identifying and drawing upon local character and uniqueness, with input from local communities and local expertise

All projects are unique, and design teams will identify different opportunities and ways that meet local needs. These can and should challenge briefs where there are benefits.

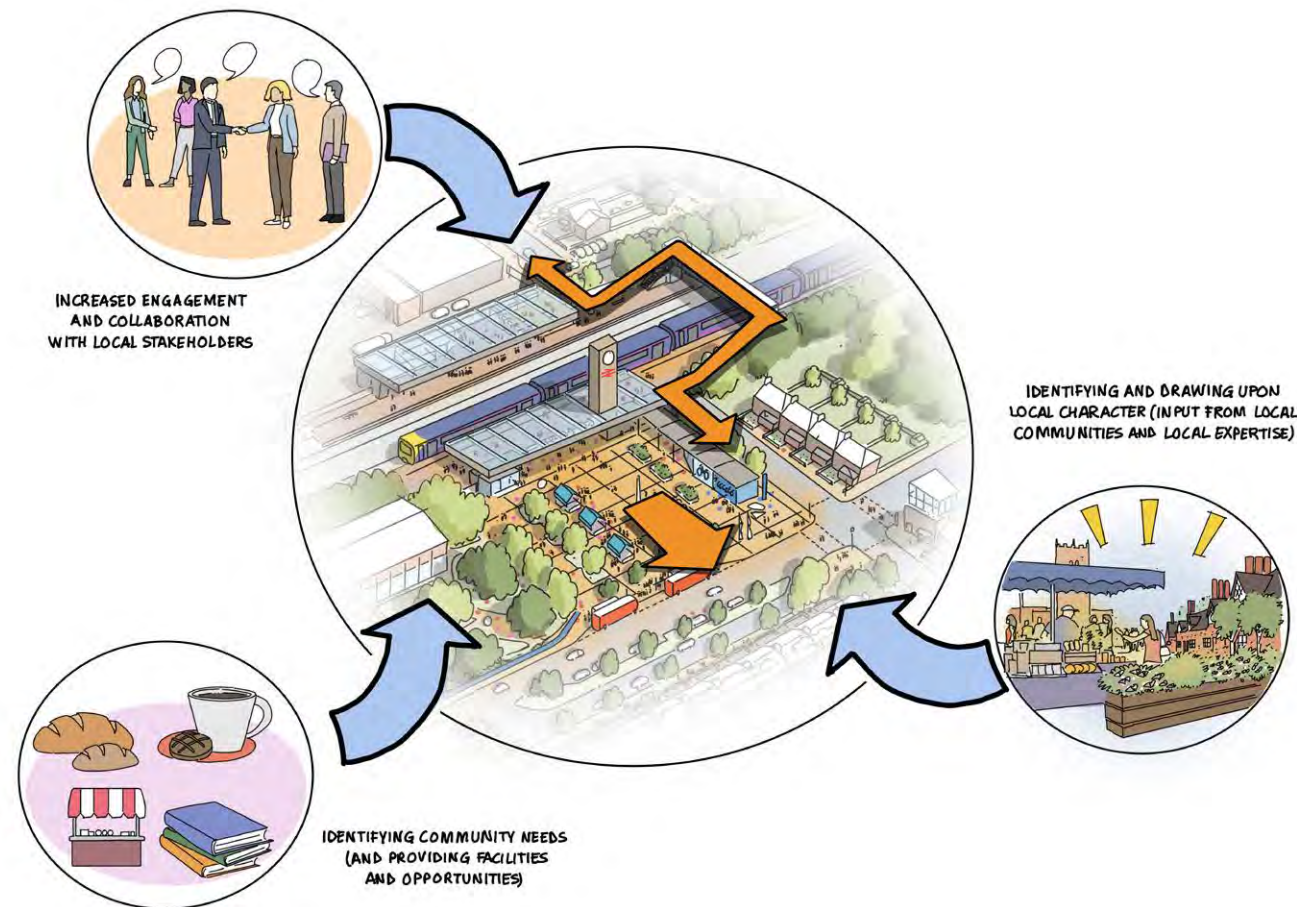


Image 2.2
The station as a place

2.1.2 Identifying Community Needs

The railway is a focus for the communities that it serves. Its value can be far greater than that of access to the railway alone, with the potential to make it a vibrant part of everyday life.

It is important to understand the needs of the community, both current and future, to identify gaps in local servicing and prioritise spaces and businesses that align to them. Local plans, masterplans and transport policies and engagement with the local authority will draw out the social character, demographics and other issues of the area. Engaging with community representatives will integrate professional expertise with local insight, tapping into local knowledge and revealing what makes a location unique.

A community will need not only facilities and spaces, but also opportunities, for instance a preference for local business or for hiring locally. There is huge value in doing simple things well, creating opportunities for social interaction and providing open spaces that make everyone feel welcome, or every-day facilities that make life more convenient: reliable wi-fi or charging points. Light-touch, flexible uses such as community gardens, local art installations or markets are a low resource solution with a high social impact.

2.1.3 Collaboration on Aims and Goals

Collaboration starts with an open attitude and open dialogue, with asking questions and being open to alternatives. Working and behaving collaboratively will help everyone involved establish a common basis of understanding, share requirements or aspirations, and help to reconcile them where they conflict. Open dialogue and engagement can present different ideas, not just in terms of how something looks or functions but also opportunities for different investment, procurement or ownership models that might make the difference between projects happening or not.

Working in this way has the potential to lead to both greater coherence: a consistent look and feel for key railway elements, and greater divergence: assets that become more representative of a local community, ultimately leading to both stronger national and local identities for the rail network and a rich overlay of the two.

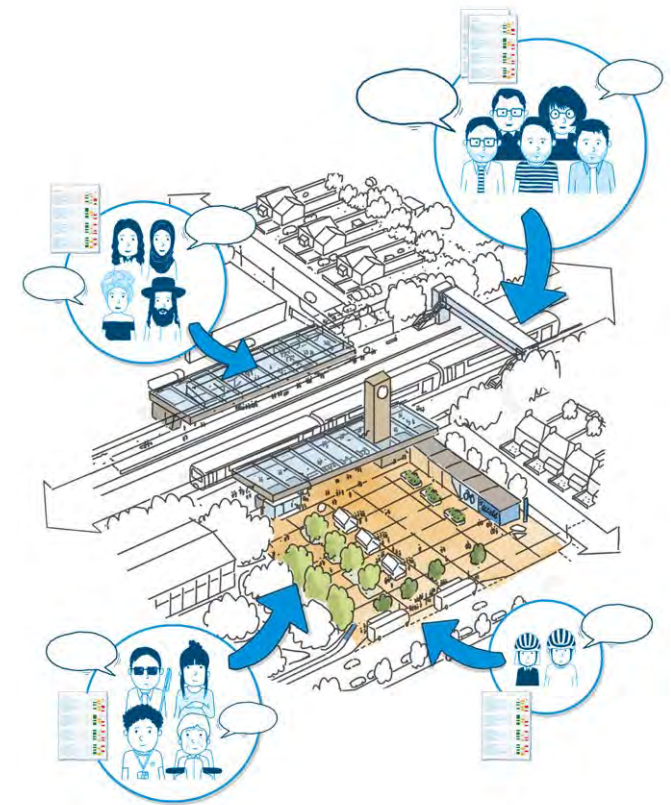


Image 2.3

A collaborative attitude while accounting for diverse priorities leads to better outcomes



2.2.1 Introduction

This section sets out the broader rail industry context for a station design project. It makes clear that station design can take many forms and be at many scales. It sets out the key considerations and procedures to follow so that the objectives of a project are both clearly stated and understood at the outset and effectively delivered.

Promoters of investment in stations should identify the specific objectives of their scheme. These might include:

- Providing greater capacity
- Improve passenger experience and satisfaction
- Improve accessibility of a station, and integration of the station within the local environment
- Increasing the connectedness of a community by providing new travel options
- Providing transport links to a new or growing community, a commercial centre or public facility
- Encourage or support local development
- Increasing usage of a station
- Increasing local and community amenity, and/or revenue generating opportunities at a station

To show how these objectives will be achieved through investment in a station the proposal will need to:

- Identify the nature of the local transport challenges being faced
- Determine the different transport options that could be adopted
- Understand the existing and future market for rail travel
- Demonstrate why a rail-based enhancement is most appropriate as part of a package of transport enhancements or on its own
- Evaluate which of the potential options for rail investment is appropriate
- Consider the impact of the proposed option on the operation of the railway
- Consider how the proposed option fits with wider rail industry strategy and objectives

2.2.2 Understanding the demand

In recent years, since the COVID 19 Pandemic, and the trend towards increased remote working, there has been a sharp increase in leisure travel and a decrease in commuting travel and business travel. Leisure travel now exceeds both commuting and business travel combined, as the main travel category.

Sources of travel trends include Train Travel Snapshot and ORR Passenger Rail Usage updates

At a local level the market for rail travel will be influenced by factors including local population density and work patterns, train service provision and the accessibility of a station. A proposal for station investment should consider and understand the size and nature of the future market for rail travel at a station and develop a proposal that addresses the needs of this market.

2.2.3 Understanding the capacity

Having established that demand exists, the promoter should assess the impact of the proposal on existing and planned rail services and stations. Capacity constraints elsewhere on the network might restrict the potential for new demand.

2.2.4 Aligning with rail industry strategy

The Rail Industry Long Term Planning Process (LTPP) looks at the long-term capability of the network up to 30 years into the future to promote efficient use of network capability and capacity.

By looking further ahead the industry can develop potential infrastructure interventions and explore important strategic issues.

2.2.5 Station enhancement programmes

Network Rail has several station specific enhancement workstreams as part of the Control Period 7 2024–29 programme, including but not limited to:

- Access for All
- National Station Improvements Programme
- New Stations Fund
- Putting Passengers First

In England and Wales The Rail Network Enhancements Pipeline (RNEP) sets out the Government's new pipeline approach to enhancements as outcome based investments. It provides a rolling programme of investment which moves away from a rigid five year cycle.



Image 2.4
Telford station

RNEP establishes a framework of five stages: the first three stages, “Determine”, “Develop” and “Design” are characterised by increasing levels of detail and understanding; the final two stages are “Deliver” and “Deploy.” By the time these latter stages are reached, all investment decisions have been taken and the focus is on building and operating the enhancement.

The PACE and RNEP stages do not align uniformly, but as a guide PACE Stage 1 is commensurate with Decision to develop, which produces an Outline Business Case. PACE Stage 2 is commensurate with Decision to Design, which produces a Final Business Case. RNEP relates to enhancements in England and Wales and includes a range of schemes, such as station enhancements, improvements to journey times and capacity of the network.

2.3.1 Good Design through repeatable elements

Repeat elements, such as common components can assist high quality design, as they offer predictability of assurance, and predictability of quality and implementation.

The HUB station concept demonstrates how designs can be modular and repeatable, whilst allowing a high degree of flexibility for local integration and local choices of materials and finishes.

2.3.2 Alignment of Stakeholders

Project Teams should develop a programme or matrix for engaging with stakeholders, to share updates on the project, allow opportunities for feedback, and to develop the project inline with local needs. Engagement with stakeholders should help build support for the project, identify and address concerns, and allow the project to deliver a successful design for those that will use it.

2.3.3 Role of Good Design in Assurance

Following the guidance set out in the Network Rail Design Manual suite will help assist the project assurance, acceptance and delivery phases, as the project will be able to demonstrate compliance with all key project requirements.

2.3.4 Barriers to Good Design

Conflicting or unclear aims and priorities should be identified and raised with the client team, as these can impact the success of a design, particularly where it is attempting to address aims that may be conflicting.

Good design can be incorrectly perceived as expensive. Client teams and design teams should consider good design as design that achieves all project aims and requirements in an efficient and effective way, without deviation from the project intent or unanticipated costs and changes.

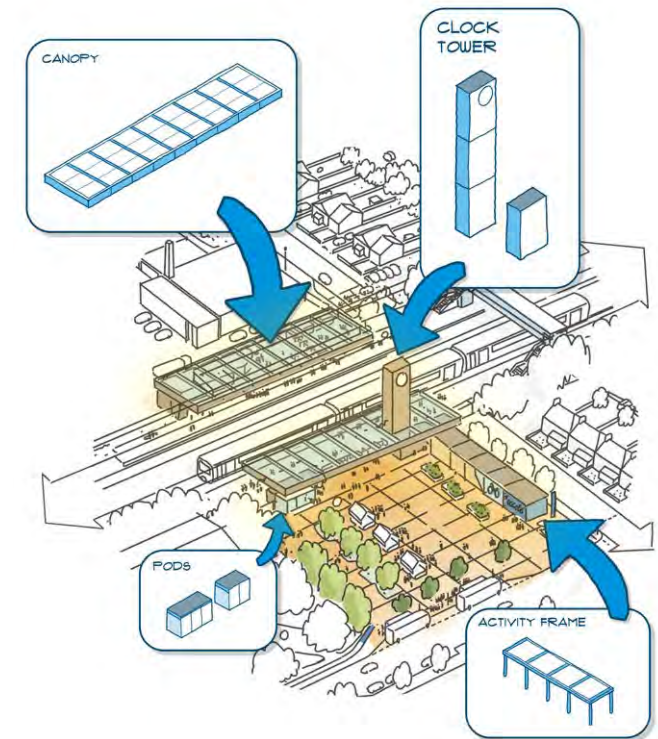
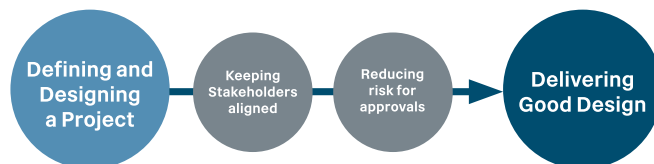


Image 2.5

HUB Station Concept -
Repeatable and modular elements provide a consistent identity while adapting to their environment



2.4 Options for Station Investment



2.4.1 Approaches to investment

There are three approaches for investing in station facilities that should be considered in the following order:

- Investing in an existing station
- Relocating an existing station
- Opening a new station

Any proposal should demonstrate that it offers value for money and fits with the Government's objectives and rail industry plans.

2.4.2 Investing in an existing station

The majority of projects will involve investing in existing stations. This is likely to be the least expensive option and the least disruptive to the operational railway. Investment can take a number of forms. Lower-cost initiatives range from the cosmetic such as improved lighting, signage or redecoration, through to new or upgraded retail and refreshment facilities.

More substantial improvements are necessary to increase accessibility or capacity, for instance installation of ramps or lifts to improve access, creation of new entrances/exits in response to changes in the wider context, or improvements to cycle and car parking or interchange facilities.

All projects at existing stations should identify opportunities to reuse and re-purposed existing buildings and structures, whilst exploring how these can be operated in more energy efficient and sustainable ways.

2.4.3 Implementation

Key issues that need to be understood with regard to the impact of the works are:

- Understand who owns and operates the station. Typically Network Rail will be the freeholder and a Train Operating Company (TOC) will be the leaseholder and operator
- Understand whether enhancement works are likely to impact on the operational railway
- Understand whether enhancement works are likely to impact on the access to and from the station

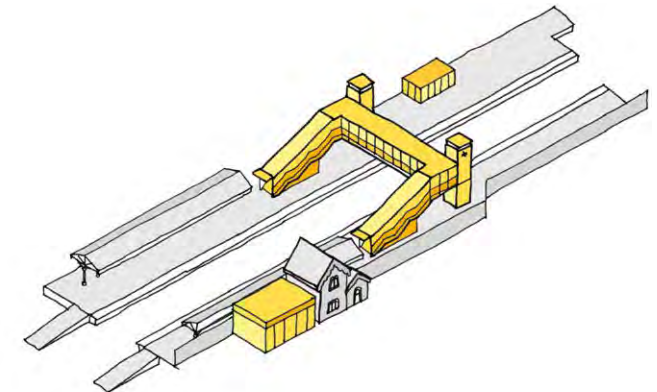
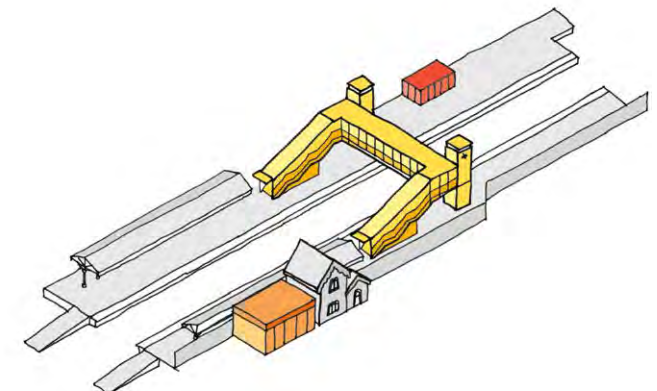


Image 2.6

Investing in an existing station —
Example with new accessible footbridge, expanded entrance building and additional waiting room on second platform



- Phase 1 - New accessible footbridge
- Phase 2 - Expanded entrance building
- Phase 3 - Additional waiting room

Image 2.7

Investing in an existing station —
The same investment project with a phased approach

2.4.4 Relocating an existing station

Shifts in settlement patterns and town centre land uses over time mean that some existing stations may no longer be located to best meet demand for rail travel.

Any proposal to replace or relocate a station should improve its ability to meet this demand and will need to clearly demonstrate value for money and fit with government objectives and rail industry plans. It should aim to make the station more accessible to the local community, attract new passengers and offer better access to the rail network, providing improved journeys and interchange opportunities, as well as more frequent and / or diverse services.

It will be important to understand the net increase in demand achieved by relocating the station, and to be clear on the new destinations or catchment areas served. It is also important that the current catchment area is not disadvantaged.

There will be an impact on the operational railway but relocation mitigates this by avoiding duplication of facilities and additional stops.

2.4.5 Planning a new Station

New stations are likely to represent a large investment and a potentially disruptive impact on the operational railway. It is crucial therefore that the proposal is robust, and that the benefits (e.g. increased revenue; modal shift; greater accessibility to communities leading to new passengers) and negative impacts (e.g. extended journey time from the extra stop) are clearly understood.

A positive business case is essential to the success of a new station proposal. In order to develop a business case the costs, benefits and impacts of the scheme should be understood. Both the capital costs associated with construction and the ongoing operating costs, including those for maintenance, repairs and renewals, and how these would be funded, need to be understood to assess affordability and the potential whole life cost of the development. A franchised Train Operating Company (TOC) will be required to operate services and will need to be engaged from the start alongside the relevant franchising authority. The Station Facility Owner (SFO), typically the TOC, will need to be identified.

It is important that a proposal for a new station is developed with an understanding of the current and planned service pattern on the route and of existing infrastructure constraints as defined in the Route Studies. Early engagement with NR and TOCs is recommended to establish scheme feasibility.

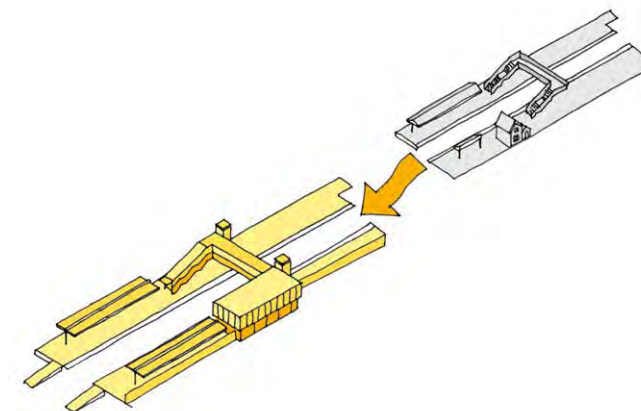


Image 2.8
Relocating an existing station

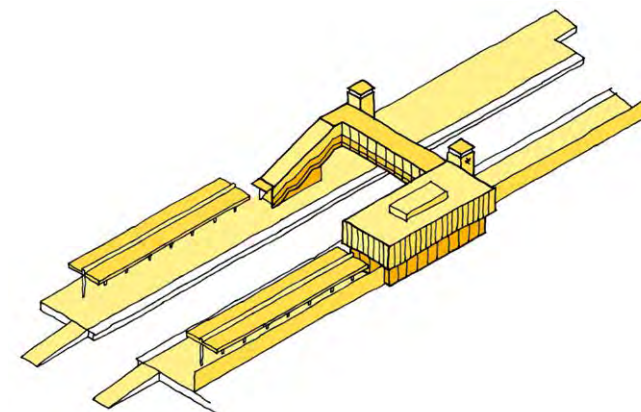


Image 2.9
Planning a new station

2.4.6 Strategic Design Considerations

There are key constraints that can have a major impact on the design concept of both new station developments and major station upgrades. These should be considered at an early stage and include the following:

Is there space for the length of platforms required?

- Platforms of new stations should be at least the length of the longest train planned to serve the station
- Are the station ownership / project boundaries optimal?
- Are there areas of land and/or building fabric that are surplus to the station current and future needs, that could be leased for community or commercial uses, or disposed of?
- Could additional space enhance the success and design quality of the project, and better support capacity growth or integration with surroundings?

Is the railway alignment straight or curved?

- Curved platforms result in larger gaps between the platform edge and the train, making it harder to board or alight and sighting of train doors by crew difficult

Are track gradients acceptable at the location of the proposed station?

- Wherever possible the average gradient of track where it runs alongside a platform shouldn't exceed 1 in 500
- Steeper gradients can make stopping or starting trains difficult

Is there road access to the site and optimised space for parking?

- Road access will be required for construction and during operation
- There will be a minimum number of pick-up / drop-off points and parking spaces required, including accessible spaces
- Is the provision of car parking appropriate for demand? And is there the opportunity to release or re-purpose space if provision exceeds current and future anticipated demand?

Are there existing services / utilities on site?

- Providing service infrastructure (water, drainage, electricity, communications) can be a major cost if they do not currently exist at the proposed site
- Existing services might be an obstacle to new construction. Surveys should be carried out early in the design process to identify any services that will need relocating

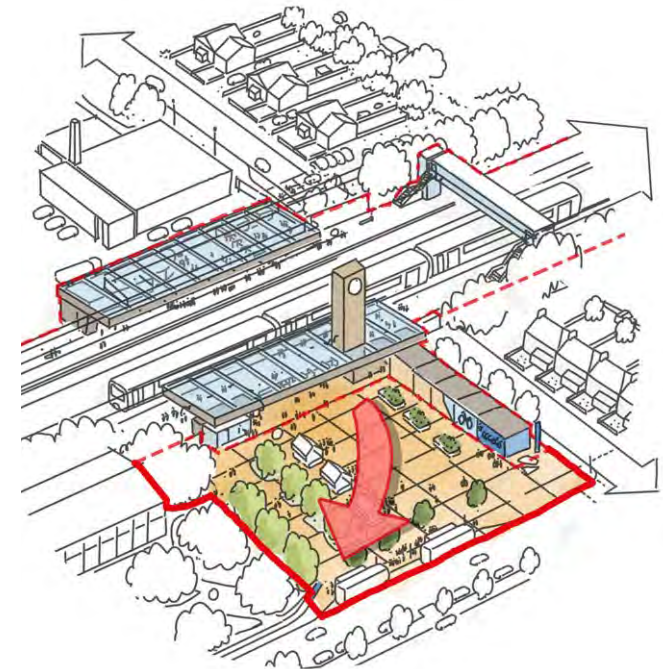


Image 2.10

Challenging and redefining the red-line (project boundary) can be a key opportunity in delivering good design

Project Definition

2.4 Options for Station Investment



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Image 2.11

Planning a new station — Worcestershire Parkway

Worcestershire Parkway is a new station that opened in 2020, and is sited where the Cotswold and Cross Country lines cross each other, providing connection to both lines.

The station is also located close to the M5, providing park and ride access that is expected to relieve traffic problems in Worcester city centre.



Image 2.12

Relocating an existing station — Meridian Water

Meridian Water station in Enfield, Greater London opened in 2019, replacing a poorly located and underused station, Angel Road that was sited 600m further north. The station has a higher number of trains calling at it than the former station, and is the starting point for some services.

The station serves the new housing development, Meridian Water, which will eventually have 10,000 homes.



Image 2.13

Investing in an existing station — Hackney Wick

Hackney Wick station was comprehensively rebuilt between 2017 and 2018, with a new entrance and ticket hall, and subway access to the two side platforms replacing the previous footbridge.

Wayfinding is improved, as a single entrance replaces the previous separate entrance ramps to each platform. The rebuilt station has lift access to platforms, and the new entrance is better sited for the nearby Queen Elizabeth Olympic Park.

HUB Stations are Network Rail's reference design intended primarily for category D, E, and F stations, which comprise approximately 80% of British railway stations.

The design provides flexibility in configuration and implementation, allowing for a range of local community input through a 'kit-of-parts' approach. The kit consists of five primary elements that can be assembled to suit a range of scales and contexts, this includes:

- An Activity Frame which allows for local uses and station facilities
- A Welcome Mat; the configurable public realm
- A Clock Tower providing a local landmark and housing core station equipment and services
- A modular Canopy which incorporates renewable energy via it's photovoltaic roof
- Modular Pods which provide configurable enclosed spaces for additional waiting shelters, toilets, ticket facilities etc.

The Implementation Strategy for Medium to Small Stations discusses how station teams can engage successfully with local communities and develop their projects to meet local needs, reflect local character, and enhance their environments.



Image 2.14
HUB Station concept visualisation

NR Guidance Suite Reference

Implementation Strategy for Medium to Small Stations
NR/GN/CIV/100/09

Design Manual for Medium to Small Stations
NR/GN/CIV/200/02

Project Definition

2.6 PACE



Station Design
Strategic Planning
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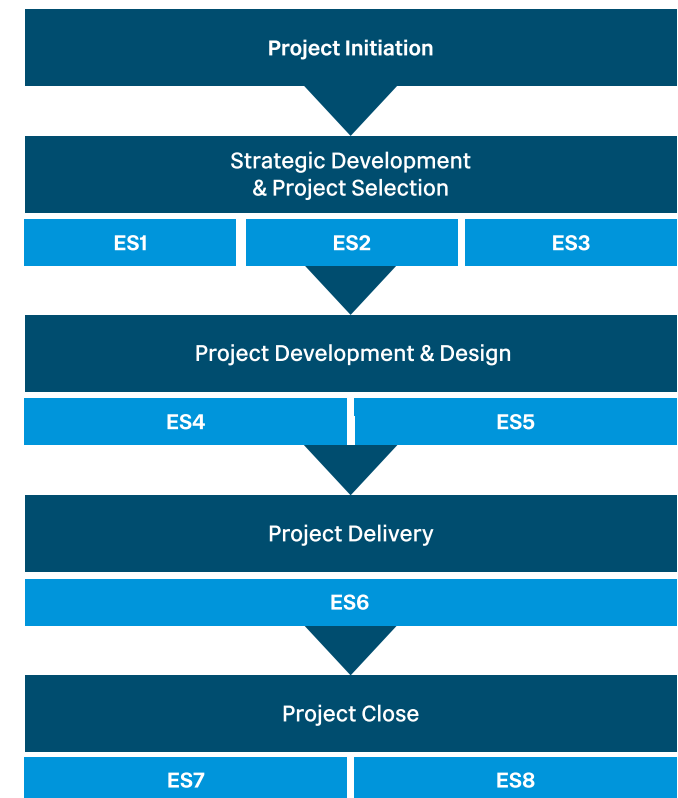
Project Acceleration in a Controlled Environment (PACE) is a project management process which has replaced Governance for Railway Investment Projects (GRIP). It is expected that all new projects will be managed via PACE moving forward.

PACE has been developed as part of Project SPEED; a wider joint initiative between Network Rail and the DfT in response to concerns that GRIP established an inflexible project environment which was too focussed on pre-determined deliverables

PACE provides a flexible delivery framework which is divided into five stages:

- Project Initiation
- Strategic Development and Project Selection
- Project Development and Design
- Project Delivery
- Project Close

PACE allows for a principles based, rather than rules based approach to project delivery, allowing project sponsors to overlap tasks where this provides benefit. The process includes regular 'phase readiness' and gate review processes to provide assurance that projects do not proceed at risk.



Standards Reference

Project Acceleration in a Controlled Environment (PACE)
NR/L2/P3M/201

Image 2.15
PACE Project stages

Project Definition

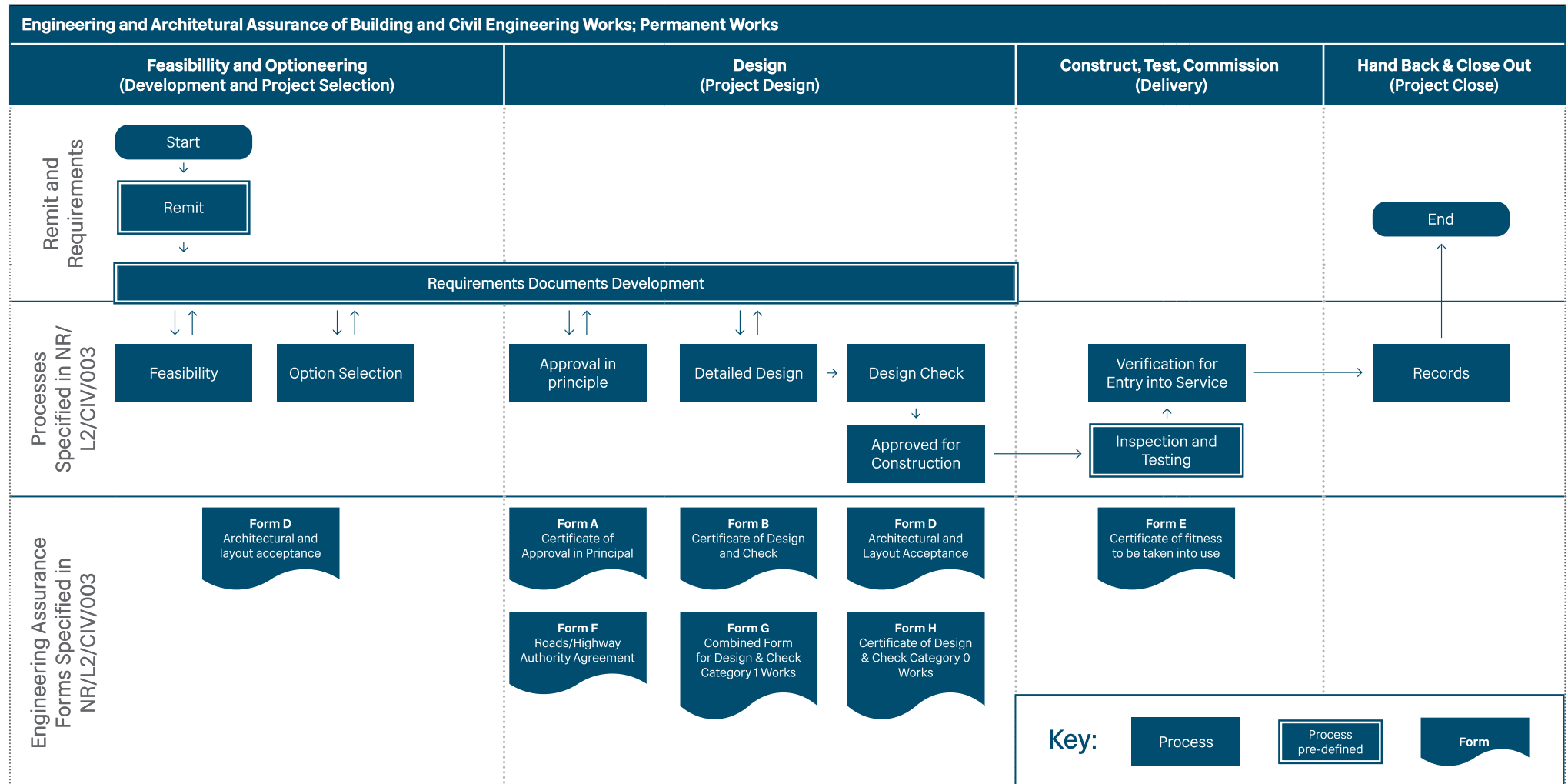
2.6 PACE



Station Design
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Engineering and Architectural Assurance of Building and Civil Engineering Works



Note: Timing of processes and outputs by PACE Stage shown indicatively and may vary to suit the project delivery strategy



2.7.1 Safety Regime

In order for a new station to become a usable part of the national rail network, its operator should comply with the conditions of The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS) by obtaining safety authorisation from the Office of Rail and Road (ORR). Major work to existing stations and the construction of any new station will need to comply with the Common Safety Method for Risk Evaluation and Assessment (CSM Regulation).

2.7.2 Network Rail Approvals Processes

Any development of or changes to Network Rail's property require a number of approvals from Network Rail and may also need approval from the ORR and the TOC.

Design approvals required include Technical Design Approvals (including forms A, B and D). The approval process is typically managed by the Project Manager's engineer.

2.7.3 Landlords Approvals

Operators who hold a Station Lease from NR may be required to apply to NR for their written consent as Landlord before they are able to undertake certain works at a Station. This is a bi-lateral agreement between NR and the Operator and does not require industry consultation. Consent is granted via a 'Licence to Alter' using an on-line portal.

Some activities at stations such as maintenance and repairs, emergency works, and works that don't materially impact on the operation of the station may not require Landlord's Consent. Stations leased under certain terms do not generally require Landlord's Consent for works other than where sub-tenants such as retailers want to make alterations. Landlords Approval does not remove the need to apply for Station Change or Minor Works agreements where required.

2.7.4 Minor Modification and Closure

Minor Modification is a shortened process that permits the removal or reduction of certain station services without the need to follow the full closure procedure under the Railways Act (2005). The removal or reduction may be treated as a Minor Modification rather than a closure if it is not necessary for, or in connection with, the provision of railway passenger services. This will need to be agreed formally with the ORR, the DfT and/or Transport for Wales or Transport Scotland as appropriate, and the affected TOC.

2.7.5 Station Change Procedure

Station Change is a regulatory process required for approving physical changes to a station or contractual changes required to facilitate development.

The Station Change procedure is a Station Access Condition (SAC) which along with other obligations, are rules governing Station Access Agreements (SAA), typically granted to Train Operating Companies (TOCs).

Proposals for Station Change can be brought forth by either a Station Facility Owner (SFO), a developer as a station investor (if they meet certain criteria), or by Network Rail with prior SFO approval. This involves consultation by the party promoting the change with the other beneficiaries (usually TOCs) and generally also the DfT, ORR and/or Transport for Wales or Transport Scotland as appropriate.

The majority of Station Change proposals require unanimous consent, or lack of objection, on the part of the beneficiaries. In most cases, the proposer is also required to offer the beneficiaries an indemnity against certain qualifying costs that they may incur either during or after the development has taken place.

Station Change for a major development should be run in parallel with the planning process and will likely require similar information to a detailed planning application.



2.7.6 Interdisciplinary Design Coordination (IDC)

The design team carry out an assessment to confirm that proposed design information is correct and meets the requirements of all aspects that the design will be interfacing with.

2.7.7 Interdisciplinary Design Review (IDR)

A review is undertaken by the Designated Project Engineer (DPE) to confirm that the design information that has been submitted for acceptance appears to be correct and meets the requirements of all interfacing designs and assets. The design team will need to prepare and present the information in a clear way to assist this review. Issues arising from the IDR should be recorded in an action tracker register, so that they can be managed and resolved before IDR close-out.

2.7.8 Design Advice Panel (DAP)

Network Rail's independent Design Advice Panel (DAP) assists Network Rail (NR) by enhancing design quality in its projects. It achieves this primarily through design review, a process where independent experts collaborate with NR project teams to provide constructive feedback and improve design quality. The DAP's main focus is on project design impact, distinct from other NR panels like the Built Environment Accessibility Panel.

	Description Checked Against												
Discipline Checked	Buildings	Civil Engineering	Construction and Staging	Earthworks	Ergonomics	ETE / Contact System	Level Crossings	OLE	Plant	Signalling	Systems (MEP)	Telecoms	Track
Buildings		X	X					X		X	X		X
Civil Engineering	X		X					X		X	X		X
Construction and Staging	X	X									X		
Earthworks													
Ergonomics	X	X											
ETE / Contact System													
Level Crossings													
OLE	X	X											
Plant													
Signalling	X	X											
Systems (MEP)	X	X	X										
Telecoms													
Track	X	X											

Image 2.16
Example of an IDC Discipline Matrix



2.7.9 Department for Transport Accessible Railway Stations: A Code of Practice (CoP)

The 'Design Standards for Accessible Railway Stations' is a Code of Practice jointly developed by the Department for Transport (DfT) and Transport Scotland. The purpose of the Code is to ensure that any infrastructure work at stations makes railway travel easier for disabled passengers. It applies to services provided by operators in Great Britain in relation to trains and stations.

Compliance with the Code is a requirement of the licence that Network Rail and each train operating company (TOC) has from the Office of Rail and Road (ORR). It applies in all cases including new, replacement, or renewed infrastructure.

Designers and operators should apply the CoP to all new, renewed or replacement works at stations, and where it is not possible to achieve this, dispensations should be sought. Where the CoP conflicts with Building Regulations, the CoP should take precedence.

Standards Reference

Design Standards for Accessible Railway Stations (CoP)

Department for Transport

National Technical Specification Notice (NTSN): Persons with Reduced Mobility (PRM)

Department for Transport

Diversity Impact Assessment - NR/L2/OHS/00135

Network Rail

The standard contains mandatory sections (in Cyan and Magenta) and non-mandatory advice (in Orange). Dispensations for mandatory items could be applied for from the DfT.

2.7.10 Diversity Impact Assessments (DIAs)

The Diversity Impact Assessment is a process that NR uses to gather and assess information, to demonstrate that projects and changes to stations or services are done in accordance with the Equality Act 2010. DIAs seek to anticipate the likely effects of projects or changes to the characteristics protected by the Equality Act.

The DIA process helps NR to identify the actions needed to improve performance, either by eliminating any potential or actual discrimination or disadvantage, remove or mitigate barriers, or taking opportunities to promote equality and foster good relations.

2.7.11 Built Environment Accessibility Panel (BEAP)

Network Rail's Built Environment Accessibility Panel (BEAP) assist Network Rail to deliver an inclusive and accessible built environment. They offer technical advice on the design and management of Network Rail built environment proposals public realm improvements. Project teams should contact the BEAP to determine whether their proposals require BEAP consultation, and at which stage within the design process.

NR Guidance Suite Reference

Design Advice Panel Project Guidance

NR/GN/CIV/100/01

Built Environment Accessibility Panel

NR/GN/CIV/100/10

Inclusive Design

NR/GN/CIV/300/04

Diversity Impact Assessment

NR/GN/CIV/300/07



2.7.12 Railway Industry Approvals

As a 'Statutory Undertaker' certain legislation does not apply or is not relevant to development works undertaken by Network Rail.

Conversely, in addition to applicable legislation, further provisions and procedures apply specifically to the railway industry. Prior to the commencement of any design commission or any contract works, guidance should be sought from Network Rail to fully understand which apply.

The overall design will need to satisfy the following:

- Provide suitable capacity and facilities to meet the project objectives
- Comply with relevant national standards so that the construction, operation, maintenance, and renewal of the facility can be achieved safely and straightforwardly
- Due regard to any heritage requirements
- Either Network Rail or the Train Operator's design standards as appropriate

Detailed technical and legislative issues such as track curvature, signal sighting, proximity of track etc. can have a material impact on the concept and therefore need to be factored in at an early stage. Other railway upgrades under consideration may also have a bearing on the project. Network Rail is well placed to offer guidance on these issues.

2.7.13 Dispensations and Derogations

Projects and their Operators are required to comply with a variety of standards, guidance, and the DfT Code of Practice: Design Standards for Accessible Railway Stations for all installation, renewal, or replacement works at stations.

Where adherence to the Code of Practice is not possible; for example, retrofitting a sensitive heritage asset, the operator must apply to the DfT for a dispensation or derogation. The difference depends on which aspect of the Code cannot be adhered to.

Application for dispensations (or derogations) must be made to the DfT as early as possible, i.e., well before the finalisation of design proposals, or seeking planning or other consents (including Station Change).

It is unlikely that dispensations or derogations will be granted for new or relocated stations, or the substantial redesign of existing stations.

2.7.14 Challenge Statements

Where standards conflict with the aims of achieving good quality design, Network Rail encourage issues to be raised through the Challenge Statements page on the Network Rail website.

2.7.15 Planning Approvals

At a national level planning guidance on transport infrastructure differs across Great Britain. In England this is provided by the National Planning Policy Framework, in Wales by the Planning (Wales) Act 2015, and in Scotland by the National Planning Framework 4.

Network Rail as a Statutory Undertaker has permitted development rights to undertake certain works without further planning permission. This can include alterations and modifications to existing station buildings. There is no such exemption under Listed Building Legislation, where any works impacting on such buildings normally require separate consent prior to commencement.

Any station development that involves a joint venture with a developer may require a traditional planning application procedure.

Construction of new stations is not usually possible under permitted development rights. In such cases either a planning consent, Development Consent Order (DCO), a Transport and Works Act (TWA) Order or a Transport and Works Act Scotland (TAWs) Order may be needed. Any proposal should be assessed to assure the correct approach is taken as various thresholds and differences apply depending on the type of development proposed and where it is in Great Britain.

Where permitted development is being used, early consultation with the Local Planning Authority (LPA) is important. The LPA is still able to exert an influence over the design and location of the proposed works, and in certain instances 'prior approval' from the LPA may also be required before construction starts.

Interpretation of the various planning acts and related legislation is a specialised field and should always be referred to the National Town Planning Team at NR for guidance on the use of this legislation, including when permitted development rights apply. Project budget and timing implications should be checked at an early PACE stage for an idea of the likely complexity and to identify the risks to cost and programme.

2.7.16 Building Regulations

All new works in England and Wales should be designed to comply with the England and Wales Building Regulations, the Building Safety Act, and all appropriate codes of practice.

In Scotland all new works should be designed to comply with the Scottish Building Regulations and all appropriate codes of practice.



2.8.1 Network Rail (NR)

Network Rail is the owner of rail infrastructure including track, bridges, tunnels and the freehold of most stations. It is accountable for the operation, maintenance and renewal of network assets.

The typical arrangement for a new station is for Network Rail to be the long-term owner of any new or replacement station, with a TOC taking on the role of Station Facility Owner (SFO).

2.8.2 Department for Transport (DfT)

The DfT has overarching responsibility for rail strategy and is the franchising authority for passenger rail services provided by franchised TOCs in England. This means that approval or authorisation will need to be sought from the DfT if:

- A franchised TOC is expected to serve a new station
- Any investment impacts on the long-term finances of a franchisee
- Third-party proposals include a change in the specified service of a franchised operator

The DfT also requires any proposal to have used its Transport Analysis Guidance (TAG) process to demonstrate a robust business case.

2.8.3 Office of Rail and Road (ORR)

The ORR is the independent economic and safety regulator for the whole rail network in Great Britain. It issues and modifies licences to operate trains and stations. It also approves and may amend contracts for access to track, stations and light maintenance depots. Each TOC requires a contract to enable its trains to call at any stations of which it is not the Station Facility Owner (SFO). This is referred to as an access agreement. The ORR needs to approve any new or amended station access agreements.

Any material physical change to existing station facilities require a 'Station Change' which has the effect of changing the terms of a station access agreement and will therefore require ORR approval.

New stations and major works to existing stations requiring National Technical Specification Notices (NTSNs) to be applied require Authorisation from the ORR.

2.8.4 Franchised Train Operating Companies (TOCs)

Franchised TOCs operate passenger train services and act as SFOs at specified stations on their route. As an SFO they lease the buildings and land for the duration of their franchise. They are responsible for general upkeep, cleaning, security and maintenance of the station and car park areas. They may also fund station improvements e.g. retail upgrades, where this will contribute to increased revenue over the course of their franchise. As the day to day station operators, TOCs have invaluable knowledge about the needs of their customer and the issues that need to be addressed. They should be involved in any proposal from an early stage.

2.9.1 Minimum Viable Product

Minimum Viable Product (MVP) refers to the outcome of a continual process of refinement aimed at delivering the best value for an investment. It is an aspect of the optioneering process and should help rather than hinder clients in making informed decisions.

There is difference between the 'minimum product' and the 'minimum viable product'. MVP is not just the cheapest option; it should be viable to deliver, operate, maintain, and deliver the project aims and benefits.

The purpose of MVP is not reducing scope, discounting additional benefits or social value, or defining 'the problem' or business needs.

2.9.2 Minimum, Minimum Viable, and Minimum Viable +

- Minimum: is the absolute minimum solution but will not meet the project aims, aspirations or defined project outcomes.
- Minimum Viable: is the product or solution that will meet the agreed project outcomes at the lowest cost.
- MVP++: is the minimum viable product in addition to further items that create additional value which the client agrees to fund.

2.9.3 Determining the MVP

In order to determine the minimum viable product the projects desired benefits need to be defined and agreed from the outset, this includes the key success criteria with regard to requirements and 'value drivers'.

Value drivers should be defined, agreed, and prioritised as part of the Client Remit to steer the determination of the MVP based on benefits and value. These will vary depending on the type of project, funding source, client requirements and aspirations, and environmental factors. Typical value drivers may include; Time, Safety, Capacity, Performance, Sustainability etc.

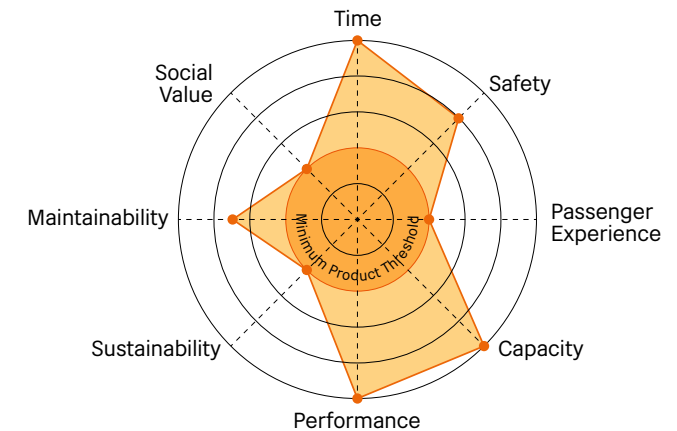
Once the MVP has been agreed it should be fed back into the project's scope and sponsor's instructions so that all stakeholders understand what will be delivered by the project.

2.9.4 Measuring the MVP

Measurement of the MVP can be achieved in a variety of ways, however measurement is undertaken it should record and demonstrate:

- How the proposed MVP has been generated.
- The predicted cost, benefits, and disbenefits of each aspect of intervention.
- How the proposed solution has been built-up from the minimum product.

Client A



Client B

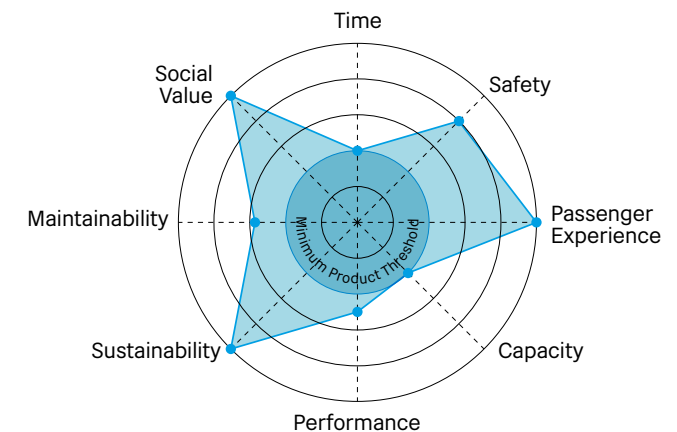


Image 2.17
Comparison of Client A and Client B's 'Value Drivers'

Project Definition

2.9 Minimum Viable Product



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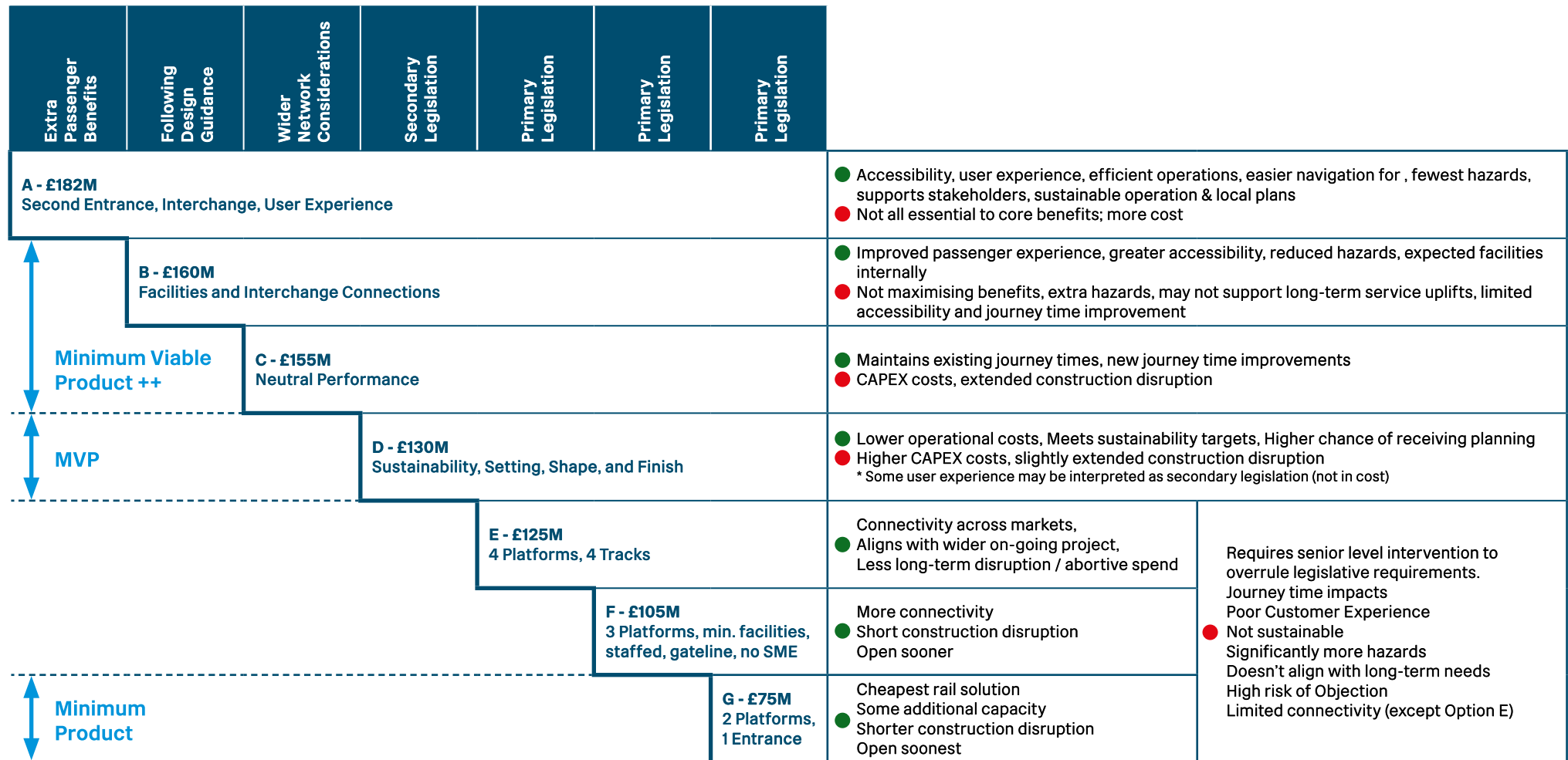


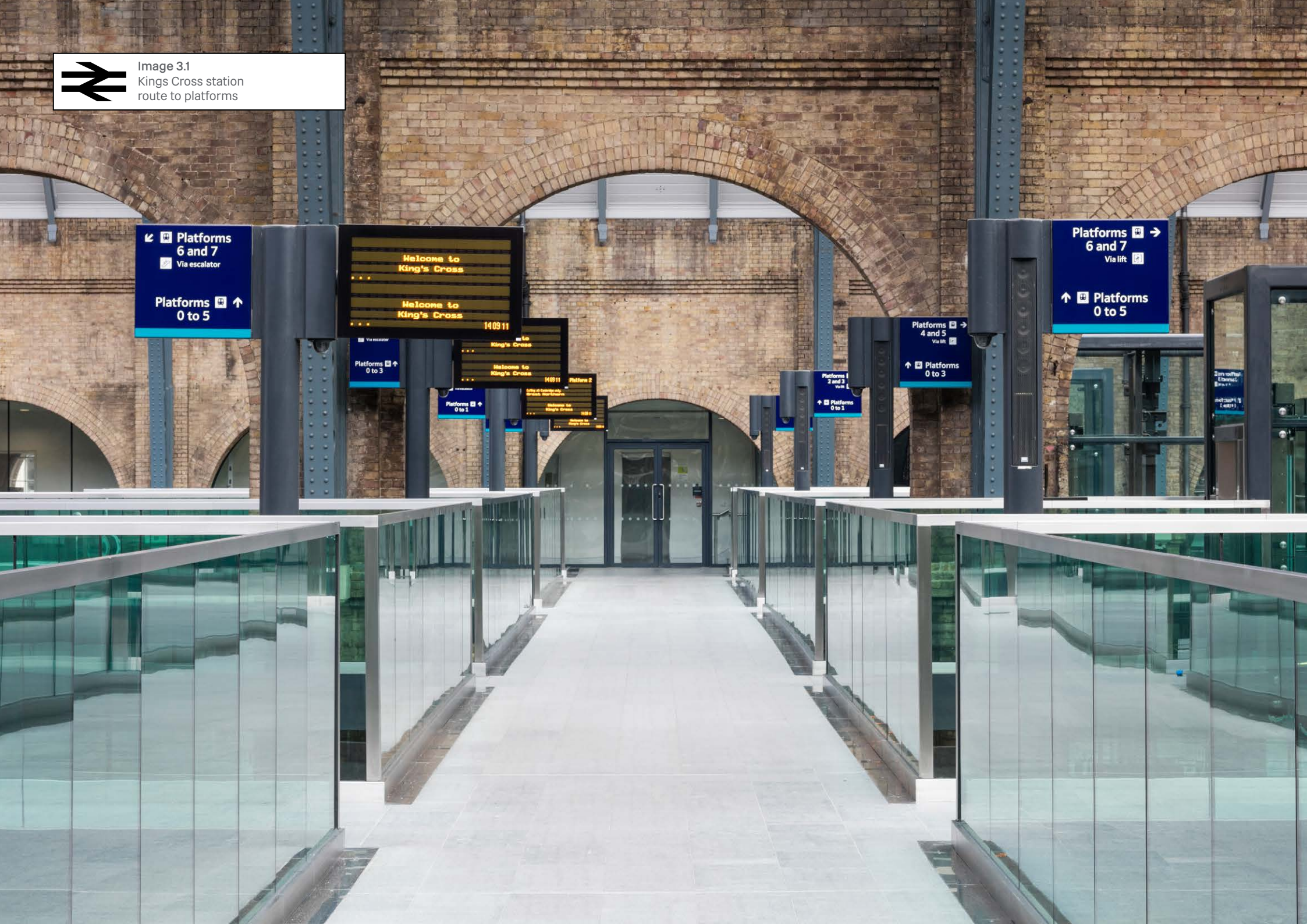
Image 2.18
Example of MVP measurement and recording developed by NR Eastern Region

Station Design
Station Planning

3



Image 3.1
Kings Cross station
route to platforms



‘Passengers are the lifeblood of our business. Good design helps to maximise capacity while at the same time making the network a better and more accessible place for passengers’

3.1.1 Our principles of good design

1.7 billion journeys were made by rail between 2019/20 in the UK, and this figure is forecast to double within the next 25 years. Passenger growth needs to be supported by new infrastructure and rolling stock of a quality that attracts and retains users.

For a great experience that meets the needs of passengers today and in the future, stations and rail systems have to provide a seamless sequence of functions and experiences, from journey planning to arrival, ticketing, waiting and boarding. Extensive passenger surveys provide the answers to what passengers want from their stations. The main drivers to overall passenger satisfaction are:



Generous Barrier-free Spaces

That are easy to navigate. The aim is to create ‘legible environments’ that are simple, coherent and understandable. These will be spaces that are convenient for all regardless of levels of ability or mobility.



Information

At all stages of the journey in and beyond the station through clear, consistent signage, supported by available and helpful staff and mobile technology.



Facilities

For welfare, for shopping, for food and beverage outlets that are convenient to use whilst travelling, often with little time to spare.



High-quality Environments

Offering all-weather protection, with safe and secure spaces to walk, stand and sit. Well maintained environments with good standards of cleanliness.

In addition to the functional criteria such as reliability or security that typically figure highest in customer satisfaction surveys, there are other, less tangible characteristics of stations that combine to deliver 'Delight' and travel that lifts the spirits, encouraging repeat use of the rail network and growth in passenger numbers. Travelling by rail engages all the senses in ways that people are unlikely to identify without prompting but would miss if they weren't part of the passenger and railway experience.

Image 3.2
Margate station



3.1.2 Light

Daylight and sunlight is animated light, alternately bright or shaded, and shifting over the daily and annual cycle. Stations should be designed to be naturally daylit wherever possible. This doesn't necessitate all glass, which in any case risks discomfort of glare or over-heating. A space can be fully daylit with carefully located glazed openings in the roof and facade that can be used to draw attention to parts of the building or be an aid to navigation and support instinctive wayfinding. Natural light should be complimented by the artificial lighting design, which provides flexibility for both functional and decorative lighting.

3.1.3 Volume

Major city termini often have a grand, cathedral scale on the inside, but even the scale of smaller local stations, through a careful consideration of volume and proportions, can provide a sense of generous space that encourages passengers to pause and take a breath.

3.1.4 Sound

Good acoustics in stations are important so that passenger information and announcements are intelligible and easy to hear, but allow people to notice the other sounds of the station, of the trains themselves or the sound of many conversations happening at once. Pianos have been appearing in stations for over a decade;

prominently positioned, they encourage passing passengers to play, overlaying other sounds with a joyful drifting note of music.

3.1.5 Touch

There are relatively few 'touch' points in a station and this has decreased further with the advent of contactless and electronic tickets. Where there is a requirement to sit or touch: passenger seating, handrails or door handles for instance, the tactile quality of materials matter. For example, the use of seating that is warm to the touch can be a small but welcome part of the passenger journey.

3.1.6 Colour and Pattern

The colour palette within stations should be predominantly neutral to generate a calm atmosphere and allow wayfinding information to stand out. Neutral, however, doesn't equate to bland. The combination of base materials: the multiple colours of stone or brickwork, grey slate, the warmth of timber or light catching on metal, create an inherently rich backdrop. Against this, bright or distinct colours pop to highlight particular elements: benches, handrails or the structural frame. Certain colours become a signature, indelibly linked to the station, and become part of its heritage, for instance the orange and brown of Wemyss Bay, or the rich dark blue at Brighton or Waterloo.



Refer to Delight
in the Design Considerations Toolkit

Stations are categorised into six types, determined by the frequency of usage of the station and complexity of interchange. A summary of the station types is shown below.

Any project involving an existing station will be driven by the need to increase capacity or to improve existing facilities. Capacity and congestion issues do not only impact the larger and busier stations. Even stations in the lowest category can experience congestion problems, especially if they serve mass entertainment venues with large peaks of activity, such as Wembley Stadium.

Network Rail's Station Capacity Assessment Guidance provides guidance on how to assess existing stations and develop proposals so that the public circulation in stations is safe and convenient.

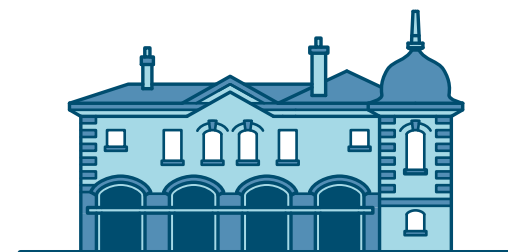
Appendix B lists the passenger amenities and facilities that should be provided for each station category.

Local needs and amenities demand will vary by station, and in many instances it will be appropriate to provide greater amenity than listed in Appendix B to satisfy local conditions and demands.



Category A – National Hub

The largest stations, these are major termini or interchanges. Examples include Birmingham New Street, London King's Cross and Cardiff Central.



Category B – Regional Interchange

These stations are key hubs on the network, serving cities and major towns, or acting as interchanges. Examples include Cambridge, Derby and Clapham Junction.

NR Guidance Suite Reference

Station Capacity Planning
NR/GN/CIV/100/03

Station Planning

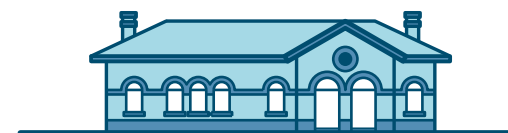
3.2 Station Categorisation

	No.	Type	Journeys made and revenue generated, per annum
A	28	National Hub	Over 2m trips: over £20m
B	67	Regional Interchange	Over 2m trips: over £20m
C	248	Important Feeder	0.5–2m trips: £2–20m
D	298	Medium Staffed	0.25–0.5m trips: £1–2m
E	695	Small Staffed	Under 0.25m trips: Under £1m
F	1,200	Small Unstaffed	Under 0.25m trips: Under £1m
	2,536		



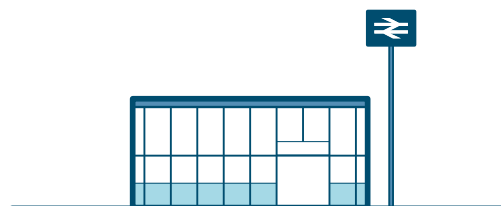
Category C – Important Feeder

Stations providing important ‘rail feeder’ services on busy routes. These stations are sub-divided into C1 (city or busy junction) such as Durham, and C2 (other busy railheads) such as Hemel Hempstead.



Category D – Medium Staffed

Stations typically serving inter-urban business or a particularly high volume of urban commuting. Examples include Bourneville, Deansgate, and Kings Norton.



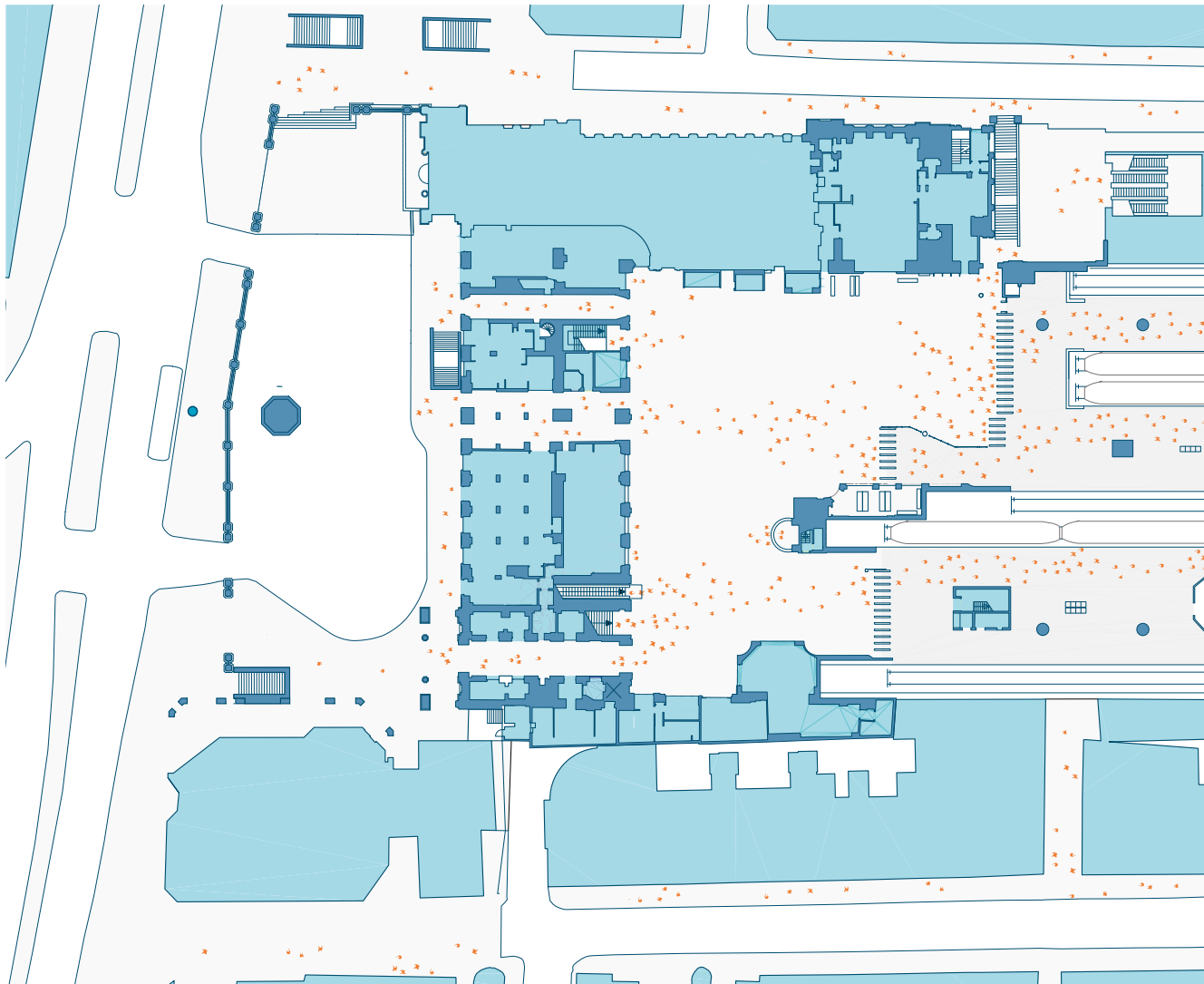
Category E – Small Staffed

These small staffed stations typically have only one member of staff in attendance at any one time. Many stations will only be staffed for part of the day. Examples include Boston, Dovercourt and Stoke Newington.



Category F – Small Unstaffed

These amount to almost half of the stations on the network. These stations serve local communities and can vary widely in terms of size and facilities provided. They often have a surprisingly large station building as part of a historic legacy, with a civic presence that defines the character of the immediate area.



‘Only architecture that considers human scale and interaction is successful architecture’

Jan Gehl

3.3.1 Steps to good station design

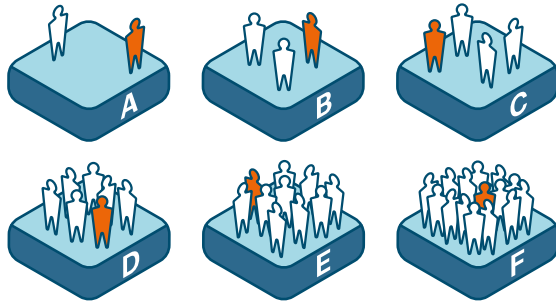
Good station design is a sequence of steps, from initial concepts, through to the exploration of alternatives to a detailed preferred option.

Each intervention is an opportunity to enhance the network, and meet or exceed the design ambition of the UK’s railway in the 21st century.

Stations need to be planned and sized to meet long term forecasts for passenger flows and resulting train service patterns. With rising demand there is a need for new stairs, lifts, entrances and connections, major changes such as new platforms and even new stations.

Image 3.3

Plan of Charing Cross Station, showing passenger flows



3.3.2 Define the comfortable passenger density to be met

American academic J.J. Fruin gave definition to comfortable passenger densities in the 1960s, a codification that is still used today around the world by transport authorities. He defined the 'levels of service' (LOS) from LOS A, corresponding to free-flowing movement, to LOS F where the passenger density makes any walking movement difficult.

The rail industry has adopted a range of these density standards dependent on their location, from LOS B/C on platforms to LOS D at ticket gates where the gathering of passengers is momentary.

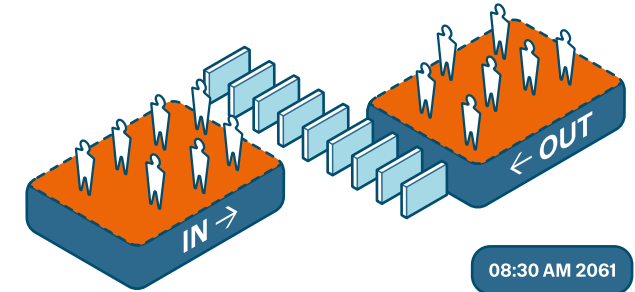
These design criteria apply in normal operations, with higher densities permitted during abnormal, degraded or emergency conditions.

3.3.3 Level of Service (A-F):

Description for queuing areas, walkways and stairways.

- **A:** Free circulation.
- **B:** Uni-directional flows and free circulation. Reverse and cross-flows with only minor conflicts.
- **C:** Slightly restricted circulation due to difficulty in passing others.
- **D:** Restricted circulation for most pedestrians. Significant difficulty for reverse and cross-flows.
- **E:** Restricted circulation for all pedestrians. Intermittent stoppages and serious difficulties for reverse and cross-flows.
- **F:** Complete breakdown in traffic flow with many stoppages.

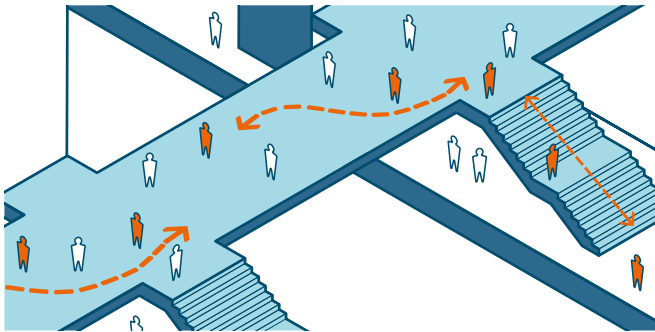
Descriptions Credit TfL 2012



3.3.4 Assess the numbers of passengers travelling

Station capacity assessments are based on forecast passenger demand for a defined time period in the future, normally the busy morning and afternoon peaks as passengers travel to and return from work. The total forecast number of entering and exiting passengers are factored up by 25% to allow train service disruption. These forecasts typically include detail on passenger numbers interchanging within the station and choice of onward destinations.

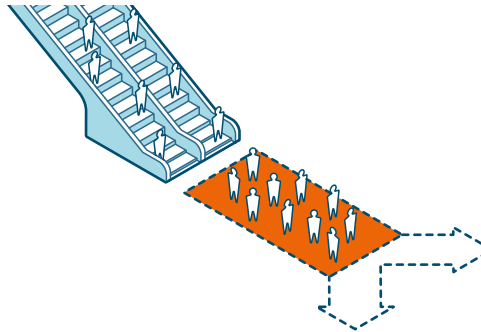
Demand forecasts are either provided by or verified by Network Rail's Station Capacity Team.



3.3.5 Establish the pattern of movement

Analysis of these forecasts gives a good indication of passenger numbers and an understanding of interchange and entry/exit movements that establish desire lines through the station. The design will need to think about intuitive wayfinding, good visibility, and fast and slow spaces. These contrast where the focus is on movement and where people are likely to sit or stand, for instance in front of passenger information screens or where food and beverage is served.

A key aspect of station design is dealing with changes of level as passengers cross above tracks or in response to variations in existing site levels. It is important to determine the optimum arrangement of routes and vertical circulation (lifts, stairs, and escalators).



3.3.6 Make space for passenger movement

Having established the passenger numbers and patterns of movement, the key station elements can be sized using clearly defined formulae set out in the Network Rail Station Capacity Planning guidance, with m² per person used for calculating areas and numbers of people per minute per metre width used for calculating routes.

Good space provision is particularly important where passengers are queuing or making a decision. Accordingly, run-off or queuing zones are mandated for certain station elements. The lengths of these are defined but vary according to the element. For run-off zones these also vary depending on what is beyond the end of the zone.

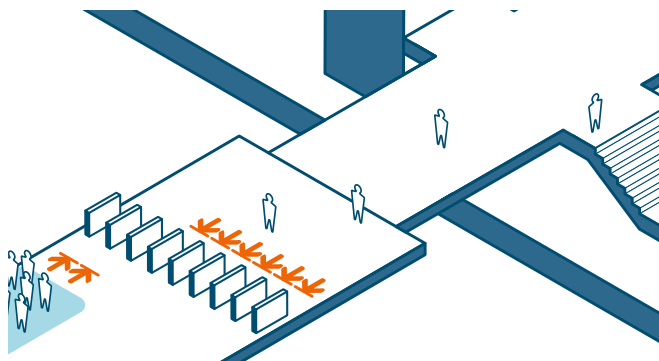
- **Run-off zones apply to:** Escalators, moving walkways, stairs and gate-lines
- **Queuing zones apply to:** Ticket machines, ticket windows and lifts



**Refer to Capacity in the Design
Considerations Toolkit**

NR Guidance Suite Reference

Station Capacity Planning
NR/GN/CIV/100/03



3.3.7 Develop an operational concept

An operational concept will define how the station passenger flows work at different times of day, how they are managed at peak times and in the event of routine stresses.

The operational concept will define passenger holding areas and measures to manage the platforms and prevent them from becoming overcrowded.

Signage and wayfinding have a key role to play in defining routes and directing flows of people through the station. Variable or switchable signage may be used to alternate routes at different times of day or to deal with specific events or pressures.

3.3.8 Assess that the station can handle abnormal, degraded and emergency situations

It is important to assure that a station continues to function acceptably during abnormal scenarios including significant delay to trains, construction activity or special events.

Station occupancy at the time of evacuation is based on peak usage, and incorporates a five minute delay to the scheduled train service in the busiest direction only. Two scenarios are considered to replicate the most onerous conditions:

- A train arriving on fire in the peak period
- A station fire occurring in the peak period in a location blocking the exit with the greatest capacity

Emergency evacuation of all or part of a station must meet maximum escape times. Key elements and areas of the station need to be stress tested in collaboration with the Fire Safety Engineer to formulate a tailored station fire evacuation plan.

A Threat, Vulnerability and Risk Assessment (TVRA) needs to be carried out. The DFT's Security In Design Of Stations (SIDOS) needs to be considered early in the design stage. ASD and OSD elements have implications for emergency escape. Refer to section 4.10 for Oversight Development (OSD) and Adjacent to Site Development (ASD) considerations.

NR Guidance Suite Reference

Wayfinding
NR/GN/CIV/300/01

Inclusive design is a process that aims to deliver spaces and places for everyone. When achieved it means that everyone benefits from the full range of services and opportunities that Network Rail can offer.

3.4.1 Inclusive design

It's NR policy to put people at the heart of the design process, so that passengers can use the railway safely, easily and with dignity. This means that one design solution does not fit all, and designers will need to carefully consider how people move through station including those with cognitive, sensory and mobility disabilities and passengers with pushchairs, luggage and cycles.

A fully inclusive station also has wider societal benefits, connecting people to their jobs, schools and colleges, shops, hospitals, open spaces, leisure facilities and their families and friends. An inclusive rail network means that everyone can make those connections, and play an active role in their local community and contributing to their local economy.

The UK's demographic is changing and fast becoming an ageing society. Providing buildings and environments that are convenient and accessible will help to future-proof the railway for an ageing population and increased incidence of disability.

Designers should be supported by Network Rail's Diversity and Inclusion Team who will provide guidance based on their extensive knowledge and expertise, supplemented by professional advice from elsewhere within Network Rail and from specialist external organisations.

As inclusive infrastructure is delivered across the network, this will help all passengers move safely, quickly and in comfort through stations. Many of the things that support disabled and older passengers, like good signage, lighting, extra seating and unobstructed pedestrian routes help everyone on their journey.

Inclusive design is an important part of the assurance process through which NR has many legal obligations including but not limited to:

- The Equality Act 2010
- National Planning Policy Framework
- Persons of Reduced Mobility Technical Specification for Interoperability
- Design Standards for Accessible Railway Stations: A Code of Practice
- Building Regulations

For the best project outcomes projects should engage with disabled and older people, as well as inclusive design experts. In support of this process the NR Built Environment Access Panel (BEAP) provides expert technical and strategic advice to project teams, particularly on major, challenging or contentious projects.

Inclusive design should be the ultimate goal of every designer, client team and facility manager. It has relevance to the whole estate including: stations, offices, depots, level crossings and footbridges.



**Refer to Accessibility and Inclusion
in the Design Considerations Toolkit**

NR Guidance Suite Reference

Inclusive Design
NR/GN/CIV/300/04

Tactile Paving at Stations
NR/GN/CIV/300/06

3.5.1 Inclusive design

Passengers on their journeys benefit from supporting facilities such as toilets, access to food and drink and places to comfortably wait for trains. These are highly valued in passenger surveys and need to be considered in design at an early stage.

Inclusive design should consider from the very beginning how buildings and environments might be easily used and enjoyed by everyone.

They should be inherently:

- Welcoming to everyone
- Responsive to people's needs
- Intuitive to use
- Flexible and adaptable
- Offer choice when a single design solution cannot meet all user need
- Convenient to use without undue effort so as to maximise independence



3.5.2 Toilets

Customer feedback clearly indicates the importance of quality, security and environment within station WCs.

There is currently a move towards free-to-use WCs which has led to a significant uplift in user numbers. Designs need to be robust enough to cope with high levels of demand. Public toilets are to be provided in a supervised location, generally within paid concourse areas, and designed for peak station occupancy. Toilets should be designed to be accessible for all passengers. Toilet provision should be equitable and should address the historic under provision of female WCs and hand washing facilities.

It is important that all WCs are accessible and laid out prescriptively as per the design guidance to maximise the effectiveness of the facility in meeting the needs of the widest range of people.

3.5.3 Waiting areas

Paid concourse and platform areas should be provided with waiting areas appropriate to the station function, use and capacity. Waiting rooms and platform shelters with good weather protection are important for a wide range of rail users including parents with young children and disabled people.

These facilities require sufficient space to accommodate wheelchair users, parents with buggies and suitable seating for ambulant disabled people.

Waiting rooms and shelters also require access to train information, including clear sightlines of customer information screens (CIS) and clearly audible public address (PA) announcements.

NR Guidance Suite Reference

Station Facilities and Amenities
NR/GN/CIV/200/03

Public Toilets in Managed Stations
NR/GN/CIV/200/04



Image 3.4 Retail units at Glasgow Central station

‘The social demographics of the local area are understood and the station is developed in a way which elevates local people’s quality of experience. Opportunities to benefit the wider community are identified and captured through the design development process.’

3.6.1 Our principles of good design

The integration of social and commercial activity with transport facilities is strongly encouraged. It supports economic viability and a positive public perception of the railway. The extent of these activities will be determined by location.

In the ‘station renaissance’ in the UK, stations enjoying high footfall, such as King’s Cross, Waterloo and Birmingham New Street have become successful destinations, attracting non-travelling visitors and local people. Small stations too can benefit from the addition of retail activity, which has positive benefits such as promoting social interaction and satisfying customer needs.

In the case of large stations there is a clear need for each station to adopt a masterplan to allow any commercial development to be integrated with the station’s operational requirements. With the increase of activities around the station there will also be an increased demand on the operators to provide additional services such as cycle parking and additional toilet facilities.

Social enterprise outlets, community and market space, meanwhile uses and temporary retail and pop-up uses should also be considered. Examples of these are set out on the following page.

Additional guidance for promoters investing in railway stations can be provided by Network Rail Group Strategy & Planning.

NR Guidance Suite Reference

Station Facilities and Amenities
[NR/GN/CIV/200/03](#)

Retail Design Manual for Stations
[NR/GN/CIV/200/06](#)

Investment in Stations
[NR/GN/CIV/100/08](#)

3.6.2 Social Enterprise

Social Enterprises can be initiated by the station team, the TOC, or by other groups that come together to propose ideas.

Change Please is a social enterprise which is tackling homelessness by training people living on the streets to become baristas. Their kiosks are now available in London Underground stations and on-board some West Coast Main Line trains.

At Preston station a cycle hub was opened along with a small branch of family run Leisure Lake Bikes.

3.6.3 Encouraging a diverse range of retail

Some schemes rent out spaces on a very short term basis, encouraging start-ups and pop-up, along with a whole range of occupants that would not otherwise be able to have a tenancy in a train station.

Appear Here is one example, and has sites in a range of stations including Old Street Underground station and Newcastle Central station. Tenancies can vary from bookings of under a week to several months. They are typically much smaller spaces than typical station retail outlets.



Refer to Retail, Social, and Business
in the Design Considerations Toolkit

3.6.4 Providing meanwhile uses

For areas that are awaiting redevelopment or are underutilised, meanwhile uses can generate interest and attract tenants that may prefer shorter term lets. They can also generate local excitement and provide more sense of community than traditional retail.

3.6.5 Market Uses

Station Forecourts and external areas that have high footfall could be suited to market uses. Examples include food markets and farmers markets. These should be held at published regular intervals. Infrastructure such as pop-up power should be provided.

A weekly Farmers Market takes place at the forecourt of West Hampstead Thameslink station, organised by London Farmers' Markets.

3.6.6 Supporting the local economy

Where possible, local contractors should be prioritised for station works and servicing contracts. Contracts and staff recruitment should be advertised locally.

Additional guidance for promoters investing in railway stations can be provided by Network Rail Group Strategy & Planning.



Image 3.5
Short Term Let Unit — Old Street station



Image 3.6
Social Enterprise — Change Please Coffee



Image 3.7
Kings Cross square





‘Our vision is to serve the nation with the cleanest, greenest mass transport. We want to put passengers first, help passengers and freight users to make green choices, support local communities and be a good neighbour’

Network Rail

3.7.1 Core sustainable priorities

The Network Rail Environmental Sustainability Strategy 2020-2050 identifies four core priorities for the delivery its sustainability vision:

- A low-emission railway
- A reliable railway service that is resilient to climate change
- Helping plants and wildlife flourish
- Recycling and reusing everything

Key sustainable design strategies that should be applied on every station to support delivery of this sustainability vision are:

3.7.2 Whole Life Carbon Emissions

The whole life carbon approach to low-emission station design targets low embodied carbon in the material used, and in the operational carbon associated with energy and water use.

Station design for a low-embodied carbon involves holistic consideration of dematerialisation, the properties of material used, its transportation, construction processes, in-use carbon in maintenance etc., and station deconstruction.

Station design for a low-operational energy/high-performance involves informed bioclimatic public realm, building massing and orientation. Use of the envelope as a climate moderator including thermally optimised constructions and shading; maximised access to high-quality daylight and passive ventilation; and high-efficiency active systems. The appropriate application of renewable energy technologies can then be integrated to complete a net zero energy station design.

Station design for a low-operational water includes rainwater collection; low flow fixtures and fittings; and intelligent water monitoring and smart irrigation.

The RSSB have produced the Rail Carbon tool to help calculate, assess, analyse, report and reduce the carbon footprint of stations. This is a web-based tool available on the RSSB website.

3.7.3 Climate Change Resilience

Station design for climate change resilience and adaptability includes employing heat island mitigation strategies such as green spaces, high albedos surfaces, shading structures for enhanced internal and external comfort, and microclimatic resilience design for wind speed/gusts, sustainable urban drainage systems (SUDS) and provision of resilient infrastructure.

3.7.4 Helping Plants and Wildlife Flourish

Station design should achieve a biodiversity net gain from a baseline derived from an assessment of the site's existing biodiversity value. Design strategies for maximising biodiversity net gain include open green spaces, drought tolerant planting, enhancing habitat zones, and maintaining ecological wildlife connectivity corridors across the site. The cascading effect of this biodiversity net gain approach is biophilic health and well-being for the community.

For reference Network Rail have produced a Biodiversity Action Plan including objectives for the management of biodiversity, targets for biodiversity net gain and design tools such as Defra's Biodiversity Metric calculator.

NR Guidance Suite Reference

Climate Action Design Manual
NR/GN/CIV/100/04

Environment and Social Minimum Requirements
NR/L2/ENV/015



3.7.5 Circular Economy

Station design should implement circular economy principles including maximising reuse of existing assets and products; designing for optimisation (longevity, flexibility, adaptability, assembly, disassembly, and recoverability); using standardisation, modularisation and kit-of-parts enabled components; using products as a service by engaging manufacturers in produce lease/buy-back/recycle agreements; and minimisation of impact and waste with low impact materials, recycled content and secondary materials.

3.7.6 Social Value

Station design should engage, identify, and integrate positive social value into community. This includes access to open green spaces for improved air quality and health & wellbeing, supporting the modal shift to green public transport by optimising connectivity to, and permeability through, the station for pedestrians and cycles, and mitigation of environmental impacts such as noise, vibration and water pollution. This regenerative approach to community and sustainability awareness will enhance social value and encourage public transport uptake.

For reference Network Rail have produced a Social Value Framework.

3.7.7 Environmental and Social Appraisal (ESA)

The ESA is an NR tool that generates project checklists and requirements for a range of environmental and social considerations. This is tailored to each project, based on project scope and activities. This tool should be used from the very beginning of project planning, and then iteratively throughout the design process.

3.7.8 Third-party Environment Assessments

BREEAM (Building Research Establishment Environmental Assessment Methodology) and BREEAM Infrastructure (Formerly CEEQUAL) are internationally recognised independent environmental assessment methodologies for rating and certifying the sustainability of buildings.

NR Standard NR/L2/ENV/015 stipulates the use of BREEAM Refurbishment and Fit-Out or New Construction for buildings and BREEAM Infrastructure for infrastructure and public realm.

BREEAM Infrastructure is generally better suited for station projects, as BREEAM places an emphasis on issues such as air tightness, high insulation values and heating and cooling performance, that is typically not applicable to station spaces that often do not require heating. Early on, design teams should identify which assessment is best for their project, so that they can get agreement from all stakeholders, including planning authorities.

Any new or refurbishment work should attain a minimum 'excellent' BEEAM rating. Clear guidance for how to achieve certification is available from BREEAM.

The BREEAM tools provide post-handover after-care to the building occupant during the first year of occupation to assure the building operates in accordance with design intent and operational demands.

3.7.9 Post Occupancy Evaluation

Predicted performance can vary wildly from actual performance. Evaluating how buildings actually perform will help to put in place a cycle of continuous improvement. Post Occupancy Evaluations should be used to monitor and evaluate project compliance with targets, successes and challenges. It is important to feed this information back within NR so that lessons can be learned and shared with future projects. Refer to Section 5.5 for more information.

3.7.10 Governance, Targets, & Metrics

As part of the initial briefing process every station design should agree science-based targets, metrics and governance for the following:

- Embedded carbon
- Operational carbon
- Biodiversity net gain
- Social value

Station Planning

3.7 Sustainability



Station Design
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Image 3.8 — Paddington Station Integration Project
Paddington Station integrates the canal for enhanced health & wellbeing



Image 3.9 — Denmark Hill station
A new overbridge provides inclusive access to a new carbon positive entrance



Image 3.10 — Edinburgh Waverley station
Edinburgh Waverley station concept

3.7.10 Station Applied Sustainable Design

<https://safety.networkrail.co.uk/home-2/environment-and-sustainable-development/>

Despite the fact the key principles of Sustainable Design are well-established there are very few examples of Network Rail stations, either in the UK or globally, that have used these as their driving principles. In the UK this is largely because of the maturity of the rail estate; most station works upgrade existing stations rather than build new ones, which limits what's achievable. Truly sustainable stations are still seen as the fringe, but the expectation is that this will continue to shift. The examples presented here begin to show how this might happen, and the ways in which station form, configuration or location can present opportunities for sustainability.

Paddington Station Integration Project (opened 2012) - maximises the reuse and flexibility for expansion of the existing Grade I listed railway station. The integration of the open canal waterways enhances air quality and health & wellbeing, and offers climate resilience heat sinks.

As part of the new entrance project at Denmark Hill, PhotoVoltaic Panels over the roof and station ramp produce more energy than the building needs, creating a carbon positive development that delivers energy back into the electricity grid. In addition, secure cycle storage for 85 bikes helps to encourage the uptake of sustainable onward travel.

Waverley Station, Edinburgh (design concepts) the opportunity was to bring a fresh sustainable design perspective to previous heavy interventions proposals for this heritage station. Applying circular economy principles maximised the reuse of the existing assets whilst using standardisation, modularisation and kit-of-parts approach to realise an exciting new design for the future.



Refer to Environment
in the Design Considerations Toolkit

Station Planning

3.8 Local Context



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Strategic Planning
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‘Local communities are placed at the heart of decisions’

Our principles of Good Design

3.8.1 Location

Any major intervention in an existing or new station should take into account the aspirations of the people using it or affected by it. A station and its integration with the surrounding context regularly provide the first impression of an area and are therefore incredibly important, both in representing the area and as a catalyst for further development.

3.8.2 Stakeholders

It is important to engage with the local authority, to integrate station proposals with local plans, masterplans and transport policies. Similarly, building an early relationship with all stakeholders is the best basis for a project and also a good way to understand and capture site specific requirements. Tapping into local knowledge often reveals issues that could not otherwise have been known and allows the designer to understand the aspects that make a location unique.

NR Guidance Suite Reference

Implementation Strategy for Medium to Small Stations
NR/GN/CIV/100/09



Image 3.11
Kilmarnock station

At Kilmarnock station several rooms at platform level that are no longer required for station purposes have been made available for market and retail unit use by community groups, in a project known as the Kilmarnock Station Community Village. The station provides sufficient footfall to sustain the market, and it has in turn created demand for the station.

Station Planning

3.8 Local Context



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3.8.3 Local Benefit

By understanding the social character, demographics and issues of the area surrounding the station the emerging design may be able to make a positive contribution to the local life and place the station at the heart of a community. This could include upgrading or creating new connections, or creating a public space for community uses and services.

3.8.4 Generating Community Engagement

Examples of successful community initiatives can take many forms. At Thessaly Road a competition was organised by the London Festival of Architecture (LFA) and Wandsworth Council. The route provides a key link to the Battersea and Nine Elms area redevelopment, but was previously dingy and uninspiring. Six proposals were short-listed, and the practices were introduced to residents, members of the local community and key stakeholders. This helped inform the designers with the needs and desires of the local community as they developed their final proposals.

At Kilmarnock station, the TOC commissioned a community art organisation to lead an art project for the refurbishment of the station subway. The project ensured that local knowledge and participation was at the heart of the process.

This type of project helps to engender a sense of community ownership and pride in these assets.

3.8.5 Planting and providing biodiversity on platforms

The Bee Friendly Society work with railway authorities, community rail partnerships, and local groups across the UK to install bee-friendly flowering planters, fruit tree orchards and micro wildlife gardens on railway station platforms. They have installed planters at a large number of stations across the South East and South West that are low maintenance and flower throughout the year. This benefits both commuter well-being and biodiversity.

3.8.6 Cycle Surgeries/Workshops

Southern Railway (TOC) run cycle surgeries with the British Transport Police (BTP). At these, BTP share advice on securing cycles and stencil attendees bike frames with a unique serial number. These surgeries act as a deterrent to crime, allow BTP to engage with the public and offer crime prevention advice and solutions.



Image 3.12 — Thessaly Road Bridge — Nine Elms
Revitalisation of a bridge under the railway as part of the London Festival of Architecture



Image 3.13 — The Bee Friendly Trust — Tisbury station
A planter provided by The Bee Friendly Trust, providing food sources for foraging bees.

Station Planning

3.9 Art in Stations



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3.9.1 Defining Aims for the Art Project

Art in stations can be part of a station project or be commissioned independently.

Good art often engages with the station and our environment. It respond to, reacts to or challenges the context, enabling those using the space to see it with fresh eyes.

A clear brief that sets out the scale of the art, the scope, the budget and where it will sit will help to provide guidance to artists. At the same time, the brief needs to allow flexibility for the artist to respond and challenge ideas and expectations.

Aims can set out what the artwork can achieve, and how it can contribute positively to passenger experience. Aims could include:

3.9.2 Assisting and improving wayfinding in stations

- Assisting and improve wayfinding by differentiating different routes / exits within the station
- Introducing important moments of delight to the passenger journey.

3.9.3 Contributing to station identities

- Bring local area character into the station
- Strengthen the individual identity of the station
- Help signify and connect the station within the local area
- Enhancing local character

3.9.4 Commissioning Art

Considering and commissioning art early on in the design process provides more time to select artists, and to engage and consult with the community.

3.9.5 Sourcing the Artist

An artist can be approached directly, nominated by other stakeholders or a community or can be selected via an open or invited competition.



Image 3.14
Platform 5, Sunderland station
— Jason Bruges Studio
Responsive artwork covering disused platforms comprised of glass brick with LEDs simulating passengers gathering

Station Planning

3.9 Art in Stations



Station Design
Strategic Planning
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3.9.6 Setting a Budget

A realistic budget should be identified early and managed through the process to avoid having to dilute or compromise the artistic intent or omit it entirely at a later stage. This is particularly important for the competition approach to appointing an artist, which may generate a range of very different proposals with widely differing costs.

3.9.7 Coordinating Art and Architecture

Is the art standalone, applied to the finished building or fully integrated? The approach taken will affect the degree of coordination required between the artist and station designers.

Integrated art can be part of a wall, soffit or floor that has to meet other technical criteria, for instance fire resistance, slip resistance or a specific design life. There may also be technical challenges to delivering a particular artistic intent or visual effect in unfamiliar materials, i.e., those that can be produced at scale and warranted to achieve the technical requirements, rather than the media the artist might usually work in.

The process of getting a building built can alienate an artist from their original idea and leave them without a sense of ownership, as the process becomes focussed on technical detail or delivery. A need for value engineering across the project might require a rethink of the artwork component.

All these issues risk losing or critically undermining the artist's intent. For fully integrated art the artist should be engaged early so that the detail of the artwork can be developed jointly with the station design team and these issues can be overcome.

3.9.8 Reflecting the community and local context in Art

Artwork can take the station, local context or the local community as the subject or as an inspiration. This could involve capturing the community or those that use an area. For example, at Woolwich, the Elizabeth Line station entrance creates a link with local history by incorporating a 'Woolwich rifling' motif first developed on the site in 1865 into cast bronze panels.

3.9.9 Involving the community in Art

Local groups, and the local community can be involved in the selection process once a shortlist has been developed or a range of proposals have been produced. They can also be involved through consultation with emerging designs. Local involvement can help to foster a collective sense of pride and ownership in the artwork, and ultimately the stations they sit within.



Image 3.15
Hoardings, Glasgow Queen Street station — Gabriella Marcella
Gabriella, a graduate from Glasgow School of Art, was asked to create a bold work that is modular, adaptable and unique to the setting. The art includes local motifs and railway history.



Image 3.16
Platform canopy at Bury St Edmunds station, Grade II listed

‘The rich existing heritage of Britain’s railway infrastructure is to be respected and designs developed in a sympathetic manner’

3.10.1 Our principles of good design

Starting with the establishment of the first rail network, the body of engineers, architects and builders have together created a rich heritage, the fabric of which needs to be celebrated and protected.

3.10.2 Approach

Restoration requires that the integrity of the original building is retained while at the same time allowing the intervention to achieve modern standards.

The best examples start by respecting the old building, by analysing and understanding what’s important and how this can be highlighted. The main asset could be a whole façade, an internal space or particular details and will provide cues on overall form, datums or use of materials. In this way interventions that are sensitive and subtle and those that are exuberant can both be entirely appropriate.

The use of good contemporary architectural language rather than a historical pastiche is preferred, delivered through careful detailing and high quality craftsmanship to establish a dialogue between old and new.

An underused heritage building can sometimes be saved by adopting new and innovative uses, whether for railway, community or commercial use.

3.10.3 Procedures and statutory control

There are nearly 200 listed stations in the UK, and six, including Bristol Temple Meads, Newcastle and the London termini at Kings Cross and St Pancras have been given grade I status. Twelve stations have category A status, the highest grade in Scotland. All listed stations require Conservation management plans to be prepared in consultation with the Railway Heritage Trust (RHT) who act as guardians of heritage features.

The Heritage: Care and Development guide sets out procedures to follow for buildings that are listed or in a conservation area, and provides guidance for carrying out projects and maintenance works.

The Railway Heritage Designation Advisory Board (RHDAB) also defines assets that are protected by law. This is a statutory protection and there are penalties if Network Rail fails to consult and agree before making any change or disposing in any way of a designated asset or record.

NR Guidance Suite Reference

Heritage: Care and Development
NR/GN/CIV/100/05

3.11.1 Designing Out Crime

A key aspect of passenger experience is the feeling and perception of safety. Stations should be and feel like safe places. The aim is to make them as safe as possible by eliminating hazards and managing or mitigating hazards where they cannot be eliminated.

Early and effective engagement with security specialists early in the design process can minimise opportunities for criminal activity, reducing operational expenditure. Early engagement can also reduce the likelihood of design alterations or additional costs later in the design process, or additional design measures that can create an unfriendly or 'fortress-like' appearance.

'Crime Prevention Through Environmental Design' (CPTED) is a holistic approach to analysing environmental conditions which present opportunities for criminal activity through the lenses of; Natural Surveillance, Access Control, Territorial Reinforcement, and Maintenance and Management. This approach should be considered at each stage of the design process.

The involvement of local Designing Out Crime Officers (DOCOs) and the British Transport Police (BTP) should be sought to optimise project outcomes and align with specific security needs.



Refer to Safety
in the Design Considerations Toolkit

3.11.2 Security Risk Management

Threat and Vulnerability Risk Assessment (TVRA) is an assessment process, used to establish a threat profile for the project. These are used to assess a wide range of physical vulnerabilities, which are modelled and simulated.

The station design should follow Security in Design of Stations (SIDOS) guidance and the NR Security Assurance Framework, which can be found on the NR Security Hub. Stations should be accredited under the Secure Stations Scheme. Any security concerns need to be identified by the British Transport Police as part of Secure Station certification.

All station car park designs should be accredited under the "Park Safe" scheme.

Hostile Vehicle Mitigation (HVM) is required in high risk locations. This may require offsets from road edges, with significant spatial implications, and should be considered early in design proposals.

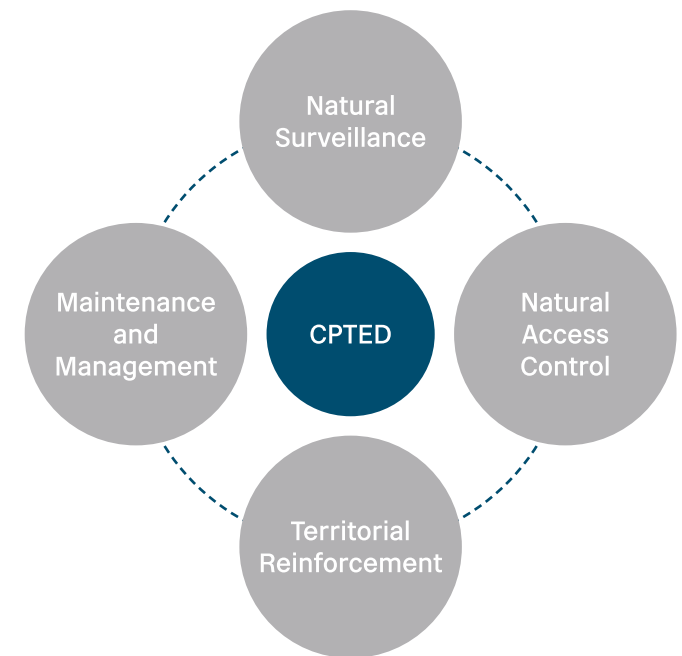


Image 3.17

Core concepts which form a Crime Prevention through Environmental Design (CPTED) approach to security

NR Guidance Suite Reference

Security at Stations
NR/GN/CIV/300/02

3.11.3 Station Categories

Stations are typically categorised on the basis of their frequency of use i.e., amount of trips per year. In addition to this are four security categories of stations (A - D), defined and reviewed annually by the National Railway Security Programme (NRSP).

At the beginning of a project the security category of the station should be identified by contacting the Station Facilities Operator, or relevant NR Region or Route Security Team in order to effectively understand and plan the appropriate measures which adhere to security assurance processes.

3.11.4 Specific Requirements

For further detailed guidance refer to the Network Rail 'Security at Stations' guidance NR/GN/CIV/300/02.

Standards Reference

Secure Stations Scheme
Department for Transport

Security in the Design of Stations (SIDOS)
Department for Transport



Image 3.18
Kings Cross Square demonstrating the integration of crime and threat reduction through environmental design



3.12.1 Fire Safety Design considerations

Fire design will have a fundamental impact on space planning and spatial requirements, and can impact how passengers experience the station.

Fire design should be considered at the beginning of any project, as part of the overall design strategy, so that fire needs and requirements can be embedded in the design, rather than becoming a secondary element that is considered later in the process, that can impact good design. For most projects a fire consultant will need to be appointed.

Key aspects to consider include:

- Travel distances and escape distances
- Secondary means of escape
- Passenger considerations
- Segregation of station functions and retail, ASD /OSD and other commercial elements
- The prevention of fire and the appropriate provisions in case of accidental or intentional fire (segregation, ventilation, suppression)
- Use of materials and fire integrity

3.12.2 Fire Safety Design and Approvals Process

The Fire Safety at Stations Design Manual sets out Network Rail's Fire Safety Vision and Objectives, and how they can be achieved through fire prevention, fire protection and fire intervention.

The manual provides clear guidance on interpreting Fire Guidance and legislation, and an understanding of key legislation, including:

- BS 9999: 2017 Code of practice for fire safety in the design, management and use of buildings
- BS 9992: 2020 Fire safety in the design, management and use of rail infrastructure - Code of practice
- Approved Document B (England & Wales) and the Non-Domestic Technical Handbook (Scotland)

Fire Safety Review is required at Form A stage and endorsement by a Fire Safety Engineer is required at PACE Stage 1 (ES3).

3.12.3 Use of materials

Materials should be non-combustible where possible. Refer to fire regulations and guidance for detailed requirements.

Structure, finishes and elements such as doors will need to achieve specific ratings for fire integrity and fire insulation when forming fire compartments. This should be defined by the project Fire Engineer as part of the Fire Strategy.

NR Guidance Suite Reference

Fire Safety at Stations
NR/GN/CIV/300/03

3.13.1 Railway Performance and Reliability Targets

The station has an important role in allowing the rail industry to achieve the performance and reliability targets that are set by the DfT and regional transport authorities, and it is the designers' responsibility to assist in achieving these objectives. By providing adequate space for the public to access their trains in an efficient and legible way, the station plays its part in directing the flow of passengers onto the trains in a regular and predictable manner.

The size, number and location of platform entrances has an influence on passenger distribution and clearance times. Measures such as providing canopies along the full length of the platform, and consistent widths along the length of the platform can be very effective means of distributing passengers and reducing the dwell time. Factors such as this have to be considered and integrated with capacity, safety and accessibility. Legibility of spaces, correctly designed wayfinding measures and CIS play a very important role in achieving this.

Level platform boarding gives those with restricted mobility flexibility on where they can board the train, and removes the reliance on others to provide temporary boarding ramps. This can help to meet train frequency targets and should be promoted where rolling stock and platform gauging allow. It is effective when implemented as part of line upgrades as well as at individual station level.

Network Rail has standards to support the structured application of ergonomics in the development or modification of railway infrastructure and supporting systems. Human safety, health and performance can be affected by inappropriate design of equipment, work processes, working environments and passenger facilities. This can result in risks to individual staff operating or maintaining the railway infrastructure. It can also result in risks to the safety of passengers, and can impact on the efficient operation and maintenance of the infrastructure.

3.13.2 National Rail Passenger Survey

The National Rail Passenger Survey (NRPS) was produced by Transport Focus every year until 2020. The survey captured passenger satisfaction across each operator and different routes.

The survey provided feedback on facilities both in stations and on trains, as well as level of crowding and reliability. The granularity of the survey was particularly useful for identifying what can be improved upon in future station projects.

Customer satisfaction is now being measured by 'Wavelength' an industry-wide monitoring tool developed by the Rail Delivery Group which aims to track performance against core passenger priorities.



Refer to Reliability
in the Design Considerations Toolkit



Image 3.19
Manchester Victoria station platforms

‘Assets should be designed to meet the requirements of a changing society... and the next generation’

Our principles of Good Design

It is predicted that over the next two decades, transport technology will change faster than at any time since the Victorian era, with cars powered by fossil fuels and internal combustion engines replaced by electric and autonomous vehicles and high-speed rail transforming journeys between major cities.

The challenge for designers is to anticipate and align to the direction of change.

The starting point is an awareness of trends:

- Increased passenger numbers
- Increased number of trains, service frequency and network capacity
- More elderly travellers
- Extended peak periods
- Changes in national climate
- Uncertain threat from terrorism
- Increased impaired mobility
- The impact of digital /portable technology

Construction will also change and it can be assumed that trends of standardised componentry and off-site manufacture will continue. The adoption of collaborative BIM techniques and the creation of a rationalised product component/ library also represents a move away from bespoke solutions to agreed products, which will bring longer term efficiencies and assets which are fit for purpose, safe, durable/ maintainable and low carbon.

This assessment of all construction materials will take into account the life cycle stages of a product from raw material extraction to decommissioning along with objective assessments of quality, whole life cost and availability, safety and maintenance requirements.

Technological change influences the way passengers move through station spaces, they become interactive spaces responsive to user moods and requirements via smartphone applications. The way passengers access stations with no or minimal contact with control gates technology is being trialled.

Surveillance and monitoring of crowds will allow more agile control of passenger movement.

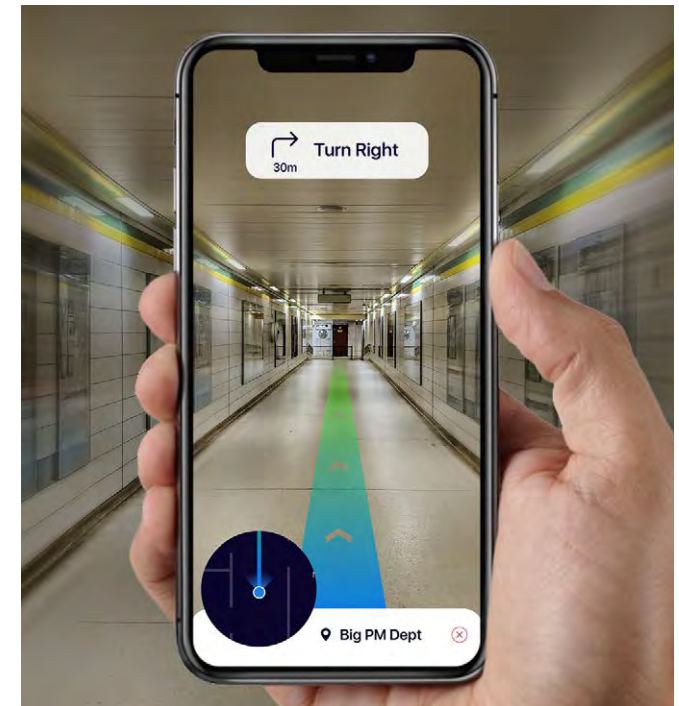


Image 3.20
Wayfinding using augmented reality



3.15.1 Benefits of innovation

Innovation calls to mind major step-changes in technology: headline 'Wow!' moments. The reality of innovation though is that it is largely made up of small iterative changes rather than paradigm shifts. The benefits may not be immediate, but instead may only be realised over time. They can be non-physical, and be innovative in terms of a process, customer service, or how something is managed, or they can be a transfer of an existing approach or technology from a different industry, making it innovative within the rail space. Improving existing ways of doing things can be as valuable as developing new ways.

Innovation should address the current and future needs of the railway and respond to both internal challenges - those that are an intrinsic part of the railway system, and external challenges – for instance the climate emergency, major demographic shifts, or the merger of digital, biological and physical worlds and utilization of new technologies that characterises the 'Fourth Industrial Revolution'.

3.15.2 Modern Methods of Construction (MMC)

Off-site construction methods can reduce time on site, and the amount of disruption and track or station possessions. It offers advantages of consistency, standardisation, and for manufacturing at scale.

Off-site construction is particularly beneficial in projects taking place at operational stations, or where the project is adjacent to a live railway.

Site activities often require smaller teams and worksites for the majority of the build, as site tasks become more task focused, for example installing foundations. At many stations space is very restricted, and constructing as much as possible off-site can help manage site constraints and storage.

Station elements can be constructed in modular elements, up to a maximum size that can be safely delivered to site. This is useful for elements such as footbridges, where stair components and overbridges can be craned into place as single elements, minimising disruption when working over rail infrastructure.

By carrying out fabrication in the controlled environment of a factory, different materials and techniques become available. These can be used to deliver a more efficient and higher quality outcome, or a design that could not have been achieved with traditional construction.

3.15.3 Standardisation of Components

The standardisation of components offers economies of scale, reliability and familiarity of installation, maintenance and replacement. It can also contribute towards a strong shared identity across the network. This includes small elements like handrails, platform furniture, lighting, signage, and advertising units as well as larger elements such as stairs and footbridges. The creation and use of rationalised components should be used where they can offer efficiency and enhanced quality.

3.15.4 New materials

New materials are suitable where they help to achieve a high quality design that is robust, and maintains performance and appearance without additional maintenance beyond that of traditional equivalents.

Glass Reinforced Plastic (GRP) has been used in canopies and footbridges, and requires little maintenance when compared to timber, which it often replaces. Glass Fibre Reinforced Concrete (GFRC) cladding can be created much thinner and lighter than precast or in-situ concrete, with more control over the process and finish. Also consider new ways of using traditional materials. For example, ceramics can be used as part of cladding systems, and are very durable.

When considering any material, check and confirm that it meets the required fire performance, both individually and as part of any system or construction where it is being employed.



Refer to Standardisation
in the Design Considerations Toolkit

NR Guidance Suite Reference

Materials and Finishes

[NR/GN/CIV/200/01](#)

Components and Fixtures

[NR/GN/CIV/200/01](#)

Lighting

[NR/GN/CIV/200/01](#)

Station Planning

3.16 Biophilia



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The integration of biophilic or natural elements into stations can significantly contribute to the well-being, mental health, satisfaction, and overall passenger experience through:

- **Stress Reduction:** Exposure to natural elements, such as plants and sunlight, has been linked to reduced stress levels and increased overall well-being. In transport environments, where stress and anxiety can be heightened, biophilia can contribute to a more calming and pleasant atmosphere.
- **Improved Mental Health:** Biophilic design can have positive effects on mental health, reducing symptoms of depression and anxiety. Introducing elements of nature can help alleviate mental strain.
- **Enhanced Air Quality:** Plants contribute to improved air quality by absorbing pollutants and releasing oxygen. Incorporating plants can help mitigate indoor air pollution and create a healthier atmosphere for passengers.
- **Community Connection:** Biophilia can be used to reflect local flora, fauna, and cultural elements, fostering a sense of connection to the community. This can be particularly relevant in transport hubs that serve as gateways to different regions.

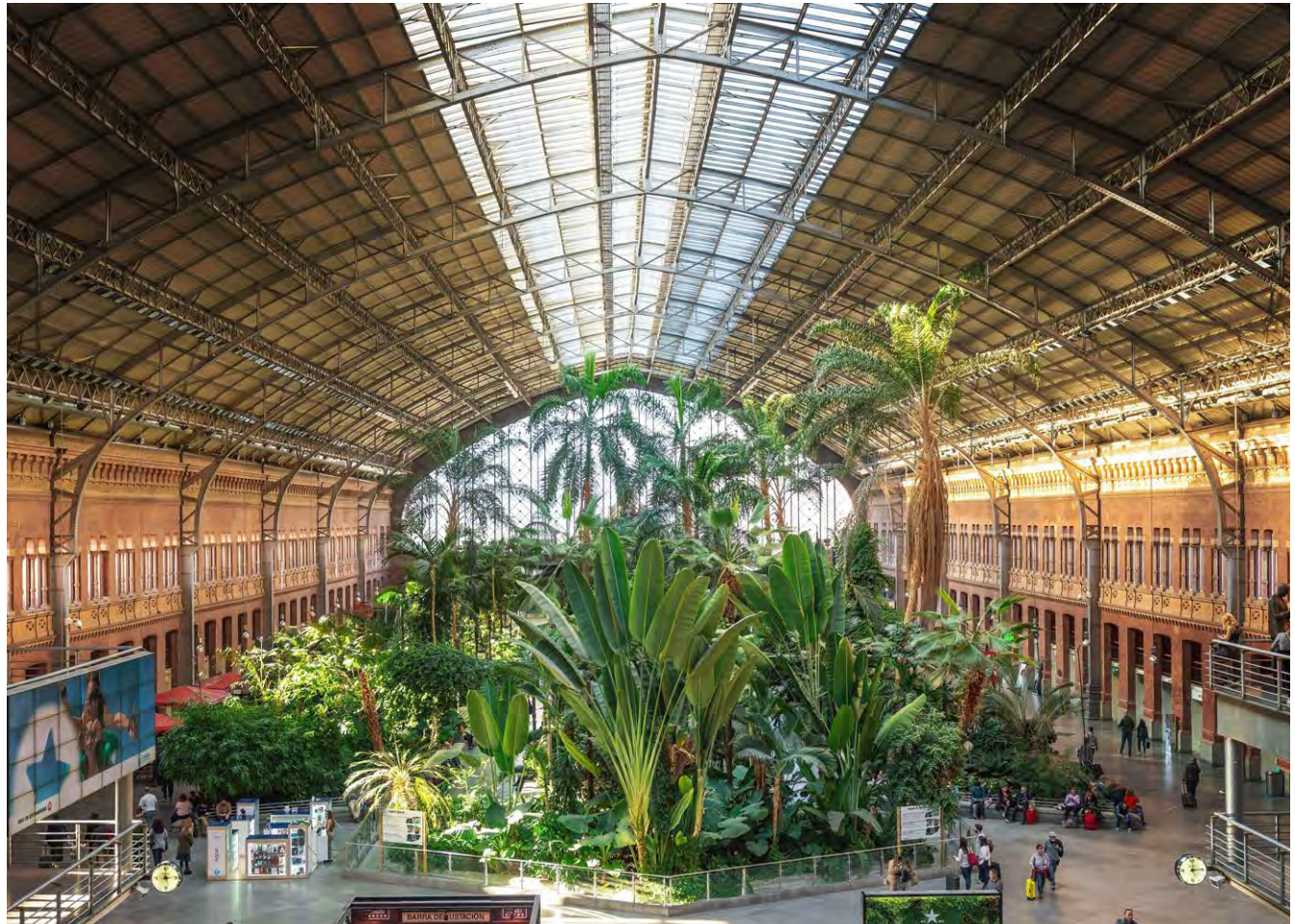


Image 3.21 — Atocha station, Madrid

Atocha is the largest railway station in Spain and includes a 4,000m² botanical garden located in the commercial complex created after the station's expansion in the 1980s.

Station Design
Station Elements

4



Image 4.1
Reading station
entrance and public realm



4.1 The Passenger Journey

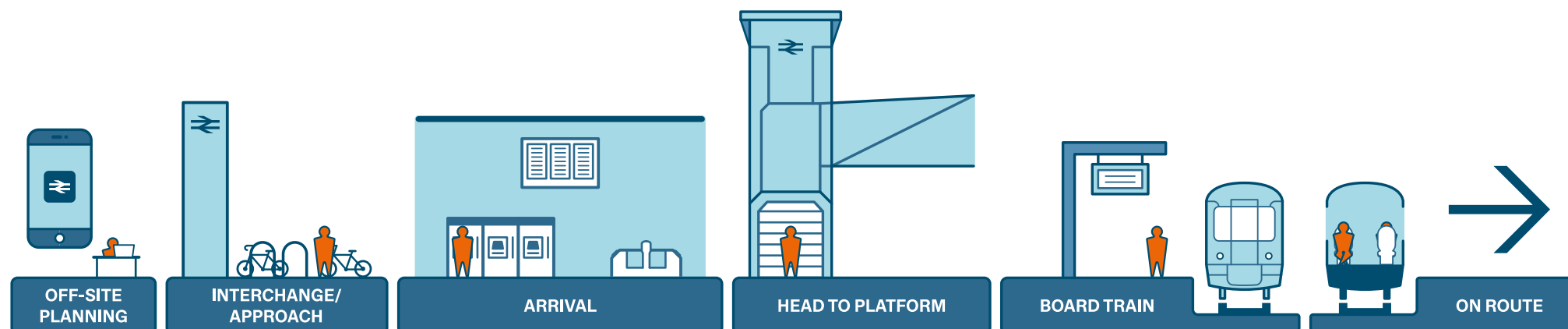


4.1.1 The Passenger Journey

To put ourselves in a passenger's shoes, there is a need to consider all aspects of a rail journey: from planning ahead, arriving and spending time at a station, making the journey, and leaving a station at the other end.

The following sections track the passenger journey through the station environment and highlight key design considerations specific to each area.

The industry is well aware of the need to constantly improve this 'end-to-end journey' experience. Many such improvements have been informed by the extensive feedback from the National Rail Passenger Survey (NRPS) and other monitoring tools such as 'Wavelength', an industry-wide monitoring tool which aims to track performance against core passenger priorities. (Wavelength was developed by the Rail Delivery Group).



4.2.1 Masterplan and Urban Integration

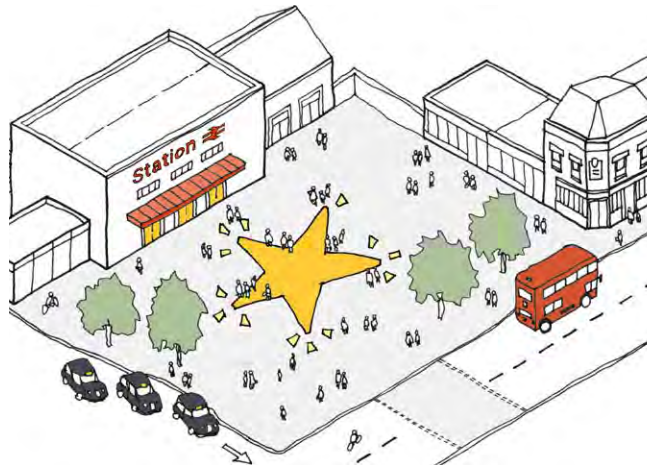
Railway stations are critical travel infrastructure components for our cities, towns and rural communities.

Proposed designs should be co-ordinated with the Local Planning authorities in which they are located, to enable integration with any wider development initiatives.

Local Plans, Area Action Plans and Supplementary Guidance may also help to reveal potential additional station design initiatives, such as new entrances, public realm proposals, location of interchange components and complimentary land use facilities within the station environment itself.

Similarly, the local planning authorities will need to understand current and anticipated railway operations, so that that additional station capacity and future transport mode requirements are not precluded.

An approach that aligns to all stakeholder priorities will mean that transport provision is effectively future-proofed.



4.2.2 Contributing to a sense of place

The station public realm is where the station engages with its surroundings, knitting the two together. It is the gateway and often the first impression of an area for visitors but equally the space that makes the station part of everyday life to those that live there. It can range in scale from a station forecourt to a major civic space. Whatever the scale it should be a space to breathe and orientate, to make a decision about what to do and where to go.

4.2.3 Determining the priorities for each station

Each station will have different needs for the public realm, varying by size of station, the needs of the local area, and the proximity to town/city centres.

Connections to other transport modes such as buses should be nearby and intuitive to transfer to. First time visitors should be able to orientate themselves, and wayfinding should feel natural, with signage only needed to assist.

Key considerations include:

- What type of users does the station serve? Commuters? Tourists? Events?
- What transport interchanges are the most important?
- Which direction do passengers approach from?
- What are the key local connections? A cluster of offices? A retail area? A business park?
- What are the main pressures on the station? Events? Is there space to wait outside at busy times?
- How can the Urban Realm complement the local offering?

NR Guidance Suite Reference

Masterplanning
NR/GN/CIV/100/07

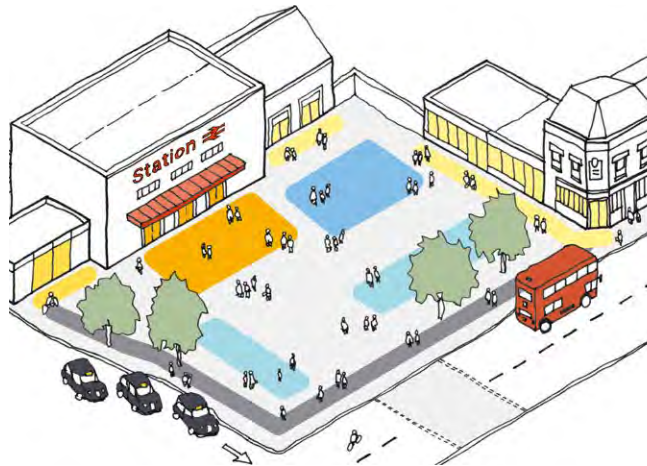


Refer to Place and Social Considerations
in the Design Considerations Toolkit

4.2.4 Spatial zones

Successful station public realm planning needs to balance multiple spatial zones:

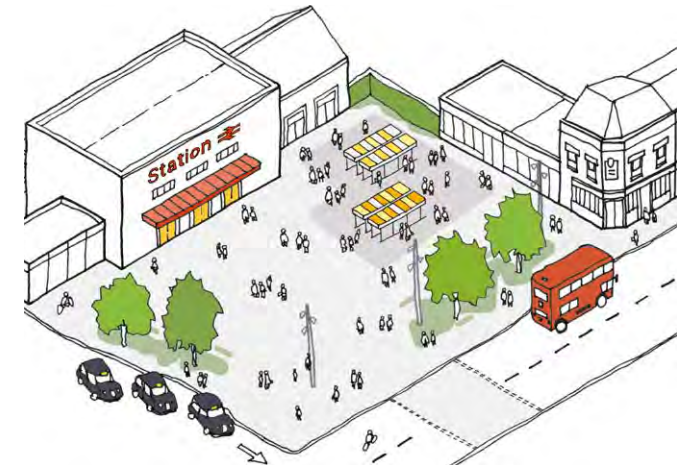
- At the entrance to the station there will need to be a clear area for decision making and for dealing with crowds in the event of abnormal, degraded or emergency conditions.
- Where there is a threat of hostile vehicles or terrorism there will need to be a zone for vehicle stand-off, enforced by bollards or other street furniture, that limits how close vehicles can get to the station buildings
- Social spaces should be visible, but away from passenger flows. These should be flexible, at a sufficient scale that they can accommodate a wide range of activities and flexible programming
- Retail units with active frontage may benefit from spill out areas
- For seating and landscaping consider the areas with more breathing space away from main flows and busy roads.



4.2.5 Character and Elements

The public realm should draw on the characteristics and identity of the context, and enhance the surroundings through high quality materials and space. Places that are legible and easy to navigate.

Stations generate footfall, and where there is space and sufficient demand markets and other community and retail activities can be provided. These offer convenience to passengers whilst serving local communities.



Consider aspects such as:

- Providing spaces to gather and congregate
- Providing slower spaces to sit or meander
- Providing lines of sight to and from key views and on desire lines
- Providing space for activities and events that can be managed and programmed
- Landscaping and increasing biodiversity through trees, planting and habit creation
- SUDS should be considered in hard landscaping
- Using local materials, and incorporating local vernacular design elements
- Integrating urban art and sculpture

4.2.6 Brief Production

Public realm presents key opportunity to enhance a core part of the passenger experience. In station environments this extends to include not only the areas surrounding a station, but the station itself as both an amenity and public space. This includes the platforms, concourse, entrances, and forecourts.

The production of a specific public realm brief should be tailored to each station in order to capitalise on the opportunities that the public realm presents to enhance the experience and perception of the railway.

Key priorities and areas of consideration in the development of the public realm brief are:

- Inclusivity and Accessibility
- Safety
- Quality of Experience
- Flexibility
- Environment and Biodiversity
- Local Communities

NR Guidance Suite Reference

Public Realm Design Guidance for Stations
NR/GN/CIV/200/10

Parking and Mobility at Stations
NR/GN/CIV/200/11

4.2.7 Spatial Zone and Activity Zones

When planning the public realm, particularly areas related to movement within and around the station, it's important to consider the spatial organisation carefully. Successful public realm strikes a balance between allowing easy movement and access while providing spaces that encourage people to meet, interact, and use the station effectively.

Designing a comprehensive movement framework with clear and convenient routes connecting key points benefits all users and allows the station to function efficiently. Understanding the various types of movement occurring at stations is also vital, including pedestrian, cycling, and vehicular flows, along with their capacities, interactions, potential level changes, and access points for servicing and emergencies.

Proposals should prioritise creating safe, accessible, and inclusive routes for the entire “end-to-end journey” experience, as well as other movement patterns within the station’s public spaces.

4.2.8 Further Details and Specific Requirements

For further detailed guidance refer to the Network Rail Design Manual for Public Realm Design Guidance for Stations NR/GN/CIV/200/10.

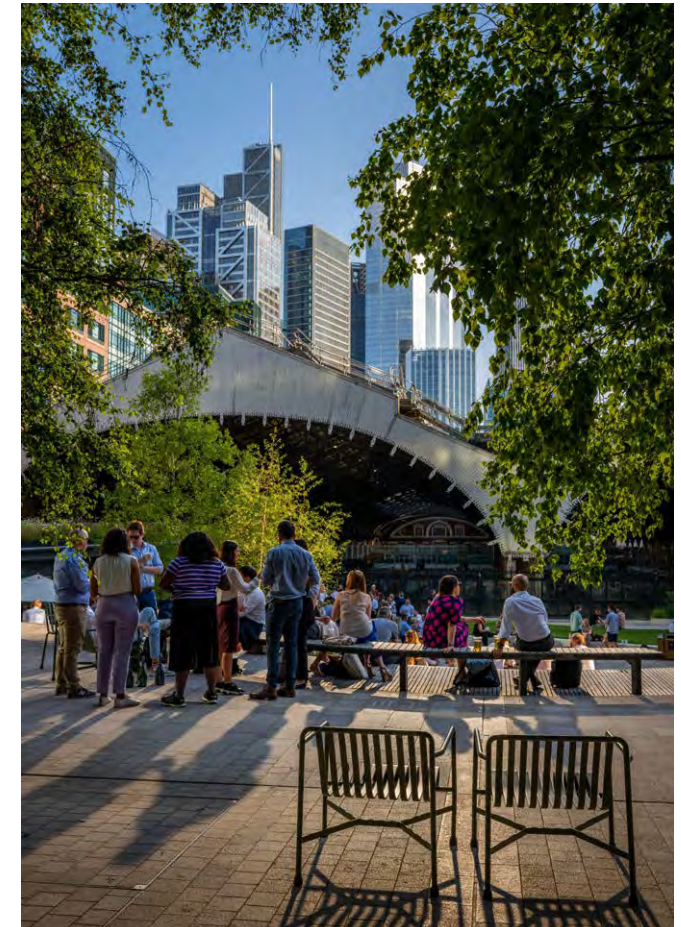


Image 4.2
Exchange Square, Broadgate, Liverpool Street
Exchange Square is arranged with a variety of spaces to sit or gather, to meet the needs of local workers, residents and users of the station.

4.2.9 Approach to Urban Realm and Biodiversity

Public realm presents key opportunity to enhance a core part of the passenger experience. In station environments this extends to include not only the areas surrounding a station, but the station itself as both an amenity and public space. This includes the platforms, concourse, entrances, and forecourts.

The production of a specific public realm brief should be tailored to each station in order to capitalise on the opportunities that the public realm presents to enhance the experience and perception of the railway.

Key priorities and areas of consideration in the development of the public realm brief are:

- Inclusivity and Accessibility
- Safety
- Quality of Experience
- Flexibility
- Environment and Biodiversity
- Local Communities



Image 4.3
The HUB Station concept places emphasis on the station approach and public realm through modular elements

4.3 Intermodal and Interchange



4.3.1 Design considerations for Interchange

Historically, individual transport modes have evolved at different rates and times and are subsequently not well integrated. There has also been a fragmented approach to transport governance, one in which different modes and regions are considered in isolation. This is now changing. We are seeing the emergence of a new mobility that brings together functions such as customer information and payments across different transport modes. In time this should mean an expansion of services, more choice for consumers, greater reliability, greener journeys and lower cost. The opportunity is there to develop a genuinely integrated 21st Century transport system that provides door-to-door connectivity.

Seamless interchange is key to delivering this in reality. If changing from one form of transport to another is quick and straightforward, barely noticeable, it will encourage people to make this part of their regular journey.

The station forecourt and public realm is the interface point between the railway and other transport modes. It should consider a hierarchy of interchange:

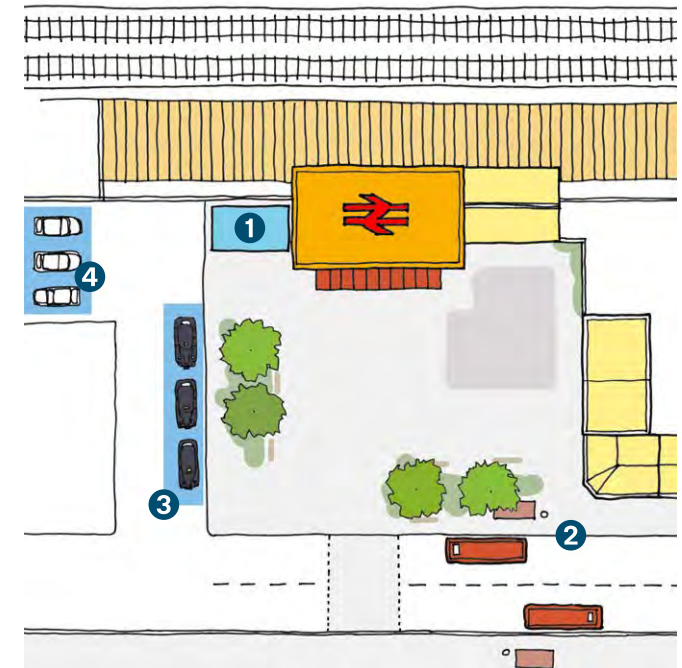
- Public transport options and cycle storage as close to the entrance of the station as possible
- Taxi and Passenger Pick Up and Drop Off (PUDO) close to the entrance
- Blue badge car parking no more than 50m from the entrance

- Regular car parking can be further away, it should not obstruct or impede other journeys

4.3.2 Seamless Interchange

To integrate transport interchange successfully at a station the following factors should be considered:

- Journey times: Minimise journey times between transport modes by reducing horizontal and vertical travel distances. Routes should be short and direct
- Clarity of routes: Provide generous, uncluttered routes between modes with good weather protection and use clear, consistent wayfinding signage, design language and materials
- Safety: Routes should be safe and secure, avoiding road crossings or other vehicle routes wherever possible. CCTV and natural surveillance give people confidence to use them at any time
- Accessibility: The accessibility of a station from the drop-off point of other modes is a significant factor in many disabled and older people's ability to use the station independently. Long distances, changes in level and obstructions all make this journey more difficult



- 1 Cycle Hub
- 2 Bus Stops
- 3 Taxi Bays
- 4 Blue Badge Spaces

NR Guidance Suite Reference

Parking & Mobility at Stations
NR/GN/CIV/200/11



Refer to Interchange
in the Design Considerations Toolkit

4.3.3 Cycling Facilities

The growth in cycling to or from stations depends on providing a big increase in cycle parking that is secure, easy to use, well organised, affordable and reliable. The Government is committed to delivering this through the Cycle Rail programme.

The location and quantum of cycle parking at stations needs careful consideration. Planned poorly, cycle parking can be unsightly and take up a lot of room and therefore be detrimental to the public realm and the setting of the station. When large numbers of cycle spaces are required, planning around individual cycle stands can quickly take up a lot of space. Two tier cycle racks provide a much greater density. When considering quantum, local demand and local design standards should be considered and followed.

Increasingly stations have dedicated cycle hubs that provide a large number of secure and enclosed cycle parking spaces. To encourage cycling they often contain helpful ancillary functions such as cycle repair and maintenance or a café. Larger facilities, for instance the Cycle Hub at Brighton Station, also include showers, changing rooms and toilet facilities as well as exercise and office space.

Cycle hire provides a means of getting cycling without the responsibility of owning one. These schemes include those provided by city Transport Authorities and independent operators. Initially these tended to make use of secure docking stations but increasingly allow cycles to be picked up and dropped off anywhere. The growth in e-bikes also has the potential to increase the market for cycling by making it accessible to people who have longer distances to travel.

When providing space for e-bikes and scooters, protection should be considered against fire and explosion that can result from faulty batteries.

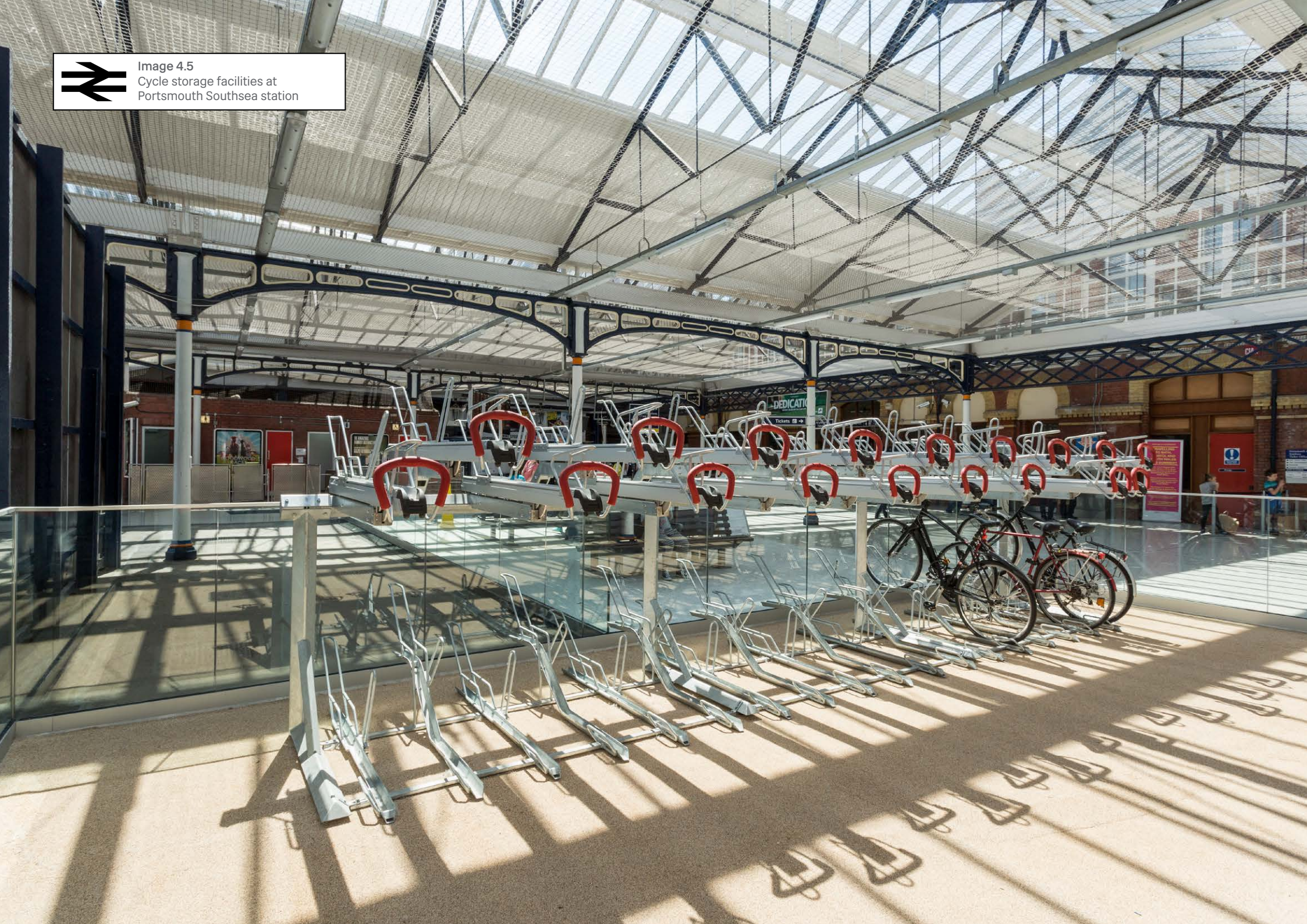
Most cycles taken on trains by commuters are foldable and require little special provision. Fixed frame cycles are more likely to be taken on trains by leisure cyclists. Wide, step-free routes from entrance to platform will help people wheel these through stations and reduce the chance of obstructing other passengers.



Image 4.4
Cycle Superhub at Brookwood station



Image 4.5
Cycle storage facilities at
Portsmouth Southsea station





4.4.1 Entering the Station

When entering the station there should be a clear line of sight to ticketing facilities, CIS and departures information, and the gateline.

Retail grab and go provision should be located on the route between entrance to gateline without interrupting the visual legibility of the main routes through the station.

4.4.2 Concourse / Ticket Hall

In smaller stations the mediating space between the forecourt and the platforms is likely to be no more than a single room ticket hall, offering ticket facilities, information, shelter and seating. At larger stations this expands to become a concourse that acts as the heart of the station, where movement decisions are made and passengers meet, eat and shop.

At either scale the function calls for a light, welcoming space with a generous ceiling height and a calm and uncluttered ambience. There should be space for passenger flows, queuing zones and quieter spaces for waiting and meeting. Clearly visible onward routes to the forecourt in one direction and the platforms in the other will help people to move freely and avoid congestion.

Security and the perception of safety can be built in by avoiding blind corners and having clear lines of sight throughout the public areas. This supports passive surveillance, making it easier to spot both anti-social behaviour and those who may require assistance. A visible staff presence reinforces the image of the railway as a supervised safe space for passengers.

The high footfall and passenger dwell times in the concourse make it an ideal location for retail and advertising. Commercial opportunities need to be balanced with essential railway operations, in particular they should not obscure or confuse wayfinding signage or occupy space that is necessary for key passenger movements.

4.4.3 Gateline

The gateline is the primary access control point to the railway via the platforms and often the key means of revenue control. It is the boundary between the 'paid' and 'unpaid' areas of the station. The gateline requires run-off space either side to allow for safe queuing and decision making on exit.

There is an aspiration to remove ticket gates and ticket offices and replace with digital or self-service technologies to increase capacity, reduce costs and improve customer experience, for example by freeing up station staff to circulate among or be more available to support passengers.

4.4.4 Concourse volume

Guidance on the relationship between concourse area and height can be derived from operational and historic examples.

As a rule of thumb, there should be a minimum floor to ceiling height of 5 metres for concourses up to 500m² and an additional height of 1 metre for every 500m² thereafter up to a maximum height of 15 metres. Beyond this, architectural judgement will need to be made as to the most appropriate height.

For very small concourses e.g. below 100m² it may be permissible to reduce the height to 3.5 metres but in this instance consideration should be given to the availability of natural lighting from above, through side windows and from clerestory windows

It is permissible to vary the headroom within a concourse so long as those areas where this is below the minimum are transitional spaces or where there is no dwell time.

Station Elements

4.5 Circulation



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4.5.1 Circulation Routes

Circulation around the station should be arranged to give passengers confidence to make the journey through the station by themselves and reduce the walking distances between any point on a train to the station entrance or, if applicable, an interchange route. Routes should be logically arranged, direct, and vertical circulation should be clearly indicated.

It is often the case that platforms are offset or misaligned in stations that have developed piecemeal over time. In these circumstances new infrastructure, for instance a new footbridge, can cut through this historic tangle to provide a much quicker, direct route. New circulation routes can also provide more flexibility for station operation, for instance allowing one-way routing to reduce cross-flows of passengers during peak periods.

There can be a tendency for boarding passengers to gather at or close to the point at which they step onto the platform, locally overloading trains. New points of platform access can help make better use of platforms by dispersing passengers along their full length.

Routes should be safe and secure with good visibility and be free of obstructions, recesses and blind corners. At decision points passengers may slow down or pause before continuing their journey. Allowing additional space is useful to prevent people from obstructing one another.

Footfall is high on circulation routes, making them ideal opportunities for 'grab-and-go' retail or advertising. It is important that the hierarchy of information is maintained and these facilities don't obscure wayfinding signage or the route itself.

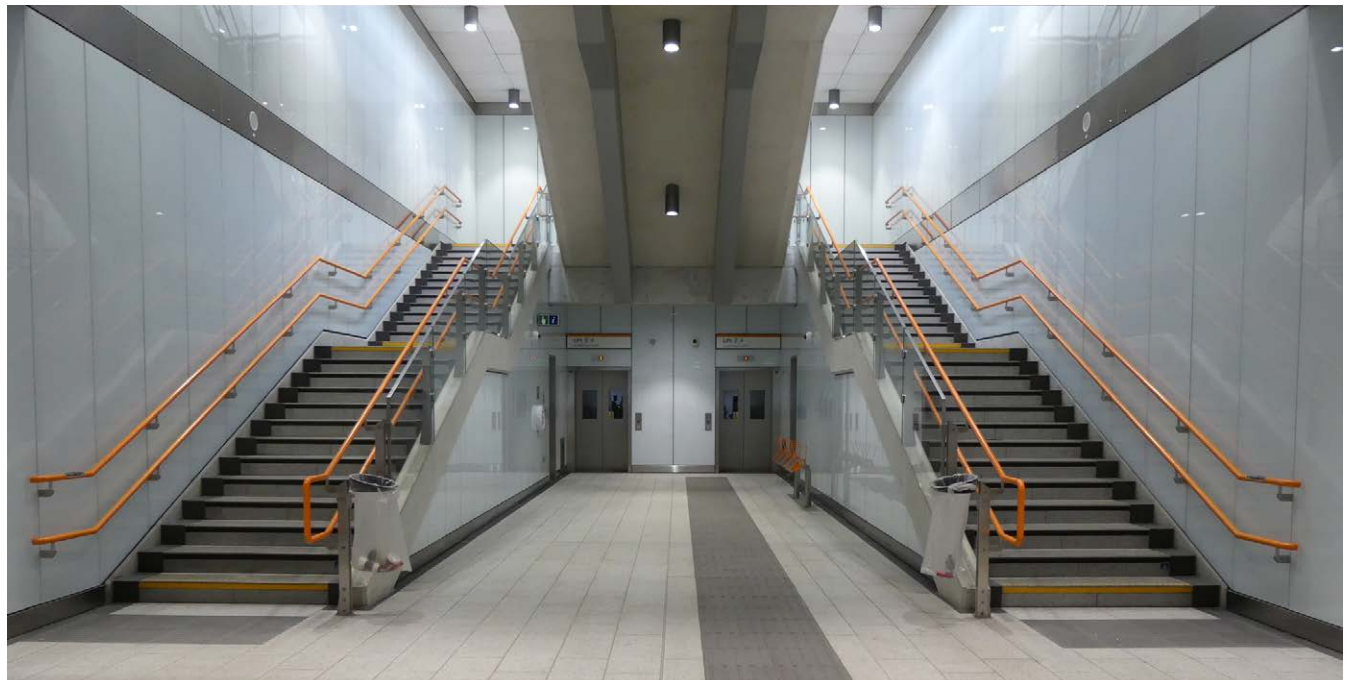


Image 4.6
Circulation to platforms at Barking Riverside station

NR Guidance Suite Reference

Wayfinding
NR/GN/CIV/300/01

Tactile Wayfinding
NR/GN/CIV/300/06

Station Elements

4.5 Circulation



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4.5.2 Vertical Circulation

The different types of vertical circulation — stairs, escalators, lifts and ramps — vary in terms of their capacity (the number of people that can use them per minute), the maximum recommended rise and their spatial requirements. All require run-off zones at the top and bottom.

Whilst widening a flight of stairs increases its capacity, and the capacity of a lift can be increased by increasing its size, the capacity of an escalator is effectively fixed.

To increase capacity another escalator is required. This means increasing the capacity of a bank of escalators results in a jump in width, rather than the incremental increase of a stair. This is a key consideration when assessing capacity requirements against the spatial constraints on a platform, where minimum clear widths need to be maintained to safely accommodate passenger numbers.

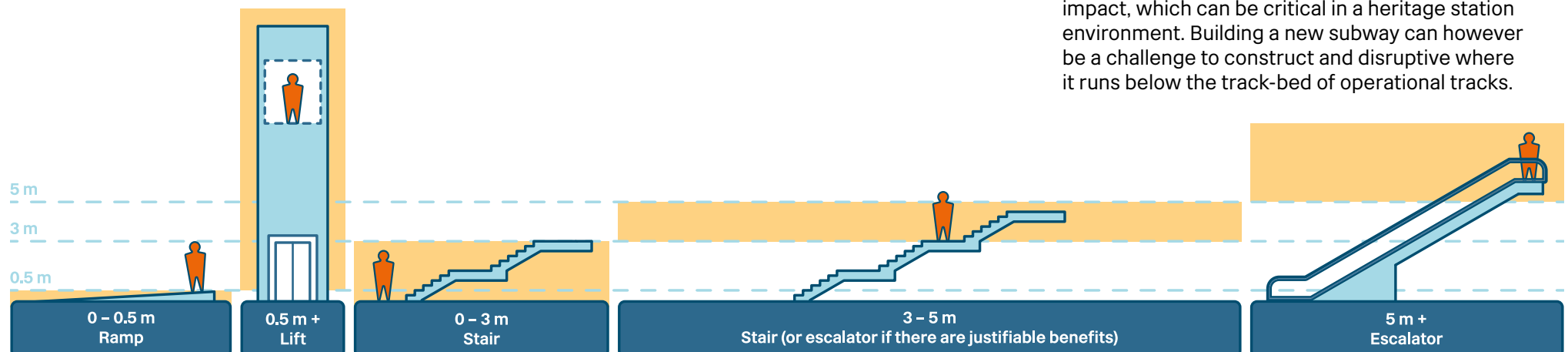
4.5.3 Ramps

Ramps are best used to overcome small changes in level. Ramps are non-compliant for vertical rises above 2m in a station environment on an accessible route.

4.5.4 Stairs

The recommended maximum overall rise for a staircase is 5m. The height of a footbridge deck above the tracks is often 5m or more, especially when it is above electrification lines. For a vertical rise above 5m, it is recommended that an escalator is included as an alternative route particularly where this can be a passenger flow issue. This may force a choice of escalators instead, though an acceptable alternative is to have an escalator and a stair, with the escalator serving the 'up' direction. The stair can then become two-way if the escalator is out of action.

Stairs are the most appropriate means of level change for subways, where this level change is usually less than 5m. This shorter distance makes subways a quicker means of interchange than footbridges, and they also have less visual impact, which can be critical in a heritage station environment. Building a new subway can however be a challenge to construct and disruptive where it runs below the track-bed of operational tracks.



Station Elements

4.5 Circulation



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4.5.5 Lifts

Lifts are the primary means of providing step-free access through stations. They should be located as close as possible to the main passenger routes whilst providing clear space in front to wait, so that they are highly visible, convenient to use, and so that those using step-free routes benefit from the same experience of the station as those using stairs and escalators. Through-lifts are recommended to avoid users having to reverse out or turn around within the lift to leave, and lift doors should face along the platform rather than towards the platform edge.

For resilience it is preferable for all platforms to be served by at least two lifts in case one is out of action. The overall width of two lifts side by side can make it difficult to fit these next to each other safely on a platform though, and arranging them back to back means they can't be through lifts. A large number of lifts can also place a high on-going operational and maintenance cost on a station. It is therefore important that lift numbers and locations are carefully assessed on the basis of the size and footfall of the station.

NR Guidance Suite Reference

Vertical Circulation
[NR/GN/CIV/200/05](#)

Footbridges and Subways
[NR/GN/CIV/200/07](#)

4.5.6 Escalators

As escalators can only serve one direction at a time a minimum of two, or an escalator and a stair, are required so that one can run in the Up direction and the other Down. This allows for the eventuality of an escalator breaking down and requiring maintenance or replacement during station operation hours. A bank of three or more escalators also provides this resilience and allows for the direction of escalators to be changed to suit AM or PM peak passenger flows that may run in opposite directions.

Consideration needs to be given to the expense of installation and on-going maintenance of escalators and the spatial and construction requirements of the machinery requirements at the top and bottom.

Escalators are a safety and maintenance liability and are normally provided only where lifts and stairs are insufficient to deal with the flow of passengers.



Image 4.7
Vertical Circulation at
Victoria Underground station

4.6 The Platform and Canopy



4.6.1 Platform design considerations

Platforms accommodate both passengers waiting to board and passengers alighting from trains. At the same time there are often passengers moving along the platform, whether this is to find space to stand, access platform facilities or as a route to other parts of the station or the exit.

With the risk of falling onto the tracks or being hit by a train, platform edges are the most hazardous part of the station. It is critical therefore that they are a sufficient size to accommodate passenger numbers. Platform widths are based on calculations derived from the peak number of passengers boarding and alighting trains plus an allowance for circulation along the platform, the interface with the platform edge (yellow line zone) and an 'activity zone' for seating and passenger facilities. If fast non-stopping trains pass through a station it is important that people can wait further back from the platform edge.

Platforms can be made safer by making it easier for passengers to circulate and find space. This can be done by managing and minimising obstructions on the platforms, providing clear lines of sight and by locating vertical circulation where it will encourage passengers to disperse over the full length of the platform.

Platforms should be long enough to accommodate the full length of the trains that call at the station, with 5m added to allow for slight variation in the train stopping point. Curved platforms can result in large gaps between the platform edge and the train door so should be avoided where possible.

The relative levels of train door and platform on the UK rail network are such that there is typically a step down, often large, from one to the other. This results in slower boarding and alighting and an increased risk of tripping and falling. It is also very difficult for wheelchair passengers to get on and off a train without assistance.

Temporary ramps need to be stored on the platform and are put in place by a member of station staff. This operation takes up space on a platform, increasing congestion and acting as a hazard if the platform is busy. Serious consideration should be given to reducing the level difference between train and platform so that the transition can be managed by wheelchair users without assistance.

At stations where temporary ramps are used, a platform width of 3.3m is recommended. This allows for a 1.8m ramp length, and 1.5m beyond the ramp for a wheelchair turning circle.

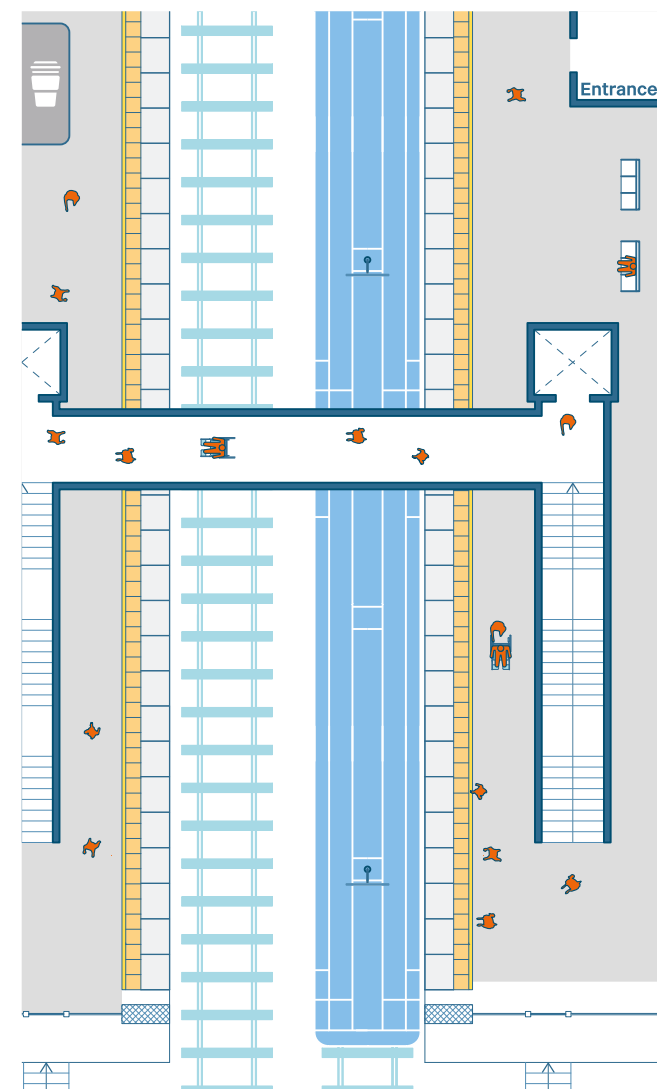


Image 4.8
Plan view of typical platform

Standards Reference

Interface between Station Platforms, Track, Trains & Buffer Stops
RIS-7016

4.6.2 Platform canopies

Platform canopies are important for passenger comfort and, especially at smaller stations, the platform and canopy can be by far the largest station element. They should be more than just utilitarian structures: and should combine function with confident structural expression and detailing.

Platform canopies can provide cover for a range of activities, from grab and go retail to providing shelter for waiting spaces. This will encourage passengers to spend more time waiting on platforms, rather than in the station ticket hall.

Where platform canopies only cover limited areas of the platform (or are replaced with standalone shelters) that can encourage passengers to bunch up, slowing boarding and alighting and leading to uneven train loading. Long canopies, that cover all or a wide length of the platforms are therefore strongly preferred.

Platform canopies also provide an important technical function, for organised, well considered integration of CCTV, Lighting, Comms, WiFi and other station requirements.



Image 4.9

Platform canopies at a HUB Station



4.7.1 Design considerations for station servicing

Servicing (deliveries, maintenance, material handling and waste management) is an important element in the successful functioning and operation of all stations. Lack of proper planning and design for operations will result in the potential for ongoing issues throughout the lifetime of the station, including poor functionality and resilience, safety issues and cost. It is therefore important that consideration is given to the servicing strategy early on in the planning of a project.

4.7.2 Determining the quantity of service space

A key factor is the quantity of space that needs to be provided. This should be calculated and presented within an accommodation schedule that articulates the spatial requirements for a future station.

4.7.3 Security

Undertake a TVRA (threat and vulnerability risk assessment) to determine the security requirements (e.g. service vehicle access control) and provide the operational flexibility/resilience required for the site.

4.7.4 Servicing Routes

Provide logistics routes that minimise travel distances and level changes. The key to this is to locate the loading bay area(s) as close as possible to the final points of goods delivery, ideally at the same level.

Where possible there should be independent servicing for station and retail functions.

4.7.5 Vehicular Routes

A key hazard relating to servicing is the potential for conflict between servicing vehicles (including material handling equipment) and pedestrians (passengers, staff and visitors). To avoid this, separation of pedestrian and vehicular routes should be planned, with clear demarcation.

Highways design will be needed for vehicle tracking and for connecting the vehicle access to neighbouring roads.

4.7.6 Provision of staff parking

Staff parking will be required for a percentage of the total number of staff. As a minimum, blue badge parking should be provided for 5% of the total number of staff. The staff that need blue badge parking will be less mobile, so this should be in close proximity to staff entrances, with a step free route.

This needs to be considered early on in the project, particularly for larger stations or those in constrained locations where passenger parking would not be provided and space is at a premium.

NR Guidance Suite Reference

Masterplanning at Stations
[NR/GN/CIV/100/07](#)

Retail Design Manual for Stations
[NR/GN/CIV/200/06](#)

Public Realm Design Guidance for Stations
[NR/GN/CIV/200/10](#)

4.8.1 Quantum of retail, location of retail, relationship of retail to concourse and urban realm

The quantum of retail will depend on the size of the station, the level of usage and service, and also local demands and the level of provision locally. Station retail will also be used by those that are not travelling, so it is important to consider how it can complement and contribute to the local offer.

Retail units require as much visible frontage as possible to attract custom. This needs to be balanced with the needs of the station, to avoid a confusing and cluttered layout, where retail and customer information and wayfinding compete.

4.8.2 Segregating service access for retail

Where retail is provided, service access will be required. For small kiosks, access may be via the passenger environment. For larger retail units, access that is separate from both public and station staff areas is advised.

4.8.3 Retail Management Suite

In large stations, a retail management suite should be included alongside station management offices where retail is managed by the station operator or owner.

4.8.4 Building services, connection and extraction

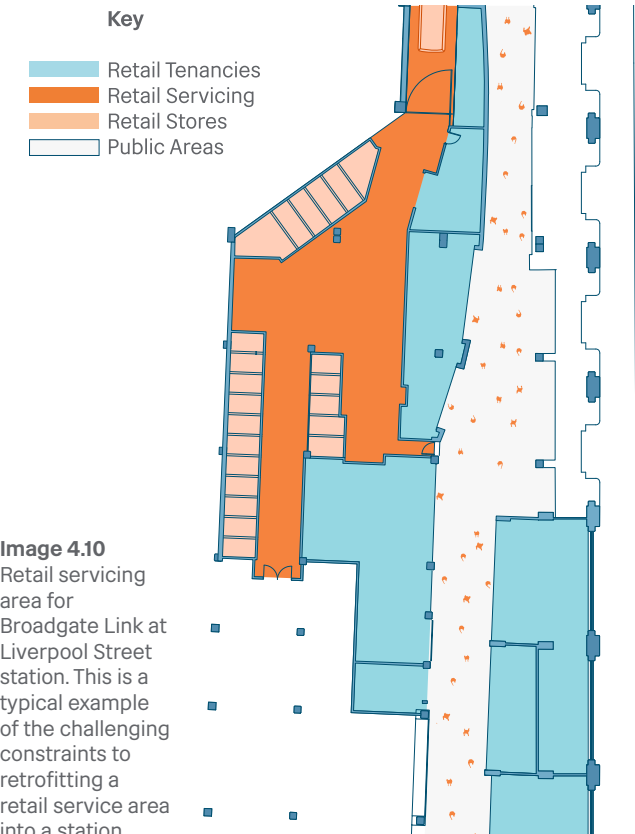
Early on in the design of any project the Mechanical, Electrical and Public Health requirements should be considered.

- Does the retail unit require toilet facilities?
- Is cooking taking place? Will it require an extraction system to atmosphere
- Is the station power supply sufficient to support the proposed retail?

4.8.5 Designing and planning a retail service area

A retail accommodation schedule can help to define the spatial requirements for a retail service area. Other key considerations include:

- How is vehicle access provided, and is there sufficient space for the retail units to load and unload
- What size of servicing vehicle has been allowed for?
- Will servicing space for the retail units be shared, and will usage be staggered or required at the same time?
- Is the transfer distance between servicing and retail as short as it can be?
- Where will waste be stored and how can recycling be maximised?
- Is a compactor required, and has sufficient space and headroom been allowed for?



NR Guidance Suite Reference

Retail Design Manual for Stations
NR/GN/CIV/200/06



4.9.1 Requirements for facilities

The range of staff rooms and facilities will vary depending on the size of the station. The requirements for the largest of these rooms are introduced here.

4.9.2 Ticket Offices and Ticket Vending Machines

Where Ticket Offices are provided, they should be located adjacent to the station concourse, and should be visible from the concourse without having to visually compete with retail and other station elements.

Space for Ticket Vending Machines (TVMs) should be provided adjacent to the ticket office, so that the ticket office overlooks the TVMs and the ticket gate line, if the station has one.

There should be space for passengers to queue at the Ticket Office and in front of TVMs without disrupting station flows.

Staff facilities for ticket offices should be in a secure area adjacent to and accessed from the ticket office, with toilets, a mess room and lockers provided. These should be separate from other staff facilities at the station.

4.9.3 Station Control Room (SCR)

The function of the SCR is to provide safety and security to passengers, customers, staff and visitors to the station at all times, to provide information on train services to passengers and coordinate operational train and platform information in liaison with the TOCs. It is the point of contact with all the emergency services during incident management. The SCR may be located alongside the station management suite. It should be located in close proximity to the Telecoms Equipment Room.

4.9.4 Station Management Suite

This provides accommodation for the station manager and duty manager teams, along with meeting, conference and training space.

4.9.5 Staff Facilities and Mess Rooms

Staff mess and toilet facilities are to be located wherever staff are based. They are to include segregated male and female locker areas. These facilities may be duplicated where access is made difficult by distance or change of level. They will also be duplicated in secure areas of the station such as the secure suite.

4.9.6 Train Management Suite

At terminus stations and larger stations a Train Management suite will often be required. This includes management space and facilities for drivers and conductors. Space for drivers should include a mess room and toilet facilities for use between services. This may be shared with other staff, but it is important that it is located close to the trains.

4.9.7 Train Cleaning and Servicing

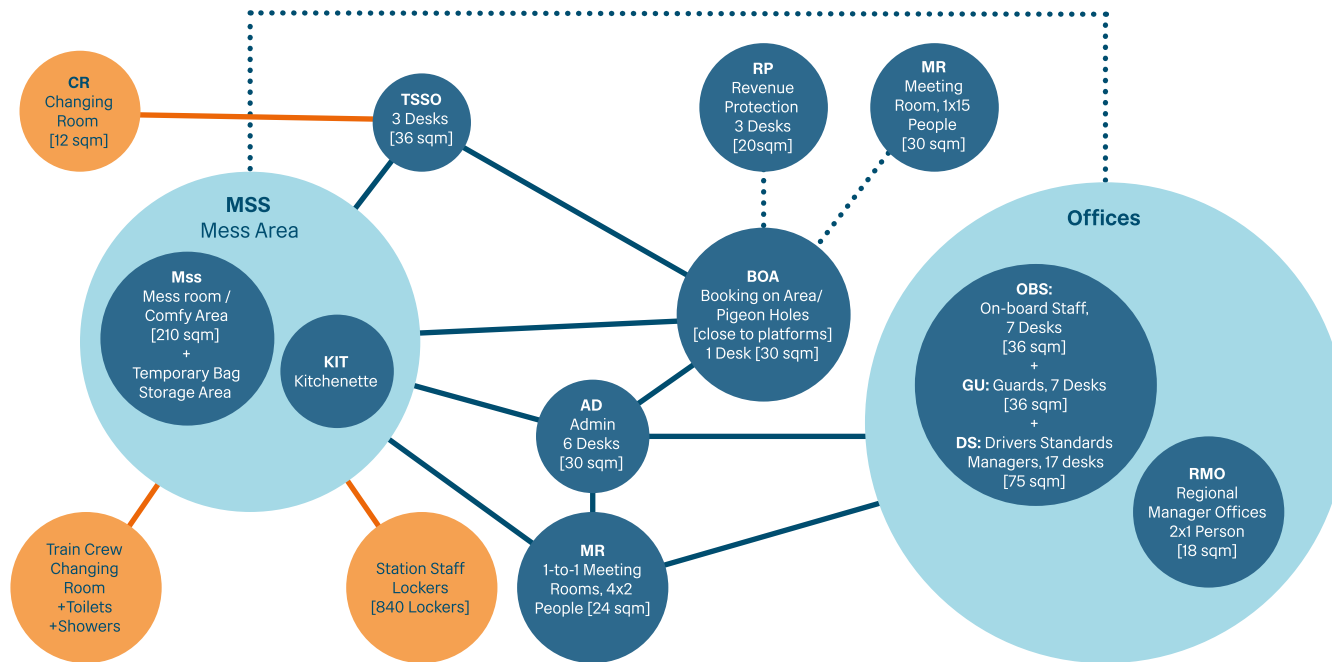
Space is required at some stations for train servicing, this includes train cleaning and fitting. Cleaning of trains is managed by the TOCs and includes turnaround cleaning, berth cleaning, toilet tanking and providing a supply of fresh water to the train.

Cleaning staff require a mess room, toilets and showers, locker facilities, a cleaner site manager desk and storage space. Work is usually undertaken by contract cleaners. Accommodation is best located on platforms, near to the trains, as the cleaning staff carry heavy containers and chemicals. Cleaners toilets may not be shared with other staff.

4.9.8 Other facilities that may be required include:

- Excess Fares Office
- Train dispatch area
- British Transport Police (BTP) Office
- Onboard Catering Suite/storage

4.9 Staff and Operations Facilities



At larger stations, understanding the structure of staff teams, clustering these into functional groups and mapping out the relationships within and between these clusters, for instance where adjacency is required, valuable or unimportant, can help in identifying how to use space effectively in support of station operations.

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
Joint Station Management	Train Crew	Locker Space	Other TOC & NR functions	Catering and technicians
Includes control, shift managers, shared stations, management suite, briefing room, e-learning, meeting rooms, storage	Including office space for drivers, managers, on-board staff, managers, admin, coordinators, TSSO, the mess area, quiet rooms, toilets and showers	550 lockers for TOC; Potentially 65 lockers for NR and an additional 150 lockers for TOC	This includes office space for TOC: catering managers, publications, print room, training, MR etc., as well as NR meetings rooms and Mitie	This include stores for catering suppliers and train technicians

Image 4.11
Space planning cluster example for a Category A station



Oversite Development (OSD) and Adjacent to Site Development (ASD) make use of land immediately next to or above a station or rail corridor. Challenges to viability include:

- Disruption to rail services
- Additional safety restrictions on building close to an operational railway
- Constraints on construction or permanent access
- Land that is often awkwardly shaped and difficult to plan efficiently

Planned correctly though this development can be a key part of bringing a station precinct vibrantly to life, and where ASD or OSD projects are considered as part of station redevelopment, the financial benefits can be used to fund or unlock upgrades to the station or railway.

The issues identified above are most pronounced above railway tracks and platforms. For this reason OSD is more likely to be viable over lineside elements such as entrances and concourses.

NR Guidance Suite Reference

Masterplanning at Stations
NR/GN/CIV/100/07

Investment in Stations
NR/GN/CIV/100/08

Third Party Funded Railway Car Parks Design Manual
NR/GN/CIV/200/12

When designing a new station, or a new element such as an entrance, the potential for ASD or OSD should be considered early on, even if it won't be designed in detail or built out as part of the scheme.

Key considerations for successful ASD or OSD include:

- Keeping development and station separate: critical functions need to be kept separate. These include access and egress, both for normal use and for the emergency services, and other fire safety systems
- Commercial attractiveness: the layout and size of building floorplates need to be commercially attractive and fit for purpose. Contrarily, the footprint and massing of the ASD or OSD may need to be agreed before a tenant is found, and potentially before the use is defined. The design requirements for an office development are not the same as those for a residential one and market conditions change, as does demand for different types of space. It is important therefore to maintain flexibility where possible through design development
- Construction worksite and access: careful construction planning will help to mitigate the restrictions placed on accessing and building adjacent to a live railway
- Maintainability: it should be possible to safely maintain the building, for instance façades that are adjacent to or overhang the railway, without any impact on railway operations

Additional challenges applicable to OSD include:

- Locating structure: Regular column grids are preferable to expensive transfer slabs and other complex structural solutions, which are unlikely to be viable except in areas with very high land values. The layout of railway infrastructure directly below the building will constrain the locations of structural columns and building cores. Space will be reduced further by factoring in safe offsets from tracks
- Providing 'a front door': the attractiveness of a development to tenants, especially a commercial tenant, may be reduced if the 'front door' and access to the building is raised on a deck above the surroundings and lacks traditional street presence. It is important to reconcile the level differences through the design to overcome this
- Planning for rebuilding or demolition: it should be possible to construct and dismantle an ASD or OSD without affecting the ability of the railway infrastructure to function. While a new station may have a design life of 120 years, the OSD may be entirely or substantially rebuilt after only 60 years. A strategy should be in place from early on in the design process as to how this change will be managed



Image 4.12
Public realm at Cambridge station



Station Design
Project Execution

5

5.1.1 Whole Life Design

The designer will need to consider all phases in the whole life of the station, from initial design to construction and beyond to allow safe maintenance, cleaning and eventual demolition.

The materials selected for station works are required to be fit for their intended function and represent the best whole life value.

All designers have a duty to record the materials expected design life and to state how the material is to be maintained, repaired and cleaned whilst minimising the impact on station operations and users.

The following considerations will help in reducing the whole life cost of a project:

- A building configuration plan and specification of materials and equipment to minimise operational and maintenance costs
- Minimised energy use and costs through consideration of passive environmental design strategies (e.g. natural light and ventilation)
- Robust material choices and detailing to resist the impacts of weather, wear and tear and antisocial behaviour
- Considering future flexibility for the station to expand or change, for instance to respond to an emerging context
- Planning MEP (Mechanical, Electrical and Plumbing) systems so that they are simply configured and easily accessed for maintenance or replacement



Image 5.1
New footbridge, Cambridge

NR Guidance Suite Reference

Climate Action Design Manual for Buildings and Architecture
NR/GN/CIV/100/04

5.2.1 Effective use of BIM

Network Rail recognises that design, construction and asset management are part of a wider integrated system and aims to comply with the UK Building Information Modelling (BIM) Framework, and ISO 19650. The application of BIM will provide an opportunity for Network Rail to make efficiency savings.

BIM design work takes place in a collaborative environment using asset information models, underpinned by common reference systems and formats based on standards, shared libraries of elements and electronic information sharing. Adopting BIM principles leads to savings through reuse of information and a reduction in information handling, waste and rework.

Effective use of BIM optimises value from lifecycle asset information, the introduction of collaboration in the design process, and the creation of information which is fit for downstream operation and maintenance for use by future projects.

5.2.2 Determining the value of BIM to the project

Key factors to consider when determining the maturity of BIM, and the scope of modelling on the project:

- Is there already BIM information for this station? Will it assist the project? Will it need updating?

- Is the model just for this project, or is it being setup for use on future projects?
- Will the BIM model be used for Facilities Management (FM)?
- Is the BIM model an investment for use on future projects? This will help to determine the definition of the model, for example detail for elements that are not specific to the project.
- Consider the scale and scope of the project. If it is an upgrade project to a small area of a large station, then producing a BIM model of the whole station may not be appropriate.

5.2.3 Employer's Information Requirements (EIRs)

Once the project requirements are defined, they should be captured within the EIRs. The EIRs set out the information required from the NR internal team and from suppliers for the project development and operation of the completed building. These typically cover:

- Methods for how the information is created, named and exchanged
- Roles and responsibilities, and what is required
- A plan or schedule of information to be delivered, who will be delivering this and when
- A COBie (Construction Operation Building information exchange) demand matrix (applicable when the model will be used for FM)

5.2.4 Network Rail BIM Strategy

The former Infrastructure Projects division of Network Rail produced a guide for EIRs 'Implementing BIM principles for Railway Infrastructure Projects'. The management of assets and BIM information is now undertaken directly by each Network Rail region.

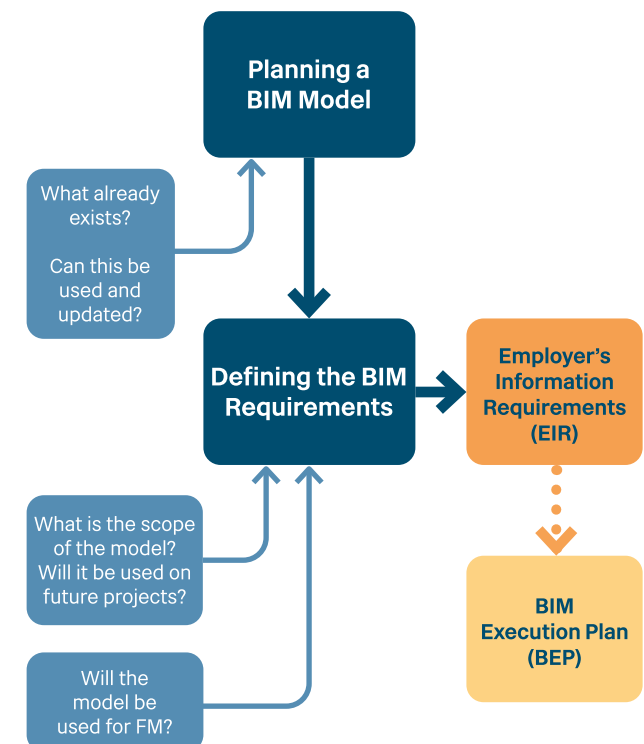


Image 5.2
Defining BIM Model requirements



5.3.1 Keeping the station operational

When a project is at an existing station, consideration should be given to whether the full level of service is to be maintained, or if for example, the number of platforms and level of service is to be reduced. Reducing services can have a longer term impact on passenger satisfaction, and lead to passengers seeking alternate modes of transport. Specialist input should be sought before considering this option.

Whilst a project is in progress, the station still needs to meet all regulations that usually apply. For example, this includes egress, platform capacity clearances, and fire regulations.

Wayfinding can be challenging when the usual route for passengers is interrupted, particularly when passengers have a familiar routine. For this reason, good wayfinding is more important than ever during construction projects, and good temporary wayfinding should be employed.

5.3.2 Segregating operational and construction elements

Construction areas should be segregated from operational and public areas through the use of secure hoardings or other means.

Where possible, construction areas should have direct external access, avoiding access through the operational station. Construction areas should have welfare and storage facilities that are separate from facilities used by station staff.

Work sites that are segregated from railway operations, with separation of activities and risks from the railway are defined as a 'high street' environment. NR standard NR/L3/OHS/005 sets out the criteria for a high street project, and the procedural differences for managing these projects.

5.3.3 Possession of track and other assets

In some instances, for example in the construction of a footbridge, it may be necessary to close tracks. Track closures need to be planned a long time in advance, and should be made as short and efficient as possible. Off-site construction can reduce the length of time a possession is required, as pre-constructed elements can be quickly moved into place. This and other methods should be employed to help reduce possession lengths.

Opportunities should be sought to align this with any other works along the line, where a line closure may already be in place. For stations that serve events, care should be taken to avoid disruptions that coincide with times that the station is busy.

5.3.4 Keeping passengers and stakeholders informed

Good communication is important to manage expectations both with passengers, passenger and user groups and neighbours that will be impacted by the works. This can also generate engagement and interest in the project.

Standards Reference

Design and Construction Management in a High Street Environment
NR/L3/OHS/005

5.4.1 Post Occupancy Evaluation

Post occupancy evaluation (POE) is used to evaluate whether a building behaves as intended and whether the occupants are happy with the results. High performing buildings have higher user satisfaction and significantly lower running costs. A POE should identify where there is potential for improvement and lessons that can be learned for future projects by helping designers and clients to understand the impact and effectiveness of the decisions taken during the design stage. Conclusions should be shared with Network Rail so that this information can be used in future.

It is useful to commit to carrying out post occupancy evaluation at the beginning of the project so that the project brief and budget can include a requirement to test whether objectives are achieved, and the evaluation criteria can be agreed and tracked through design development.

5.4.2 Post Project Review

A post-project review evaluates the effectiveness and efficiency of the project delivery process. Input should be sought from contractors, designers, suppliers, and the client as to how well the project was managed and delivered against the project requirements. The criteria for a post-project review should be set early in the project so that they are part of the briefing process.

5.4.3 Performance in Use

Performance in use assessments should be carried out at least 6 to 12 months after occupation, so that the station is fully in use and a routine is established. It is more effective if the station has been used across all seasons. Assessments do not need to be a one-off, they can follow at different times of the year or be an ongoing process.

An assessment of performance in use can include:

- An assessment of whether the project is functioning as designed
- Effectiveness at achieving project objectives
- Satisfaction of passengers and staff
- Passenger comfort
- Ease of use for disabled passengers, and those with children or luggage
- Improvements in passenger flows and capacity
- The standards of lighting, acoustic environment, ventilation, temperature and humidity
- Environmental and energy consumption in use
- Maintenance and occupancy costs
- Quality issues and Defects

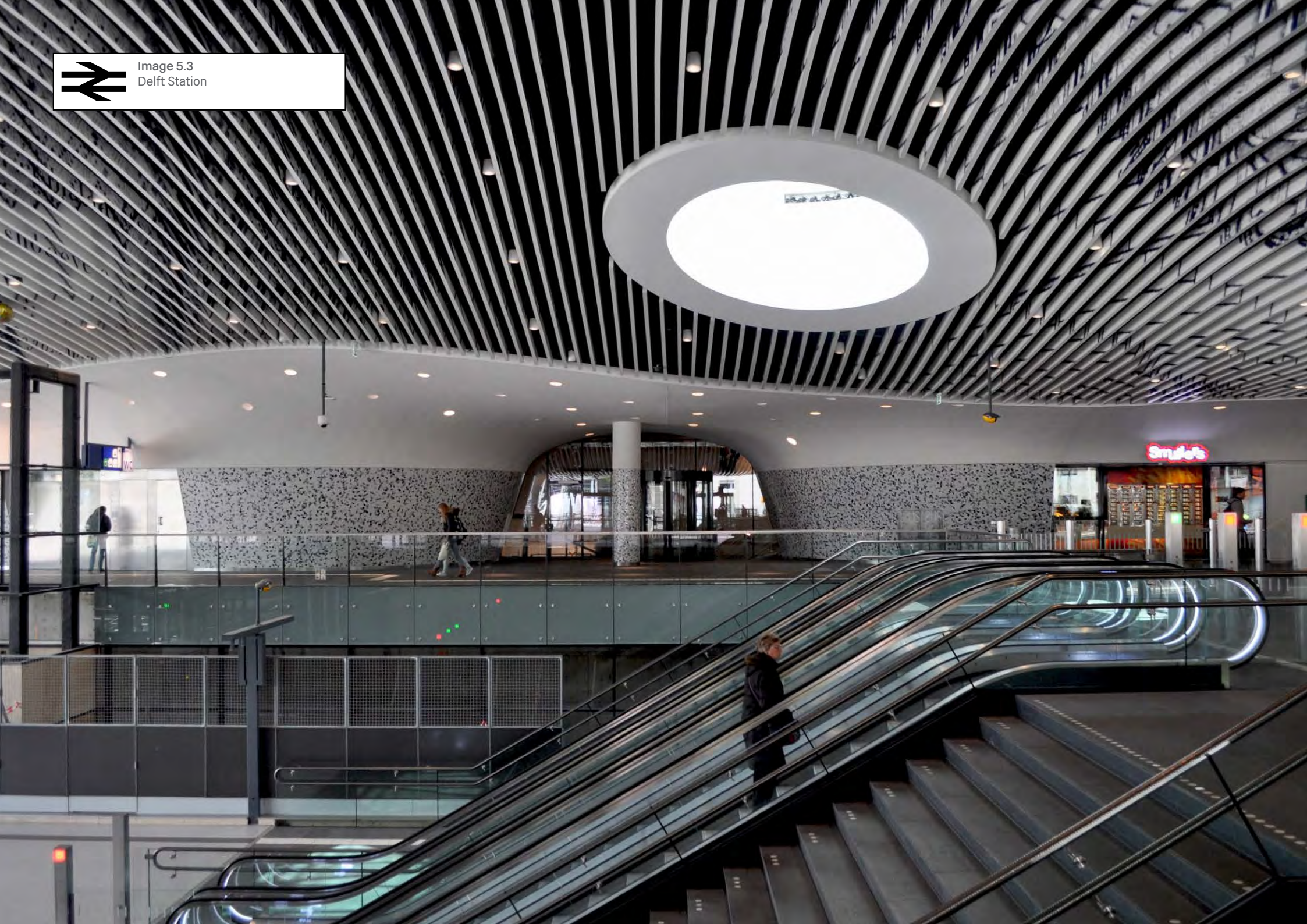
5.4.4 Lessons Learned

Lessons learnt sessions should compare outcomes to the project brief and objectives, along with benchmarked projects. The outcome of the project should also be compared against a 'do nothing' alternative scenario to understand the value and effectiveness of the work carried out.

A report should be produced that covers what has and hasn't worked well and make recommendations for future projects.



Image 5.3
Delft Station





Station Design
Design Considerations Toolkit



Image 6.1
HUB Station



6.1.1 Design Considerations Toolkit

This section provides a toolkit of considerations and requirements for designers and project managers to successfully develop a project through the initial stages of the design life cycle. These cover common points, but are not exhaustive. The toolkit maps design considerations to the most applicable stage of the PACE process, though it is important that they should also be considered iteratively throughout the design process.

Network Rail's ten Principles of Good Design set out the factors for a well-considered project, one that is responsive to its context and the environment.

Projects should refer to and respond to these criteria throughout the project planning and design stages.

In parallel projects should also make use of the Environmental and Social Appraisal tool (ESA) to elicit and record opportunities for best practice in the built environment. This section identifies where requirements relate back to these criteria.

Network Rail has established an independent Design Advisory Panel (DAP) for reviewing large and complex projects. The DAP will work with project teams to assure that high quality design is developed, and that projects meet the Network Rail Principles of Good Design and the parallel ESA requirements.

A Form D (architectural and layout) is initially submitted at PACE stage 1 (ES3) and prior to a planning submission. It needs to be resubmitted to capture the maturity of a design proposal so may be required at Stage 2 (ES4) and (ES5).

Standards Reference

Environment and Social Minimum Requirements
NR/L2/ENV/015

NR Guidance Suite Reference

Design Advice Panel
NR/GN/CIV/100/01

Design Considerations Toolkit

6.1 Design Considerations Toolkit



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6.1.2 About PACE

PACE (Project Acceleration in a Controlled Environment) has now replaced GRIP. The key benefit of PACE is that it provides a more flexible control framework to tailor control points to suit the requirements of the project.

Refer to NR/L2/P3M/201 Project Acceleration in a Controlled Environment for further information about PACE.

The timeline below shows a comparison between PACE and GRIP when the PACE Milestones are delivered sequentially. This is not mandated and it is permissible to overlap the activities required to deliver individual milestones.

Comparative Timeline of Design Stages

	0	1			2		3	4	
PACE	Project Initiation	Strategic Development & Project Selection			Project Development & Design		Project Delivery	Project Close	
		ES1	ES2	ES3	ES4	ES5	ES6	ES7	ES8
RIBA	0. Strategic Definition	1. Preparation and Briefing	2. Concept Design	3. Spatial Coordination	4. Technical Design	5. Manufacturing and Construction	6. Handover		
GRIP		1. Output Definition	2. Feasibility	3. Option Selection	4. Single Option Development	5. Detailed Design	6. Construction, Test and Commissioning	7. Scheme Handback	8. Project Closeout

Note that PACE and GRIP stages do not correlate directly with RIBA workplan stages, however approximate overlaps are shown here for reference

Design Considerations Toolkit

6.1 Design Considerations Toolkit



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PACE (Project Acceleration in a Controlled Environment)	0	1			2		3	4		
	Project Initiation	Strategic Development & Project Selection			Project Development & Design		Project Delivery	Project Close		
		ES1	ES2	ES3	ES4	ES5	ES6	ES7	ES8	
Aims & Objectives	<ul style="list-style-type: none">Appoint the team required to plan and enter Phase 1.Prepare the Project Management Plan	<p>The purpose of this phase is to:</p> <ul style="list-style-type: none">Determine the baseline requirements for the projectIdentify constraints that will impact the feasibility of the projectDetermine a single option (the project) that meets the client requirements within the identified constraints			<p>The purpose of this phase is to:</p> <ul style="list-style-type: none">Undertake development of the single option to agree approval in principle and standards to which the project should be constructed,Produce an approved ready for construction design.		<p>The purpose of this phase is:</p> <ul style="list-style-type: none">Safe and efficient delivery of the project to the specification.Testing and commissioning undertakenAsset enters service		<p>The purpose of this phase is to:</p> <ul style="list-style-type: none">Transfer of asset from the project team to the operatorProject Manager closes project systems and demobilisesSponsor formally closes the project and related support systems	

RIBA (Royal Institute of British Architects)	0. Strategic Definition	1. Preparation and Briefing	2. Concept Design	3. Spatial Coordination	4. Technical Design	5. Manufacturing and construction	6. Handover
Aims & Objectives	<ul style="list-style-type: none">Prepare Client RequirementsDevelop Business Case for feasible options including review of project risks and project budgetRatify option that best delivers client requirementsReview feedback from previous projectsUndertake site appraisals	<ul style="list-style-type: none">Prepare project brief including project outcomes and sustainability outcomes, Quality aspiration and spatial requirementsUndertake feasibility studiesAgree site information including site surveysPrepare project programmePrepare project execution plan	<ul style="list-style-type: none">Prepare Architectural Concept incorporating strategic engineering requirements and aligned cost plan, project strategies and outline specification.Agree project brief derogationsUndertaken design reviews with client and project stakeholders	<ul style="list-style-type: none">Undertake design studies, engineering analysis and cost exercises to test architectural concept resulting in spatially coordinated design aligned to updated cost plan, project strategies and outline specificationInitiate change control procedure	<ul style="list-style-type: none">Develop architectural and engineering technical designPrepare and coordinate design team building systems informationPrepare and integrate specialist subcontractor building systems information	<ul style="list-style-type: none">Finalise site logisticsManufacture building systems and construct buildingMonitor progress against construction programmeInspect construction qualityResolve site queries as requiredUndertake commissioning of buildingPrepare building manual	<ul style="list-style-type: none">Handover buildings in line with plan for use strategyUndertake review of project performanceUndertake seasonal commissioningRectify defectsComplete initial after-care tasks including light touch - Post occupancy evaluation

The GRIP Process has been replaced by PACE and is no longer used on new projects. It is shown here for comparative purposes, and where GRIP is still used on some ongoing projects.

GRIP (Governance for Railway Investment Project)	1. Output Definition	2. Feasibility	3. Option Selection	4. Single Option Development	5. Detailed Design	6. Construction, test and commissioning	7. Scheme Handback	8. Project Closeout
Aims & Objectives	<p>Considers</p> <ul style="list-style-type: none">The objective, scope, timing and specification of the enhancementFunding for the project and any project risksProcurement methodology: What should be undertaken in development and implementation worksAny likely interface with existing railway operations and other relevant projects and route strategiesOther stakeholders involvement	<p>Following successful review and prioritisation of the investment proposal, stage 2 moves the project forward. Where a scheme changes the capability of the railway, for example it changes the timetable of operation of the network, or it integrates with existing major programmes of work, then Network Rail's System operator team is likely to sponsor the scheme. Other schemes, such as investment in stations, will be sponsored by route enhancement teams.</p>	<p>Workstreams to be completed:</p> <ul style="list-style-type: none">The various options available to complete the project will have been identifiedEach of these available options will have been appraisedA single option and the outline design should be recommended.The business case should confirm whether or not the project is affordable, including consideration of whole-life cost issues, whether it can be delivered in a reasonable timescale, and whether it will provide value for money	<p>Development of the single option selected in stage 3 commences to create the outline design.</p> <p>Outline designs are produced. Any technical or legal issues that could cancel an options or a project are usually identified by this point</p>	<p>The completion of a robust engineering design that provides definitive costs, times, resources and risk assessments.</p> <p>The full design to which the project will be built is produced. This includes cost and time estimates</p>	<p>The project is built to the design and specification detailed during stage 5. It is tested to confirm everything is operating as specified and commissioned into use.</p>	<p>Transfer of asset responsibly from the contractor's project team to the operator and maintenance.</p>	<p>The project is formally closed. Contracts are settled and warranties agreed. Benefit assessments commence and the project team disbands.</p>

Design Considerations Toolkit

6.1 Design Considerations Toolkit



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Document Sections & PACE

	0	1			2		3	4	
PACE Stages	Project Initiation	Strategic Development & Project Selection			Project Development & Design		Project Delivery	Project Close	
		ES1	ES2	ES3	ES4	ES5	ES6	ES7	ES8
Station Design Manual		Section 2			Section 4		Section 5		
Forms A B C D				◆ Issue Form D	◆ Issue Form A ◆ Issue Form D	◆ Issue Form D	◆ Issue Form B		
Planning				Preparation of Planning Information		◆ Submission			
					◆ Consultation				
BREEAM (or similar scheme) <small>*Typical BREEAM NC Stages shown</small>		Pre-Assessment Stage		Design Stage Assessment			Construction Stage Assessment		
		◆ Decide scheme and goals ◆ Define sustainability aims and requirements ◆ Appoint relevant 'Champions' and Assessor			Interim Design Certification			Final (Post Construction) Certification	
Stakeholder / BEAP / DIA					◆ Application and submissions (varies per scheme)				
Design Advice Panel (DAP)				◆ Design Review	◆ Design Review if required				

The above table highlights which sections of this document are most relevant for each PACE stage in addition to key events and considerations (BEAP, IDC, etc.)

Design Considerations Toolkit

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Network Rail Guidance Suite mapped against PACE stages

	0	1			2		3	4	
	Project Initiation	Strategic Development & Project Selection			Project Development & Design		Project Delivery	Project Close	
		ES1	ES2	ES3	ES4	ES5	ES6	ES7	ES8
All Stations	Heritage: Care and Development								
	Climate Action Design Manual for Buildings and Architecture								
	Inclusive Design								
	Security at Stations								
	Fire Safety								
	Wayfinding								
	Rail Symbol 2								
	Station Design								
	Investment in Stations								
	Station Capacity Planning								
	Masterplanning at Stations								
	Design Advice Panel								
	Parking & Mobility at Stations								
	Retail Design Manual for Stations								
	Station Footbridges & Subways								
	Vertical Circulation								
	Public Realm Design Guidance for Stations								
	Lighting								
	Materials and Components								
	Public Toilets in Managed Stations								
	Station Facilities & Amenities								
	Tactile Wayfinding								
	Categories D - F	Implementation Strategy for Medium to Small Stations							
Medium to Small Stations									

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PACE ES2 Strategic Development & Project Selection	PACE ES3 Project Development & Design	PACE ES4 Project Development & Design
Safety		
<input type="radio"/> Has the British Transport Police been consulted to identify areas that need to be addressed through design?	<input type="radio"/> Are potential hazards and risks in the station properly identified, understood and recorded? Are they minimised for all station users?	<input checked="" type="radio"/> Are the materials specified hazard-free
<input type="radio"/> Have CDM principles been properly applied to the design and its delivery stages?	<input type="radio"/> Does the station design comply with all statutory emergency requirements?	<input type="radio"/> Fire Engineer Form A sign off required
<input type="radio"/> Has a Threat, Vulnerability and Risk Assessment (TVRA) been carried out?	<input type="radio"/> Does the layout, material treatment and lighting allow for clear visibility and CCTV coverage of all public station areas?	
	<input type="radio"/> Has safe access been considered for construction, operations and maintenance of all station areas?	
	<input type="radio"/> Is a fire consultant appointed and has the Network Rail fire officer approved the design?	
Accessibility and Inclusion		
<input checked="" type="radio"/> Have escalators and lifts been located on or adjacent to desire lines with good natural surveillance?	<input checked="" type="radio"/> Is the station compliant with DfT code of practice for accessible railway stations?	<input checked="" type="radio"/> Are spaces free of clutter with appropriate tonal contrast between wall and floor surfaces?
<input checked="" type="radio"/> Has a diversity and inclusion assessment (DIA) been undertaken? The DIA should also be reassessed at PACE Stage 2 ES3 & ES4.	<input checked="" type="radio"/> Has advice been sought from an accessibility consultant?	
<input checked="" type="radio"/> BEAP Panel should be consulted at PACE Stage 1 and subsequently at PACE Stage 2 ES3 & ES4.	<input checked="" type="radio"/> Can service information be accessed and understood by all users?	

Network Rail's Principles of Good Design Key:



Identity



Passengers



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Environment

→ Refer to the Environmental and Social Appraisal (ESA). This provides additional advice and considerations

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PACE ES2 Strategic Development & Project Selection	PACE ES3 Project Development & Design	PACE ES4 Project Development & Design
Capacity		
<input checked="" type="radio"/> Has the project been assessed by a Network Rail or external accessibility consultant? <input type="radio"/> Have the Station Capacity Team (pedflow) been consulted?	<input type="radio"/> Has sufficient capacity been provided at entrances to avoid conflicts? <input checked="" type="radio"/> Does the design anticipate the need and potential for future change? <input type="radio"/> Does spatial provision meet with current and predicted future needs? <input checked="" type="radio"/> Does the design facilitate convenient and safe access for pedestrians and other feeder modes to meet with passenger and operational needs?	<input type="radio"/> Station Capacity Team (pedflow) Form A sign off required
Environment		
<input type="radio"/> Has the RSSB rail carbon tool been used to identify potential reductions in the project carbon impacts? (E.g.. renewable energy) <input checked="" type="radio"/> What environmental assessment methodology is being used? <input checked="" type="radio"/> Are there any records of protected species, or their habitat, within 250m of the project? <input checked="" type="radio"/> Will the work take place in an area at risk from flooding or extreme weather including high winds, extreme temperatures, heavy rainfall, snow, or lightning? <input checked="" type="radio"/> Will the work take place within 250m of a water body (including ponds and features that may be seasonally flooded)?	<input checked="" type="radio"/> Has expansion been facilitated or inhibited in any way by the design? How will the station cope in the future? <input checked="" type="radio"/> Will any structures or assets need to be decommissioned, demounted, demolished or stripped-out as part of preparation for the works? <input type="radio"/> Has constructibility of the design and the consequences been considered? <input checked="" type="radio"/> Will the works generate excavation materials that could be reused in other works or projects?	<input checked="" type="radio"/> Have materials been selected to avoid complicated repair, removal or disposal processes? <input checked="" type="radio"/> Does the work/ job description involve any cutting or clearing of vegetation?

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PACE ES2 Strategic Development & Project Selection	PACE ES3 Project Development & Design	PACE ES4 Project Development & Design
Reliability		
<p> Has the design considered the need for resilience against climatic change and extreme weather?</p>	<p> Has adequate spatial provision been allowed for decision points, queue locations and passenger cross-flows?</p> <p> Have passenger facilities been located to minimise conflicts with movement routes and station operations?</p> <p> Have passenger waiting rooms and weather protection been provided appropriate to station function, use and capacity?</p> <p> Can regular maintenance be undertaken efficiently, with minimal impact to station operations?</p>	<p> Has an ergonomics and/or human factor specialist reviewed the project in line with Network Rail standards?</p>
Interchange		
<p> Is the station intermodal? Can interchange be improved?</p> <p> Does the spatial organisation provide for efficient vehicle movement, while minimising conflicts between vehicles, pedestrians and other means of transport?</p> <p> Is there an integrated local transport strategy and is the design coordinated with other means of transport?</p>	<p> Does the design include conveniently located pick-up and drop-off areas for taxis, buses and private vehicles?</p> <p> Does the wayfinding comply with Network Rail's wayfinding standards?</p> <p> Does wayfinding and information support onward movement beyond the station footprint?</p> <p> Have appropriate bicycle facilities been provided? Is the quantity sufficient?</p> <p> Have appropriate car parking facilities been provided?</p>	<p> Has an independent wayfinding consultant been appointed to determine location and specification of signage?</p>

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PACE ES2 Strategic Development & Project Selection	PACE ES3 Project Development & Design	PACE ES4 Project Development & Design
Whole Life Cost		
<input type="radio"/> Have all phases of the station's life been considered? <input checked="" type="radio"/> Has the design been optimised to minimise ongoing operational costs, waste and the consumption of natural resources? <input checked="" type="radio"/> Does the design exploit opportunities to maximise energy efficiency over the station's whole-life?	<input checked="" type="radio"/> Has end of life reuse and disposal been considered to minimise waste and allow for positive reuse and regeneration of components? <input type="radio"/> Have estimates been undertaken for in use operational energy (e.g. CIBSE TM54)?	<input type="radio"/> Has the asset owner been consulted regarding maintenance?
Retail, Social and Business		
<input checked="" type="radio"/> Does the design provide for mix of uses and development opportunities appropriate to the station context and location? <input type="radio"/> Have OSD and ASD opportunities been considered?	<input checked="" type="radio"/> Have passenger amenities, such as retail and toilet facilities been provided appropriate to use and context? <input type="radio"/> Is signing provision balanced with retail frontage and advertising to avoid visual clutter? <input checked="" type="radio"/> Have potential clashes with passenger movement been identified and avoided?	<input type="radio"/> How will operational waste be managed?
Delight		
<input checked="" type="radio"/> Does the spatial design allow clear sightlines and views between principal destinations? <input checked="" type="radio"/> What is the character of the area? Can it be enhanced?	<input type="radio"/> Are the volumes appropriately sized and naturally lit? <input checked="" type="radio"/> Has the NR DAP (Design Advisory Panel) been engaged to comment on the scheme? <input checked="" type="radio"/> Is the design appropriate and responsive to its local context?	<input checked="" type="radio"/> Is the design balanced and coherent? <input type="radio"/> Will it be enjoyable to use?

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PACE ES2 Strategic Development & Project Selection	PACE ES3 Project Development & Design	PACE ES4 Project Development & Design
System Approach		
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Have other projects affecting the station been integrated and coordinated with the project? <input type="checkbox"/> Will the Common Safety Method for risk evaluation apply? 	<ul style="list-style-type: none"> <input type="checkbox"/> Have convenient and comfortable staff facilities been provided appropriate to the station size, location and functions? <input type="checkbox"/> Have management and maintenance requirements been considered and agreed to with all relevant stakeholders? <input checked="" type="checkbox"/> Does the station design take full account of heritage assets and needs? <input checked="" type="checkbox"/> Have management and maintenance requirements been considered and agreed to with all relevant stakeholders? <input type="checkbox"/> Has an interdisciplinary design coordination (IDC) taken place and approved by a Network Rail representative? <input type="checkbox"/> Has a project notification Form D been submitted to Network Rail ergonomics team prior to the closure of PACE Stage 1? 	<ul style="list-style-type: none"> <input type="checkbox"/> Network Rail Station Change Process required?
Standardisation		
	<ul style="list-style-type: none"> <input type="checkbox"/> Refer to designs handbook to see if any common details or elements can be used 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Have materials been selected to provide a balance between function, performance, sustainability, cost efficiency and appearance? <input checked="" type="checkbox"/> Have standardised and modular elements been considered where appropriate?

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PACE ES2 Strategic Development & Project Selection	PACE ES3 Project Development & Design	PACE ES4 Project Development & Design
Place and Social Considerations		
<ul style="list-style-type: none"> Is the station listed or in a conservation area? Have the appropriate stakeholders been consulted? Is the work taking place in an area that closely identifies itself with rail heritage? Has the NR DAP (Design Advisory Panel) been engaged to comment on the scheme? Is there an opportunity to enhance the public realm? 	<ul style="list-style-type: none"> Does the station design integrate seamlessly with the surrounding public realm? Have surrounding public spaces been designed to provide high quality places where people will want to linger and enjoy? Has the relationship of the station and any surrounding development been considered so there is a positive integration that opens up views, sightlines and maximises energy optimisation opportunities? Is the design appropriate and responsive to its local context? Has a Form D (architectural & layout acceptance) been submitted to Network Rail prior to closure of PACE Stage 1? Are there people living and/or working within 150m of the project? Will the project require access via third party land? And will the work negatively impact normal access routes, including Public Rights of Way (PRoW)? 	<ul style="list-style-type: none"> Are external areas appropriately lit to enhance safety?

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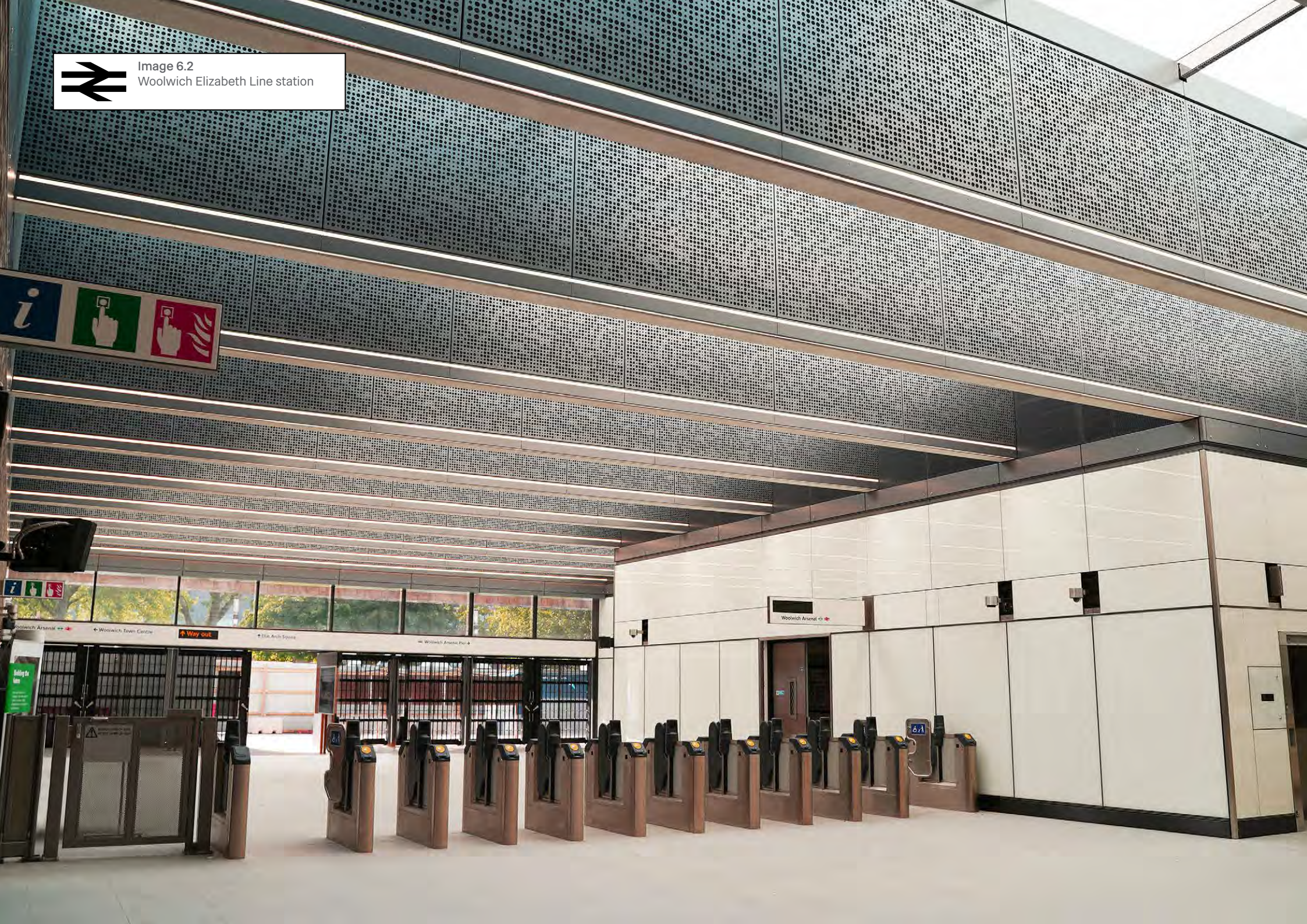


Environment

→ Refer to the Environmental and Social Appraisal (ESA). This provides additional advice and considerations

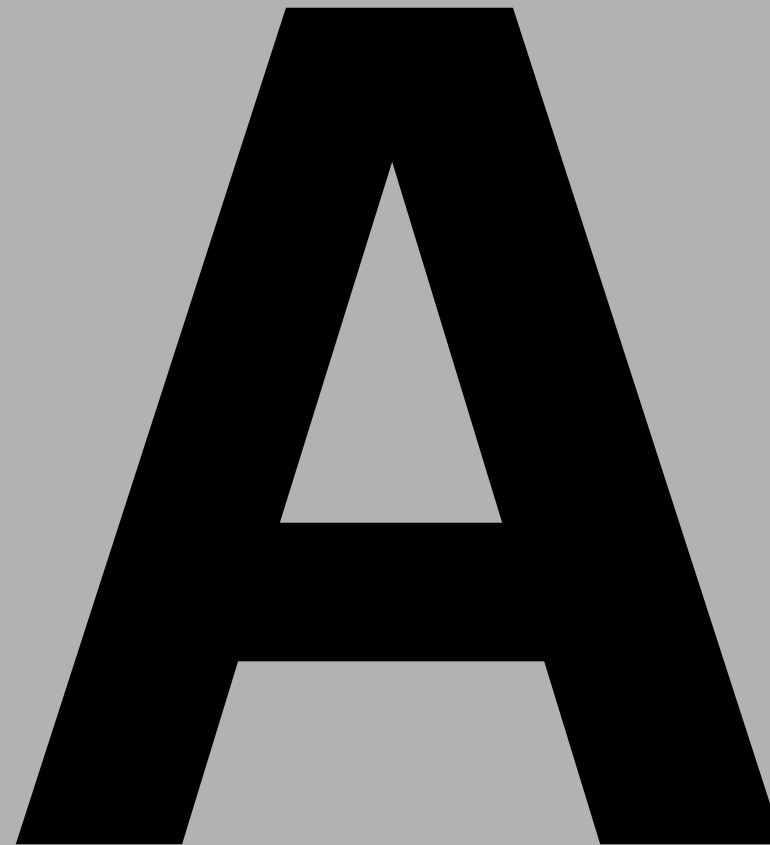


Image 6.2
Woolwich Elizabeth Line station



Station Design

Appendix A: Document References



Appendix A: Document References

Glossary



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AfA

The DfT 'Access for All' programme is delivered by Network Rail and provides accessibility improvements at selected stations.

BIM – Building Information Modelling

BIM is an acronym for Building Information Modelling, or Building Information Model. It describes the process of designing a building collaboratively using one coherent system of computer models rather than as separate sets of drawings.

CDM

The Construction (Design and Management) Regulations 2015, also known as CDM Regulations or CDM 2015 came into force on 6 April 2015. They are the regulations administered by the Health and Safety Executive governing the way construction projects of all sizes and types are planned in the UK. The regulations place legal duties on clients, designers and contractors involved in construction activity.

CPNI

Centre for the Protection of National Infrastructure. www.cpni.gov.uk

CSM and CSM REA

Common Safety Method for Risk Evaluation and Assessment is an ORR imposed European regulation that places duties on those in charge of projects who wish to implement a change to a technical, operational or organisational aspect of the railway system.

Deviation or Derogation

For Network Rail and Railway Group Standards, a deviation is defined as “a departure or alternative approach” from the originally specified requirement. The Network Rail process is defined in NR/L2/CSG/STP001/04 “Managing Variations to Network Rail Standards and Control Documents and Railway Group Standards.

Development Consent Order

A Development Consent Order (DCO) is the means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects (NSIP). Projects classified as NSIP are large scale or strategically important projects.

DfT

The Department for Transport is the UK government department responsible for the English transport network.

DPE

The Designated Project Engineer and the project engineers working with the DPE are responsible for assuring the technical compliance of the design and the delivery in accordance with NR/L2/CIV/003.

Environmental and Social Appraisal

Environmental and Social Appraisal (ESA) is an NR tool that generates project checklists and requirements for a range of environmental and social considerations. It is to be used from the very beginning of project planning, and then iteratively across PACE workstages.

GRIP

Governance for Railway Investment Projects was Network Rail's management and control process for the design and delivery of rail projects. It has now been replaced by 'Project Acceleration in a Controlled Environment' (PACE).

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Managed Station

Major stations in the UK are not only owned but also managed by Network Rail and are called so to distinguish them from the franchised stations that are managed by the SFOs. There are currently 20 managed stations.

NSIP

The National Stations Improvement Programme (NSIP) is a DfT backed programme to deliver improvements to medium sized stations in England and Wales, working together with local sources of funding.

National Technical Specification Notices (NTSNs)

National Technical Specification Notices (NTSNs) are the UK railway technical standards, which have replaced EU technical specifications for interoperability (TSIs).

ORR

The Office of Rail and Road is the independent safety and economic regulator for Britain's railways. www.rail-reg.gov.uk

RDG

The Rail Delivery Group is a membership organisation working on behalf of the rail industry to promote greater co-operation between train operators and Network Rail through leadership in the industry and by working together with Government, the supply chain and stakeholders.

RRD

Route Requirement Document is the project brief. This was previously known as project requirement specification (PRS).

RSSB

The Rail Standards and Safety Board measure safety performance and analyse risk for the UK rail industry, and publishes Railway Group Standards.

www.rssb.co.uk

Secure Stations Scheme

A voluntary accreditation scheme launched in 1998 and directed by the Department for Transport and the British Transport Police.

SFO or TOC

Usually the Station Facilities Operator or Train Operating Company franchises the station from Network Rail and is legally responsible for its operation. Hence it has a major interest in all design stages.

In managed stations, it is not uncommon for Network Rail to be the operator of the station (the SFO) that provides service to a number of train operators (TOCs) using the station.

Station category

The DfT's station categorisation reflects the number of passengers using the station and the importance of the station.



Industry Standards

The rail industry has safety, technical and procedural standards that apply only to Railway Infrastructure, including stations. It is a legal requirement that all parties comply with these standards to the extent that their approved Safety Management System refers to and depends upon them.

Railway Group Standards (RGSs)

NR's Safety Management System is based on compliance with RGSs that are produced, managed and maintained by the Rail Safety and Standards Board (RSSB). These provide a framework for system safety and safe interworking across the rail industry.

National Technical Specification Notices (NTSNs)

The NTSNs applicable to stations are the Persons with Reduced Mobility (PRM) and Infrastructure (INF).

Network Rail company standards

NR develops, publishes and maintains its own technical standards and guidance by which it mandates, through requirements and processes, its staff and contractors to uphold the commitments it has made in its Safety Management System. These standards are subordinate to the RGSs and NTSNs. Some of these guidelines are listed on the following page.

Accessibility standards

Under Section 71B of the Railways Act 1993 the Secretary of State maintains a code of Practice to protect the interests of disabled people travelling by rail.

ORR and HSE Guidance

ORR guidance covers the enforcement of railway system safety and the minimum safety requirements to be taken into account in developing alterations to infrastructure, including stations.

HSE guidance covers Health and Safety other than where this relates to railway safety. Under the provisions of the ROGS the duty holder for the station (NR for Managed Stations and TOCs for leased stations) are required to appoint a "competent person" to assess the safety risks arising from any change to the station.

Fire Legislation

National legislation applies. Advice should always be taken from Network Rail's Fire Safety Engineer.



100 - Strategic Planning

The strategic planning series provides high level guidance for planning and delivering a project

Design Advice Panel	100/01
Station Design	100/02
Station Capacity Planning	100/03
Climate Action Design	100/04
Heritage: Care & Development	100/05
Masterplanning at Stations	100/07
Investment in Stations	100/08
Implementation Strategy for Medium to Small Stations	100/09
Built Environment Accessibility Panel	100/10

200 - Design

The design series provides guidance and best practice across station design elements and components

Materials and Components	200/01
Design for Medium to Small Stations	200/02
Station Facilities & Amenities	200/03
Public Toilets in Managed Stations	200/04
Vertical Circulation	200/05
Retail Design for Station	200/06
Station Footbridges and Subways	200/07
Lighting	200/08
Public Realm at Stations	200/10
Parking & Mobility at Stations	200/11
Third Party Parking	200/12
Electric Vehicle Charging Points and Associated Infrastructure	200/13

300 - Compliance

The compliance series provides requirements and best practice for specialist technical topics

Wayfinding	300/01
Security at Stations	300/02
Fire Safety at Stations	300/03
Inclusive Design	300/04
Rail Symbol 2	300/05
Tactile Paving	300/06
Diversity Impact Assessment	300/07

400 - Operational Property & Management

The property and management series covers operational spaces and ancillary infrastructure

Low and Net Zero Carbon Plant Room Guide	400/02
Maintenance Delivery Units	400/04
Workplace DNA	400/05
Redundant Signal Box Strategy	400/06



Government Legislation, Standards, and Guidance:

- DfT code of practice — Design Standards for Accessible Railway Stations The Building Regulations
- The Building Act Approved Document parts A to P
- The Building Safety Act
- Scottish Building Standards
- Technical Handbook Non Domestic
- National Technical Specification Notice: Persons with Reduced Mobility (NTSN) - The Railway (Interoperability) Regulations
- BS 8300 Design of an accessible and inclusive built environment
- The Equality Act
- CDM Regulations Construction and Design Management Regulations
- Guide to Sustainable Design for operational Property
- Sustainability Requirements for NR Buildings
- Whole Life Cost Manual
- Arch Design Guide (commercial exploitation of Arches)
- Investment in Stations — A guide for promoters
- Design Guide for Station Street Furniture
- Implementing BIM principles for Railway Infrastructure Projects
- Suicide Prevention Best Practice Guide
- NR/L2/CIV/003
- NR/L2/ENV/015
- NR/L3/OHS/005

Network Rail Guidance and Standards:

- Our Principles of Good Design
- Operational Property Design & Construction Handbook
- Guidance on the planning and management of station flooring to public areas
- Station Safety Policy

RSSB Standards: www.rgsonline.co.uk

- RIS 7016 INS Iss 2 Interface between Station Platforms, Track, Trains and Buffer Stops
- RIS 7700 INS Rail Industry Standard for Station Infrastructure
- RIS 7701 INS Automatic Ticket Gates at Stations
- GE/RT8025 Protective Provisions for Electrified Lines
- GI/GN7520 Lighting in Railway Premises
- GC/RT5212 Railway Clearances
- GC/RT5033 Buffer stops and Impact Walls
- GC/RT5633 Risk assessment of Buffer Stops
- Wayfinding at Stations Good Practice Guide

Other Guidelines:

- ATOC Motorcycle Parking at Rail Stations
- ATOC National Rail & Underground CCTV Guidance
- BTA Review of Customer Toilets for Network Rail
- BTP Retail watch
- BTP CCTV output requirements stations car-parks and trains
- CPNI Integrated security



- CPNI Operational Requirements for Security Measures
- CPNI EBP 04/13: (Blast Performance of Laminated Glass)
- CPNI EBP 01/13 (Fixed Point Glass Fixings)
- BRE Building Research Establishment New Construction Manual
- BPA British Parking Association
- Park Mark Safer Parking Scheme
- BSI BS 6180:2011 — Barriers in and about buildings COP
- BSI PAS 2030:2012 — Improving the energy efficiency of existing buildings
- CABE / Design Council: Urban Design Principles
- CABE / Design Council: The Value of Urban Design
- CIBSE Transportation Systems in Buildings (Guide D)
- Centre for Window & Cladding Technology:
 - Technical note 66 — Safety and Fragility of Glazed Roofing — Specification
 - Technical note 66 — Safety and Fragility of Glazed Roofing
- CIRIA C722 — Safer stairs in Public Places
- CIRIA C652 — Safer Surfaces to walk on
- DfT Better Rail Stations
- DfT Inclusive Mobility
- DfT Cycle Infrastructure Design
- DfT Security in Design of Stations (SIDOS) Guide
- Dept of Health Preventing Suicide in England
- English Heritage Protocol for Care of Government Estate
- English Heritage Transport Buildings Selection Guide
- European Lift Assoc. Escalator and Moving Walk Safety
- HSE Railway Safety Principles & Guidance Part 2 Section B — Guidance on Stations
- HSE Guidelines for the safe operation of Escalators
- HSE Assessing Slip Resistance of Flooring
- HSE Workplace (Health, Safety and Welfare) Regulations
- HSE HSG65 — Managing for health and safety
- HSE L138 — Dangerous substances and explosive atmospheres
- HSE INDG370 — Controlling fire and explosion risks
- ISO 16933:2007 — Explosion-resistant security glazing
- MENCAP Changing Places the Practical Guide
- ORR Guidance on the application of the CSM on REA
- RNIB Building Sight
- RIBA Green overlay to Plan of Work
- RIBA BiM overlay to Plan of Work
- RIBA Good Loo Design (2004)
- RSSB Station Capacity
- TfL Interchange Best Practice Guidelines
- TfL Colour Standard
- TfL Parking Standards in Rail Stations Study
- TfL Highways Design Index
- TfL Climate Change and Mitigation
- UK Power Networks Standards for Secondary

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Station Design

Appendix B: Station Categories Classification

B



Image B.1
Manchester Piccadilly station





The tables on the following pages set out the passenger amenities and facilities that should be provided at each station.

This is set out by station category, with the largest most used stations (Category A) requiring many more amenities than the least used (Category F).

Note: A step free route is to be provided where the average daily number of passengers embarking & disembarking exceeds 1000 people p/a.

This is unlikely to meet the requirements of the Equality Act 2010 and should be the subject of a site specific locality & demographic study.

	No.	Type	Criteria per annum
A	28	National Hub	Over 2m trips: over £20m
B	67	Regional Interchange	Over 2m trips: over £20m
C	248	Important Feeder	0.5–2m trips: £2–20m
D	298	Medium Staffed	0.25–0.5m trips: £1–2m
E	695	Small Staffed	Under 0.25m trips: Under £1m
F	1,200	Small Unstaffed	Under 0.25m trips: Under £1m
Total	2,536		

Key

Mandatory NTSN Requirement	Highly Desirable	Desirable	Optional
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Appendix B: Station Categories Classification

Passenger Amenities and Facilities



Station Design
Strategic Planning
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	Station Category					
	A	B	C	D	E	F

Station Access/Station Egress

Interchange mode: Car/Bus/Taxi/ Tram/Cycle/Tube						
Vehicle Pick Up/Set Down Areas						
Blue Badge Parking Area						
Level, Step-free Access						
Wi-Fi						
Advertising						

Forecourt

Landscaping (Trees, Planters, Shrubs)						
Weather Protected Walking Routes Between Modes						
Sheltered Waiting Areas for Buses, Taxis etc.						
Locality Information						
Train Service Information						
Station Identification Signage and National Rail Symbol						
Secure, Identifiable Boundaries						

	Station Category					
	A	B	C	D	E	F

Appropriate Security Devices, e.g. CCTV						
Secure Cycle and Vehicle Parking in Closest Proximity to Station						
Post Box						
Public Art						
Cycle Hire						
Rail Replacement Bus Location						
National Rail Symbol						
Demarcated Accessible Route						
Passenger Help Point						
Long Stay Car Park						
Short Stay Carpark						
Hostile Vehicle Devices						
Station Service Yard						
Maintenance Depot						
Contractors/Trade Counter						
Train Crew Parking						
Other TOC Parking						
Parking Payment Machines						

	Station Category					
	A	B	C	D	E	F

Wi-Fi						
Advertising						

Station Entry and Ticketing

Concourse Building						
Station Reception						
Induction Loops						
Ticket Machines						
Travel Centre — Advanced Travel, Business Travel and Information						
Timetables, Leaflets, etc.						
Left Luggage						
Station Toilets (Unpaid Side)						
Changing Places Facility						
Station Clock						
Wayfinding Signs (Platform Signs/Exit Signs)						
Summary Departures Board						
Customer Information Screen						
Interchange Information						

Appendix B: Station Categories Classification

Passenger Amenities and Facilities



Station Design
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	Station Category					
	A	B	C	D	E	F
Trolley Management						
Customer Seating						
Mobility Assistance Point						
British Transport Police Office						
Wi-Fi						
Advertising						

Waiting and Commercial						
Comfortable Waiting Areas and Facilities						
Waiting Lounges						
Range of Seating						
Parent Room Baby Change						
Help Point						
Cash Machines						
Food Retail						
Other Retail						
Goods Collection point						
Lost Property						

	Station Category					
	A	B	C	D	E	F
Programmable Event Space						
Statutory Signage						
Advertising						
Vending						
Station Wayfinding						
Evacuation Point Refuges						
Ticket Office						
Station Control Room						
Secure Room						
Business Lounge/ Office / Meeting Rooms						
Retail Storage						
Loading Bay						
Dog Spend Area						
Wi-Fi						
Advertising						

Platform Zone						
Station Toilets (paid side)						
Automatic Ticket Gates						

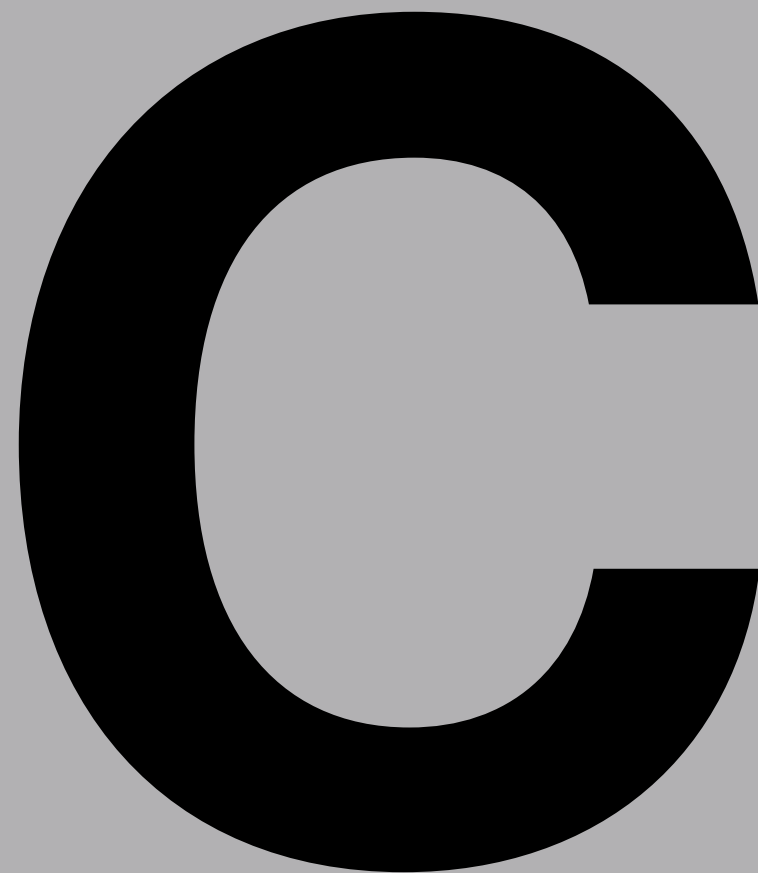
	Station Category					
	A	B	C	D	E	F
Canopies and Shelters						
Lifts						
Help points						
Seating						
Tactile Paving						
Platform End Barriers						
Public Address System						
CCTV						
Lighting						
Yellow Lines to Platform Edge						
Vending Machines						
Retail						
Landscaping						
Waste Management						
Wi-Fi						
Advertising						



Image B.2
Sheaf Square - public space in
front of Sheffield station



Station Design
Appendix C: Case Studies



Appendix C: Case Studies

Tynemouth Metro Station



Station Design
Strategic Planning
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Tynemouth Metro Station - Providing Space for Community

Tynemouth station opened in 1882 and for many years was a major station serving the North East coast. In 2007, the station was placed on the Heritage at Risk Register and was subsequently fully refurbished, completing in 2012.

A market featuring 150 stalls is held in the vast station concourse every weekend, with a farmers market taking place each month. This attracts large numbers of visitors, supporting the local community and encouraging visitors to Tynemouth.



Image C.1
Market in Tynemouth station

Appendix C: Case Studies

Bat and Ball Station



Station Design
Strategic Planning
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Bat and Ball Station - Strengthening community connections, improving stations and passenger experience

At Bat and Ball Station near Sevenoaks a derelict station building was renovated and re-purposed to provide new spaces for community use, waiting space for passengers and a cafe that sells Kent produce.

A community group, the Friends of Bat & Ball Station was formed in 2014, and together with Sevenoaks Town Council the group were successful in obtaining a grant from the Heritage Lottery Fund to restore the space. The project was short-listed for a RIBA South East Regional Award in 2019.

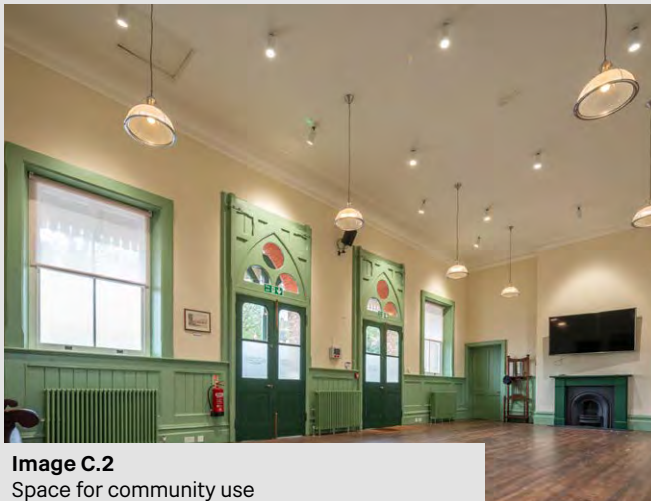


Image C.2
Space for community use



Image C.3
Cafe

Boxpark - East Croydon Station - Utilising assets for community purposes

Boxpark Croydon opened in 2016, on a site adjacent to East Croydon station. The project is intended as a meanwhile use, before the site is developed as part of wider regeneration proposals.

The focus is on small and independent food and beverage outlets that share a large covered dining and seating area. The project has been very successful and has also hosted music performances, film screenings and sports events. It is a great example of how space with good transport connections can be utilised for meanwhile uses.

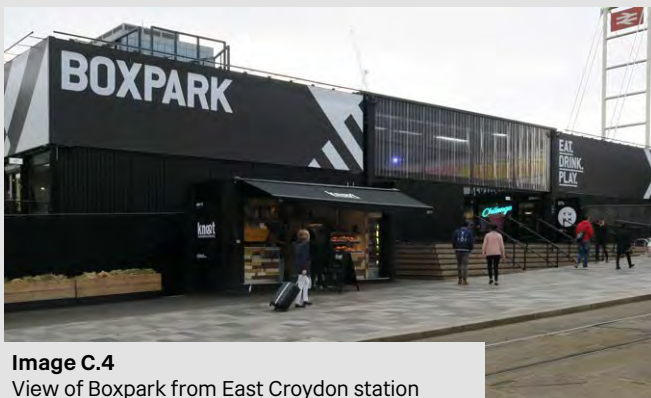


Image C.4
View of Boxpark from East Croydon station approach

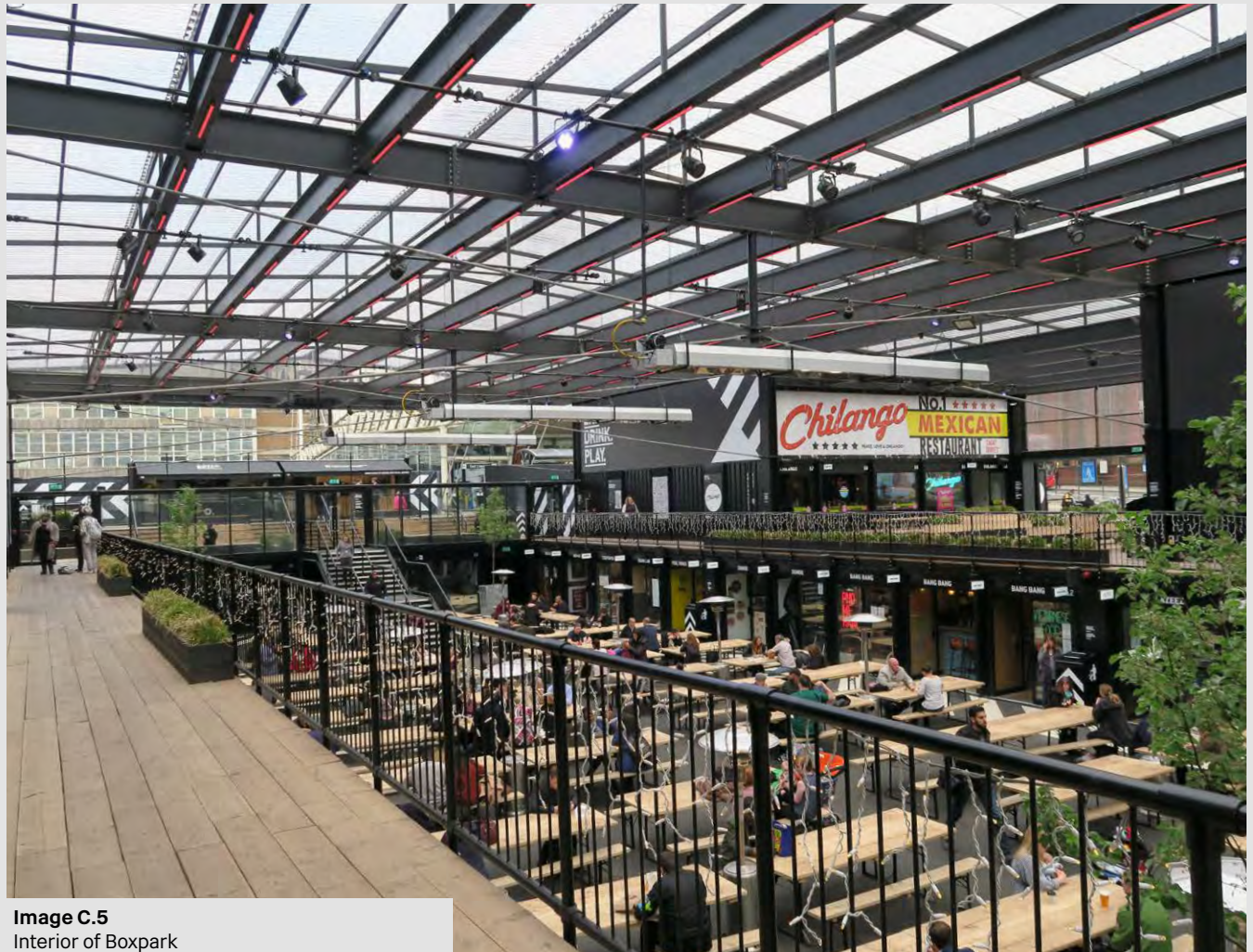


Image C.5
Interior of Boxpark

Appendix C: Case Studies

Dundee Station



Station Design
Strategic Planning
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Dundee Station - Collaboration between different parties to deliver high quality new facilities

At Dundee, new station proposals were developed alongside the Dundee Waterfront masterplan development.

A new station building and concourse spans over the station platforms, containing an integrated new hotel. The new concourse area is expansive, with a generous ceiling height. The new station when viewed as part of the hotel is of a much more substantial form than the previous low height entrance, providing a physical presence and gateway that the previous buildings lacked.

The new station saw significant investment from Dundee City Council.

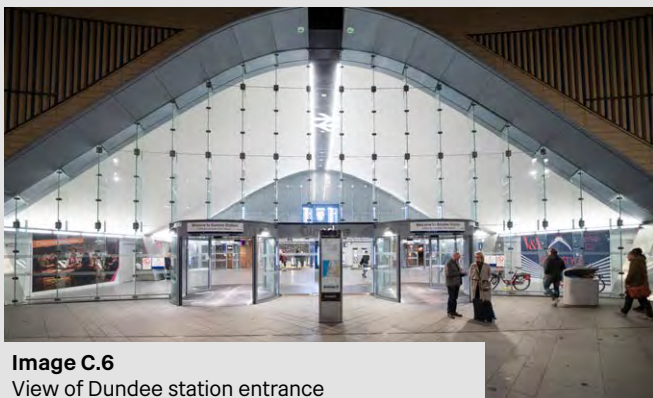


Image C.6
View of Dundee station entrance



Image C.7
Urban realm works at Dundee station



100/

02