

Tactile Paving & Wayfinding





Image 0.1
Platform Edge Warning Tactiles
Close-up view of surface-mounted
platform edge warning tactile
paving at Coventry Station

Document verification



Tactile Paving & Wayfinding
Compliance
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1 / 114

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Introduction



This document is intended to promote a common approach to tactile paving systems in station environments, for both warning and wayfinding purposes. The following highlights the processes and procedures that Network Rail expects project teams to apply in designing and implementing tactile paving throughout the railway built environment.

As the public body responsible for managing and maintaining Britain's national rail infrastructure, Network Rail wishes to deliver a consistent and proactive approach to tactile paving placement throughout station environments, with the hope of improving standards and expectations industry-wide.

The implementation of tactile paving, for both warning and wayfinding purposes, promotes consistency, safety and effective use. This is one way in which we are supporting our design vision to deliver high quality infrastructure that is inclusive, accessible, convenient and welcoming for everyone, be they our valued customers or our brilliant workforce.

How to use this document



Purpose

The purpose of this document is to provide guidance in the design, placement and implementation of tactile paving for both warning and wayfinding purposes in station environments and other occupied buildings across the Network Rail estate.

Scope

This guidance is aimed at project sponsors, developers, designers, project managers, station managers, and anyone involved in the briefing, design, delivery, renewal and maintenance of publicly accessible buildings on the Network Rail estate.



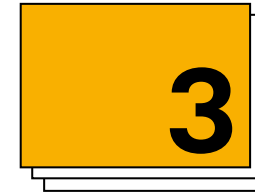
Section 1 Tactile Paving

Provides background information on tactile paving and how blind and partially sighted individuals use it to navigate rail stations safely.



Section 2 Usage and Planning

Describes the different types of hazard indication and tactile guidance paving and how and where they should be applied to create network-wide consistency.



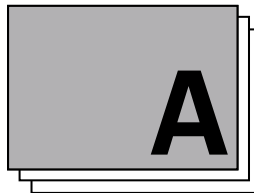
Section 3 Application Guidance

Illustrates the spatial requirements to install tactile paving in different areas of a station to avoid dangerous or inconsistent application.



Section 4 Materials and Finishes

Outlines the various materials and product types available for tactile paving, which is intended to help designers and suppliers make suitable choices.



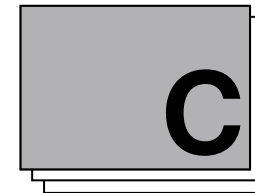
Appendix A Lived Experience Passenger Profiles

Provides case studies describing the experiences of blind and partially sighted passengers and how they interact with tactile surfaces on a journey through a rail station.



Appendix B Application Examples

Includes images of common mistakes, and obvious failures to avoid.



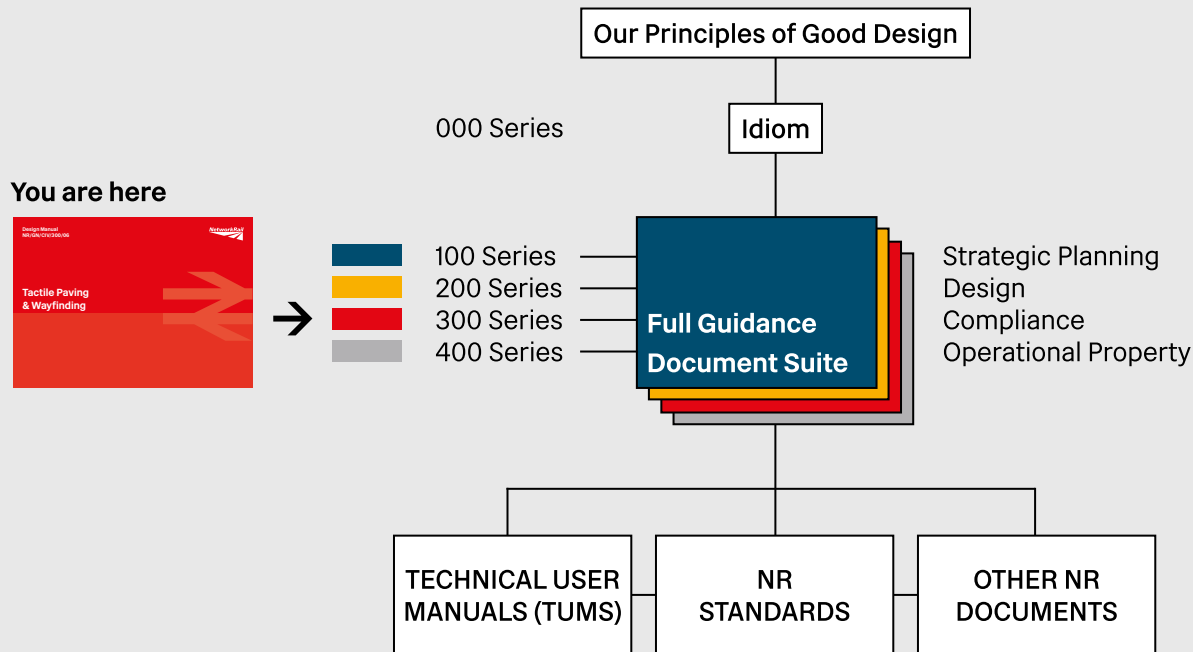
Appendix C Document References

→ Definitions
→ Applicable Legislation, Standards and Guidance
→ Image Credits

How to use the guidance



The Network Rail Document Suite



References to other documents

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

Example

Standards Reference

Guidance on the Use of
Tactile Paving Surfaces, 2021

Department for Transport

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

Rail Industry Standard

A full list of relevant documents, and other guidance suite documents is contained in Appendix C.

Figure 0.1: Network Rail Document Suite Summary

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



 Image 0.2
Tyne and Wear Metro platform
Blind and partially sighted
passengers using the platform
edge warning tactile as an
orientation aid to board a train,
photo courtesy of Nexus

Tactile Paving & Wayfinding
Section 1: Tactile Paving



1.1 What is Tactile Paving?



Tactile paving is a type of textured ground surface used across various environments to assist those who are blind and partially sighted. Differing tactile patterns (such as blisters and lozenges) on the paving are used to convey distinct meanings and purposes to users, and more information on the different types of tactile paving can be found in Section 2. Tactile paving is designed to be easily detectable underfoot or by long cane, and serves two primary purposes: to provide warnings for safety, and to provide wayfinding guidance.

- **Warning Purposes:** tactile paving of this type is designed to warn pedestrians about potential hazards, such as the edge of railway platforms or a sudden change in elevation.
- **Guidance Purposes:** tactile paving of this type is used to provide directional information to pedestrians, guiding them along a specific path.

Tactile paving plays a crucial role in enhancing the safety and independence of individuals who are blind and partially sighted, allowing them to navigate environments with confidence and reducing the risk of accidents or injury.



Image 1.1.1: Person following a tactile guidance path

1.2 The Importance and Benefits of Tactile Paving



The application of hazard warning tactile paving to identify stairs and platform edges is mandatory within a station environment.

The requirement to provide tactile wayfinding guidance paths throughout the whole station only applies to new stations or significant refurbishments at existing stations where nominated by the Network Rail Assurance Panel (NRAP). The requirement applies to all station projects under the Department for Transport (DfT) Code Accessible Stations Standard. The application of partial guidance routes in sections of a building should be avoided to prevent inconsistency and potentially hazardous situations. Where the constraints or the scope of a project prevent the correct application of tactile wayfinding, a project should pursue a dispensation from the DfT that can determine under regulation 13 (The Railways Interoperability Regulations 2011) if the whole or part of an National Technical Specification Notice (NTSN) does not apply. This should always be supported by a Diversity Impact Assessment (DIA) and local consultation.

Installing tactile wayfinding only partially or inconsistently in a station without considering its totality could lead to unsafe situations. Projects that provide tactile wayfinding should make allowance to coordinate the tactile wayfinding throughout the station, even if the project scope does not include the whole of the station.

The provision of tactile paving, placed and implemented in an appropriate way to convey meaning, can support safe, efficient and independent movement by blind and partially sighted users. It is vital that tactile paving is used correctly and consistently, and the aim of this guideline is to support designers, contractors and managers in establishing a system of design, installation and intended use that is purposeful, clear and concise to promote effective ease of use by all who require it.

The importance of tactile paving and wayfinding, and benefits of its use, is detailed below, including but not limited to:

- **Accessibility and independence:** removing barriers to safe, successful movement for blind and partially sighted individuals and encouraging independent navigation.
- **Orientation and guidance:** tactile paving provides underfoot and cane detectable cues to support users in orienting themselves and navigating through an environment. Whilst it is recognised that tactile paving alone does not provide directional information, when used alongside other features such as tactile and braille signage and with user familiarity, tactile paving can provide individuals with a consistent path to guide movement through the station environment.

- **Safety:** where tactile paving serves as a warning system, it crucially alerts users to potential hazards, such as platform edges or changes of level e.g. stairs.
- **Efficiency:** particularly important within the station environment is the ability for passengers and staff members alike to be able to move and navigate efficiently. The presence of tactile paving supports this, especially in areas that might be busy or unfamiliar.
- **Social inclusion:** when considering all elements above, when designed and implemented sensitively and sensibly, the presence of tactile paving can foster social inclusion for those who utilise it. As station environments are often an integral part of our professional and personal lives, this holds particular importance for this design guideline.



Image 1.3.1: Tactile paving installation

Tactile paving is used in various areas to enhance accessibility and safety, including rail stations. Providing visual contrast within wayfinding is beneficial to most users, regardless of accessibility requirement, and the same principles apply to tactile paving. It should visually contrast with its surrounding surfaces so it can be identified and utilised via sight (this is of particular importance when we consider that, according to the national charity Royal National Institute of Blind People (RNIB), only 7% of blind and partially sighted people have no sight at all). However, consideration should also be given to the colour and pattern of the surrounding area so that this contrast does not add to visual confusion, overwhelm or distress.

For those without sight, tactile paving can either be followed underfoot or via use of a long cane, both methods depend on the identification of surface differences to decipher whether a warning or guidance element is present.

Blind and partially sighted users often familiarise themselves with a building's layout - either with assistance from a sighted guide or by navigating independently. This approach helps to build a cognitive map of the space and learn notable landmarks, such as a station entrance and gateline. Sensory elements, such as station announcements or noises and smells coming from a cafe, can provide environmental cues to aid orientation. Tactile paving can provide an

additional layer of supportive information within a building, allowing users to 'link' the landmarks and cues together to identify and navigate an environment safely, and with ease.

Under the Persons of Reduced Mobility National Technical Specification Notice (PRM NTSN, 2021), it is a legal requirement for tactile paving to be installed in stations in order to:

- **Provide a warning at the 'boundary of the danger area'** along the length of the platform. To support safe use of the platform and allow orientation when boarding and alighting.
- **Provide a warning of 'hazards along a route'**, such as the top and bottom of a staircase, to support safe transitions and navigation.
- **Provide guidance information for passengers along an 'obstacle free route'** to the platform, to support navigation to key locations such as staffed assistance desks and toilets.

The correct location and placement of tactile paving are not the only elements that affect its safe and effective use. The correct type of tactile paving should be chosen for its specific purpose (please refer to section 2 for more information) and the proper installation and maintenance of tactile paving are crucial to its effectiveness and usefulness (please refer to section 4 for more information).



Tactile paving is primarily designed for use by blind or partially sighted individuals.

- Blind users can utilise the touch and tactile cues that the paving provides underfoot and/or using a long cane, to navigate around an environment safely and effectively.
- Partially sighted users can also utilise the tactile cues (underfoot and/or by long cane), but the tactile paving system may also provide additional visually contrasting cues to aid both orientation and mobility.

Whilst playing a fundamental role in safe, secure identification and navigation for many, there are however risks associated with the implementation of tactile paving:

- The correct installation of tactile paving depends on designer and contractor knowledge of the differing types of tactile paving, and their usage. Situations where the incorrect type of paving is used (to perhaps guide rather than warn, for example) or there is a lack of appropriate visual contrast can lead to increased risk and a distinct lack of safety.

- Not all individuals who benefit from using tactile paving will easily be able to detect a change in texture, due to reduced sensitivity in the feet, or similar. Therefore, the design of tactile paving should strike a fine balance: one that provides a distinct enough change in texture, whilst avoiding creating a trip hazard or causing undue discomfort to others. This manual utilises standardised guidance and suggests standardised products, wherever possible and practicable, to mitigate unquantifiable risk.
- Needing to traverse tactile paving can cause both pain and difficulty for wheelchair users and those with mobility impairments or sensory impairments such as neuropathy. Therefore, whilst tactile paving used for warning purposes should be implemented at all times for safety and security, tactile paving used for guidance purposes should be installed with consideration and intent to minimise the need for wheelchair users and others to traverse the path multiple times.
- Tactile guiding systems provide the user with a direction, but do not give details about the destination, or decision points along the way. Tactile paving for guidance is therefore one piece of a larger navigational picture that needs to be focused on should an inclusive solution be provided.

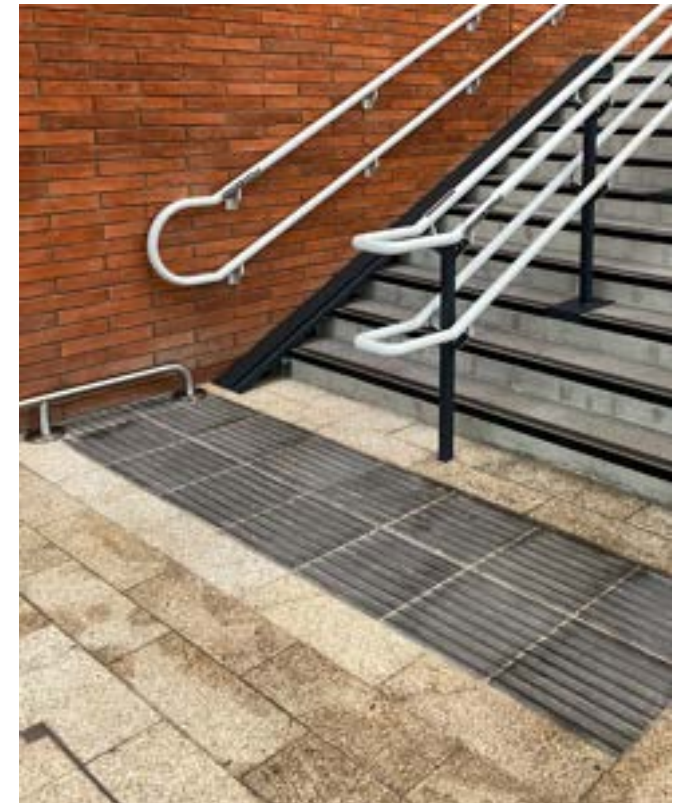


Image 1.4.1: Corduroy hazard warning surface



Image 1.5.1: Tactile street map

Several elements can complement and support the effectiveness of tactile paving, and their implementation within station environments should be considered to maximise inclusivity. Some of these supportive elements include:

- **High contrast visual markings:** High contrast visual markings, such as contrasting step nosings or painted lines to highlight platform edges, can be used to reinforce the information provided by tactile paving. These markings are especially beneficial to partially sighted users.
- **Clear and consistent signage:** Clear and well-placed signage with large, visually contrasting text and symbols can provide important information about station features and facilities. Signage should be consistent with tactile paving to support its use.
- **Appropriate lighting:** Adequate and well-placed lighting helps all users of an environment to navigate safely. Appropriate, consistent lighting levels can enhance the visibility of tactile paving and other elements, reducing the risk of accidents.
- **Tactile maps:** Tactile maps can help blind and partially sighted users to familiarise and orientate within the station environment. At present tactile maps are installed in a small number of stations.

- **Assistance services:** The presence of tactile paving does not remove the need for staffed assistance services within station environments to provide passengers with assistance on their journey through the station and boarding the train and/or further detail and direction, where this is required.
- **Navigation apps and other technologies:** Apps and devices designed for those with accessibility requirements can provide real-time navigational guidance, helping users locate services and facilities more efficiently. These products and programmes can be utilised in addition to tactile paving, enabling the system to support users in making directional decisions that are then supported by tactile guidance routes. It is worth noting, however, that these technologies should not be regarded as sole solutions as some individuals may not want to use them, might not be able to use them, and/or may not have access to them.

These additional elements are out of scope for this guidance document, which focuses on the use and implementation of tactile paving only. They should, however, be considered with great importance and priority in order to 'complete the navigational and safety jigsaw' for many blind and partially sighted users, amongst others.



Staff Training: Passenger assistance staff should be trained to understand how tactile paving is utilised in stations. When staff guide blind and partially sighted passengers through a station environment, they could offer to follow tactile paths as an opportunity for passenger familiarisation.

Installing tactile guidance paths in stations provides an additional layer of support to promote choice and independent travel. It does not replace the need to provide assistance to any passenger who requires it.

Station Operations: Station and cleaning staff should be aware that the placement of obstacles or barriers can cause an obstruction within the clearance zone of tactile guidance paths (please see section 2.3.2 for more information on guidance path clearance zones). The obstacles can include:

- Temporary operational signs
- Seating outside food and beverage outlets
- Tensor barriers (please see image 1.6.1)
- Pop-up retail signs and stands
- Advertising displays



Image 1.6.1: Example of a Tensor barrier obstructing a tactile guidance route in a Dubai Metro Station

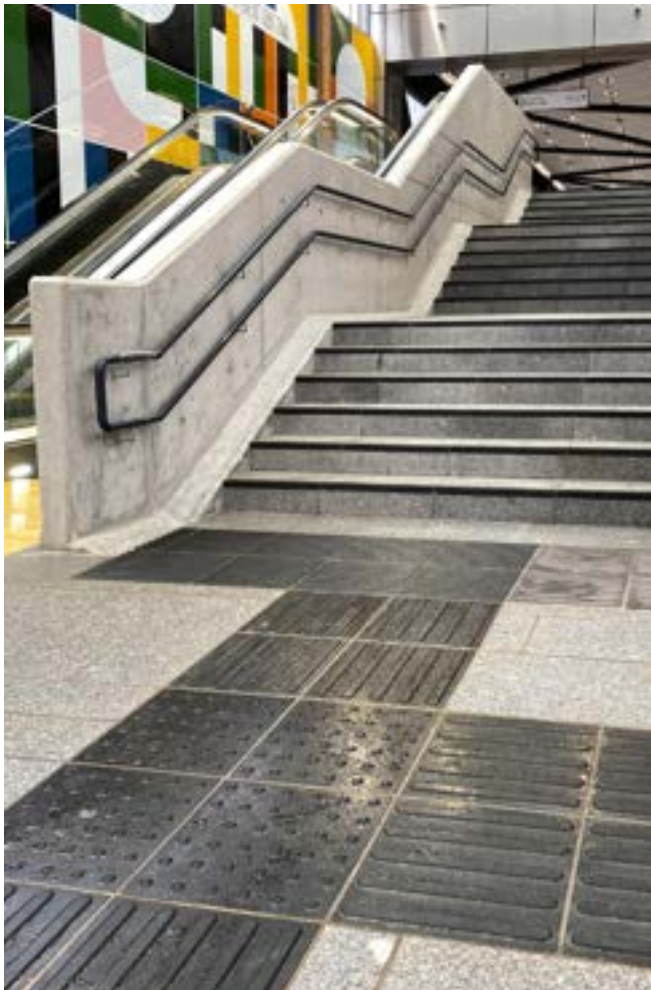


Image 1.7
Brent Cross West Station
Tactile guidance path leading
to lifts at the ground level



Tactile Paving & Wayfinding
Section 2: Usage and Planning





2.1.1 National Technical Specification Notice

In UK train stations, more consistency in applying tactile paving can help to enable intuitive and autonomous use by blind and partially sighted individuals in a way that avoids hazardous situations as per the requirement defined in PRM NTSN clause 4.2.1.2.3 Route Identification (2):

'Information on the obstacle-free route shall be given to visually impaired people by tactile and contrasting walking surface indicators as a minimum'.*

**See Appendix C for the definition of an 'obstacle-free route' as defined in PRM NTSN.*

This guideline aligns with the PRM NTSN by advising on the application of:

- Tactile platform edge warning paving
- Tactile hazard warning paving
- Tactile guidance paths

This guideline provides criteria to consistently apply the different types of tactile warning paving and tactile guidance paths, but the extent of tactile guidance is scaled to respond to the complexity of a station.

Large complex train stations with multiple platforms and a high volume of passengers may present a challenging environment for many blind and partially sighted passengers to navigate via a network of complicated tactile guidance routes, which may, in turn, lead to hazardous situations. Therefore, this guideline recommends installing a tactile guidance path from the entrance(s) to a staffed assistance point as a minimum requirement on an obstacle-free route.

Tactile paving installations in large station projects should appoint a tactile wayfinding steering group to advise on the tactile guidance routing, and whether to extend beyond the above stated minimum, to platforms and secondary destinations. This will be specific to the station layout and operations and should be planned to avoid hazardous situations.

This guideline document has been developed with input from:

- An industry stakeholder panel including: Network Rail (NR), Train Operating Companies (TOCs), Rail Safety and Standards Board (RSSB), Great British Railways Transition Team (GBR-TT) and Department for Transport (DfT).
- Lived experience research with blind and partially sighted passengers.
- Consultation with RNIB and Blind Veterans UK.

Image 2.1.1.1: Tactile paving at Brent Cross West Station



2.1.2 DfT Tactile Paving Types

DfT Guidance on the Use of Tactile Paving Surfaces recognises that the ability to detect contrasts in texture underfoot varies from one individual to another. For this reason, the six surface textures are different enough to be detectable by most individuals. However, they are also designed to avoid creating a trip hazard or causing unnecessary discomfort to other user types.

DfT describes the six different types of tactile paving surfaces as:

- Blister surface for pedestrian crossing points.
- Corduroy hazard warning surface.
- On-street platform edge warning surface.
- Off-street platform edge warning surface, only for use at the platform edge in a railway station.
- Guidance path surface.
- Segregated shared cycle track/footway surface and central delineator strip.

The research behind the DfT guidance involved users with lived experience to identify the adverse effects of tactile paving on wheelchair users and those with reduced mobility. This highlights the general desire

to minimise the amount of tactile paving used, subject to assuring it performs its vital safety functions for blind and partially sighted users navigating the built environment.

This Network Rail Tactile Wayfinding Guidance focuses on using four of the six tactile paving surfaces listed above to provide hazard warnings and guidance paths. More information on how the four types of tactile paving are applied can be found in this section.

This guidance is based on design considerations and proposals reflecting current industry best practices. It provides additional rail specific guidance for tactile paving to supplement the 2021 Guidance on the Use of Tactile Paving Surfaces DfT document, which is referenced in the non-mandatory guidance section of the DfT Code of Practice 2015. This code of practice document is currently under review.

2.1.3 Planning Tactile Paving

The application of tactile guidance paving in a station should follow a structured process to define the destinations, carefully plan the routing and specify the detailed spatial arrangement. During detailed setting out, it is essential to consider alignment with the tiling grid and plan any tactile paving 'cuts' so they can be implemented to a high standard on-site during installation.

Applying tactile paving within a station can be complex, with multiple constraints and conflicts. To provide an optimal guidance route, the station project team responsible for the installation of tactile paving should consider assembling a multi-disciplinary tactile wayfinding steering group to review the specifics of a station, including capacity, arrangement, passenger movement, assisted travel arrangements and station operations to guide decision making when applying the guidance in this document. The route of tactile guidance paths may vary based on the station layout, but the position of the tactile paving in relation to architectural elements should be applied using the guidance in section 3 of this document to provide consistency across the network.

It is recognised that the makeup of the project tactile wayfinding steering group will vary by project size, but it should aim to include an access consultant, wayfinding specialist, station operations representative, architect, contractor, project manager and the designated project engineer. For larger projects, the steering group might wish to consult a local user access group (where this exists) or the Built Environment Accessibility Panel (BEAP) panel, to receive input and feedback on how the station is used by local passengers with lived experience of differing impairments and access requirements in order to provide optimal tactile guidance routes.

2.1 Tactile Paving Types



2.1.4 Tactile Hazard Warning Indicators

Tactile paving can be used to warn pedestrians and passengers about potential hazards, such as the edge of railway platforms, a sudden change in elevation, such as the top of a flight of stairs, or the approach to a pedestrian crossing. Each tactile paving type detailed in this section has a specific application that follows DfT Guidance on the Use of Tactile Paving Surfaces. The raised, textured surface provides tactile and underfoot feedback to alert individuals that they are approaching a dangerous or potentially unsafe area.

At controlled crossing points, the on-street pedestrian crossing warning surface in image 2.1.4.4 should be red, which has been used for this application since 1981, to indicate to blind and partially sighted individuals that the crossing is controlled. Red blister paving should not be used in any other circumstances.

The hazard warning types and arrangements follow the guidance provided in DfT Guidance on the Use of Tactile Paving Surfaces, 2021.

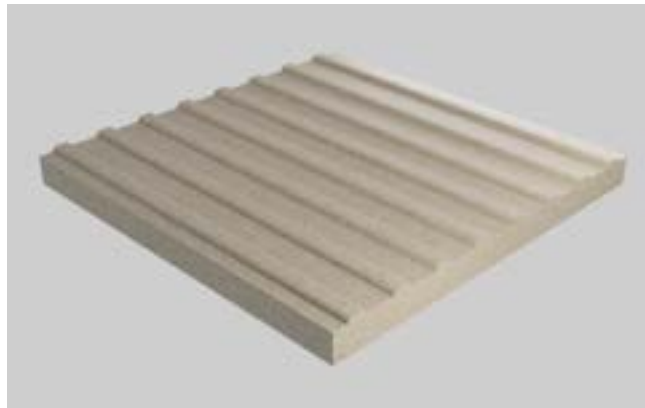


Image 2.1.4.1: Hazard warning

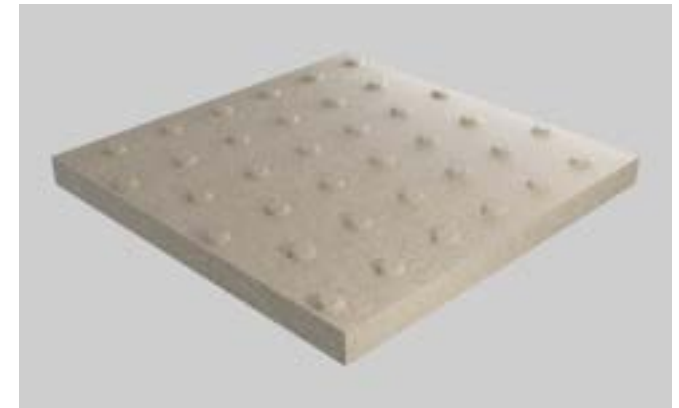


Image 2.1.4.2: Platform edge warning

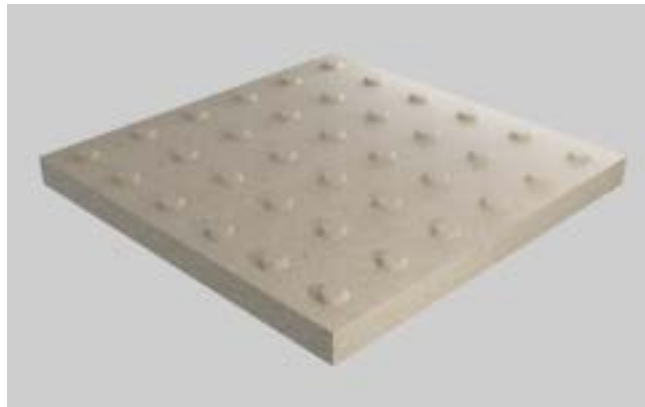


Image 2.1.4.3: On-street uncontrolled pedestrian crossing warning

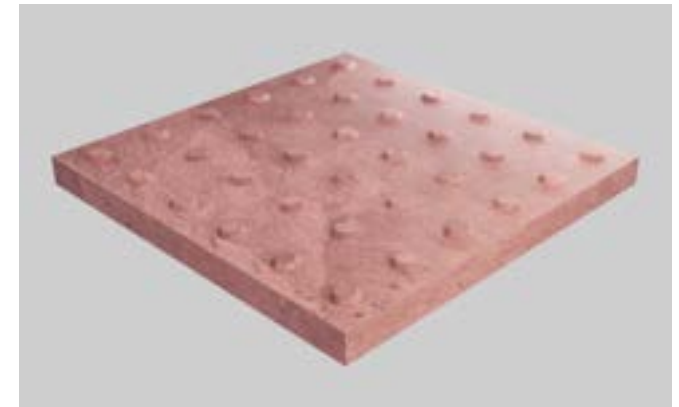


Image 2.1.4.4: On-street controlled pedestrian crossing warning

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021

Department for Transport

2.1 Tactile Paving Types



2.1.5 Tactile Guidance Paths

Tactile paving can also be used to provide directional information to blind and partially sighted individuals. The tactile guidance indicator (image 2.1.5.1) can be laid as a continuous path, that can be detected by cane or underfoot to enable individuals to follow a route to a specific destination.

The decision junction or attention indicators (image 2.1.5.2) are used to notify users of a junction or arrival at a destination. Similarly, users can be guided to pedestrian crossings via tactile paving and utilise it to define the safe boundaries of the crossing area, and correctly align with crossing parameters.

The arrangement of tactile guidance paths, decision junctions and attention indicators align with the principles of the guidance provided in International Organisation for Standardization (ISO) 23599:2019 Assistive Products for Blind and Vision-Impaired Persons, Tactile Walking Surface Indicators.

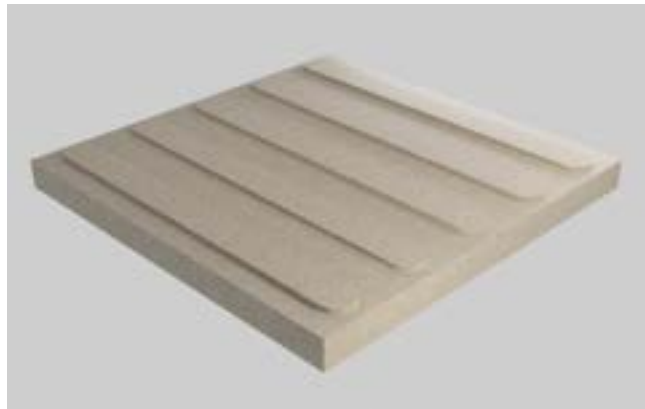


Image 2.1.5.1: Guidance indicator

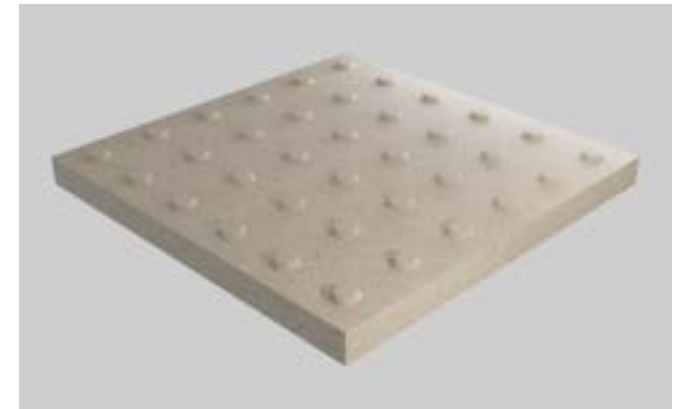


Image 2.1.5.2: Decision junction / attention indicator

Standards Reference

Assistive Products for Blind and Vision-Impaired Persons -
Tactile Walking Surface Indicators, ISO 23599:2019
International Organisation for Standardization (ISO)



2.2.1 Hazard Warning

The corduroy surface conveys the message 'hazard, proceed with caution'. Its purpose is to warn blind and partially sighted individuals and other people of the approach to a potential hazard. The corduroy surface should be used as a warning in any situation, except at pedestrian crossings and at platform edges.

The profile of the corduroy surface has rounded bars running transversely across the direction in which people will be walking, examples applications include:

- At the top and bottom of steps.
- At a railway level crossing at a station.
- At the end of a platform without a security gate.
- Where individuals could inadvertently walk directly onto a railway platform (without using a ticket gateline).
- At the foot of a ramp to an on-street tram platform (but not at any other ramps).
- In the absence of a kerb where individuals could inadvertently walk directly into the road (only use when a kerb cannot be provided).

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021
Department for Transport

All dimensions in mm

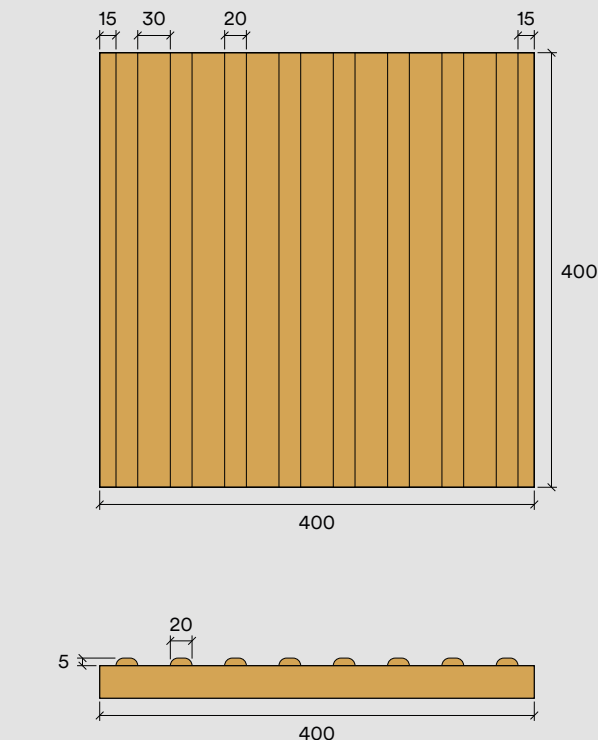


Image 2.2.1.1: Hazard warning tile dimensions



Image 2.2.1.2: Hazard warning at Coventry Station



Image 2.2.1.3: Hazard warning at Coventry Station

2.2 Tactile Hazard Warning Indicators



2.2.2 Platform Edge Warning

The off-street platform edge warning surface will alert blind and partially sighted individuals at the edge of a rail platform that a hazard is present. The tactile warning surface also provides a fixed reference point to allow blind and partially sighted passengers to orient themselves on the platform and to judge the distance from the platform edge.

The profile of the platform edge warning surface consists of offset rows of flat-topped domes 5mm high.

The off-street platform edge warning surface differs from the blister surface used at pedestrian crossing points (see section 2.2.4). It should contrast visually and tonally with the materials used for the platform and platform edge.

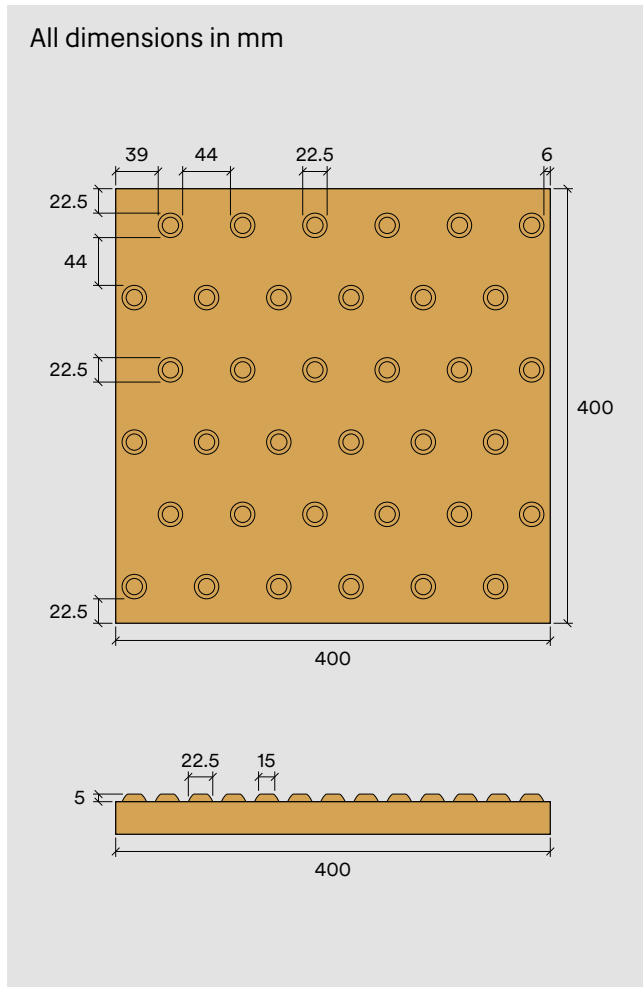


Image 2.2.2.1: Platform edge warning tile dimensions



Image 2.2.2.2: Platform edge warning at Brent Cross West Station

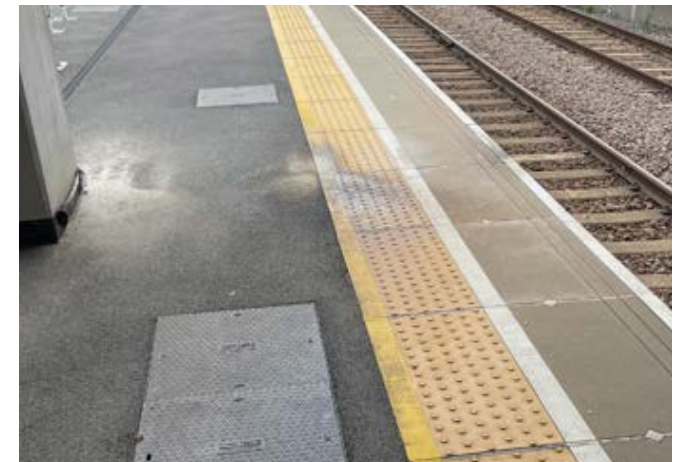


Image 2.2.2.3: Platform edge warning at Meridian Water Station

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021

Department for Transport

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

Rail Industry Standard



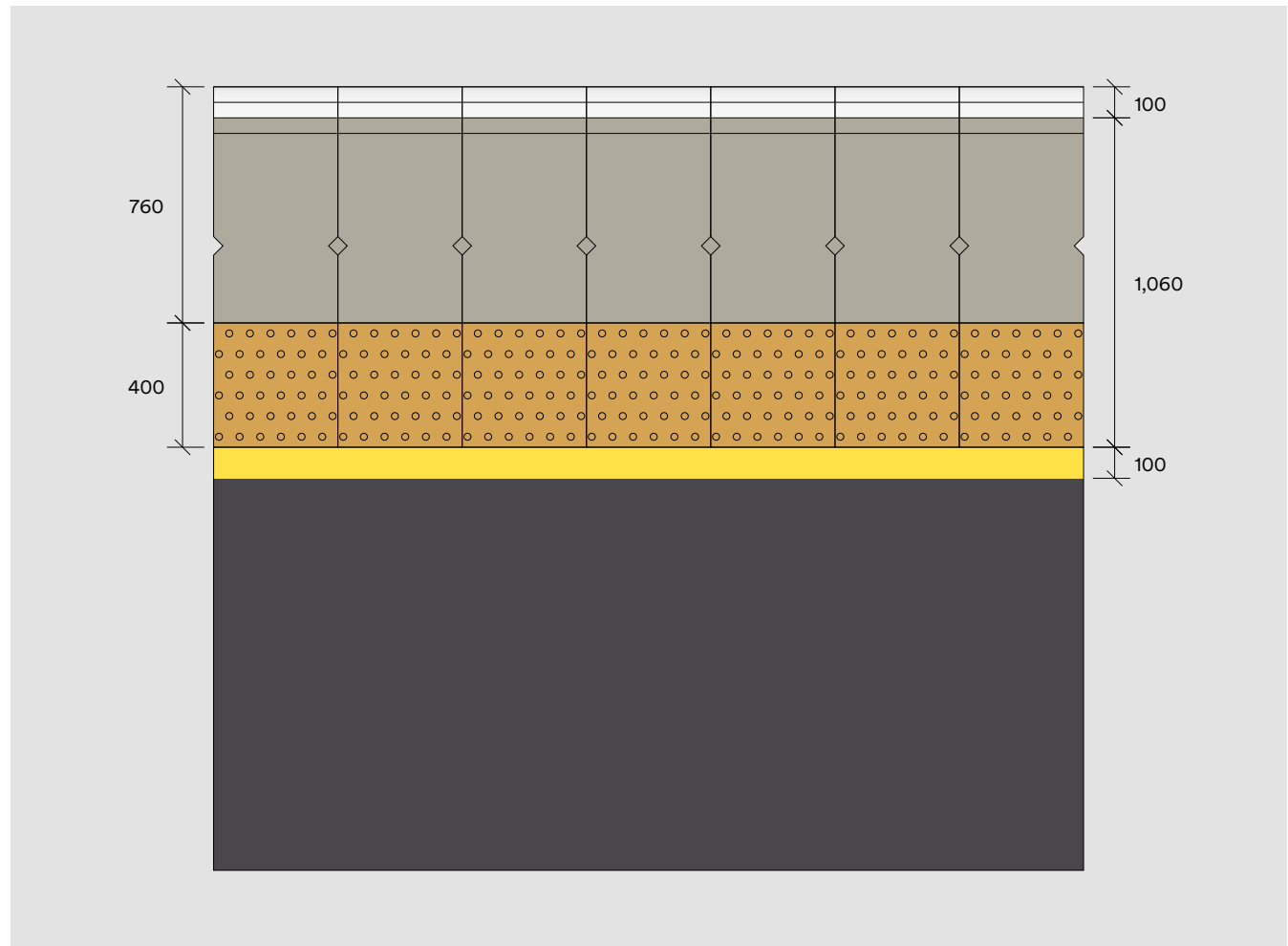
2.2.3 Platform Edge Arrangement

The off-street platform edge warning surface (see section 2.2.2) should be applied in a consistent arrangement along the platform's edge.

The tactile warning surface should be installed 760mm from the platform edge along the full usable length of the platform. The tactile warning surface should be 400mm wide. The tactile paving should contrast with the surrounding platform surfaces.

A 100mm wide high-contrast yellow line should be provided adjacent at the back edge of the tactile warning surface to provide a visible indication at the edge of the 'danger area'.

The application and arrangement of the tactile warning surface stated above aligns with the guidance provided in the Rail Industry Standard (RIS) 7016.



Standards Reference

Interface between Station Platforms, Track, Trains
and Buffer Stops, RIS-7016-INS
Rail Industry Standard

Image 2.2.3.1: Standard platform edge arrangement



2.2.3 Platform Edge Arrangement

Some station specific situations could lead to an alternative arrangement for the high-contrast yellow line. Station project teams should refer to RIS 7016 and follow the appropriate process and risk assessment to determine platform marking arrangement, such as:

- A documented risk assessment supports an aerodynamic risk as specified in **RIS 7016 sections 9.6.4, G9.6.19, 10.1.2 and Appendix B.**
- The width of the platform does not meet the requirements specified in RIS 7016 section 4.1.
- There is insufficient space to wait on the safe side of the tactile platform edge warning for the number of people using the platform.
- The ability for staff to complete the train safety check requires a specific position for the high-contrast yellow line.

When the high-contrast yellow line is moved from the 'default' position (see image 2.2.3.2) and positioned further back from the platform edge than the tactile warning paving, RIS 7016 advises that additional hazard controls, such as audio announcements, should be used to help inform blind and partially sighted individuals that they should wait further back from the platform edge on the safe side of the tactile warning paving.

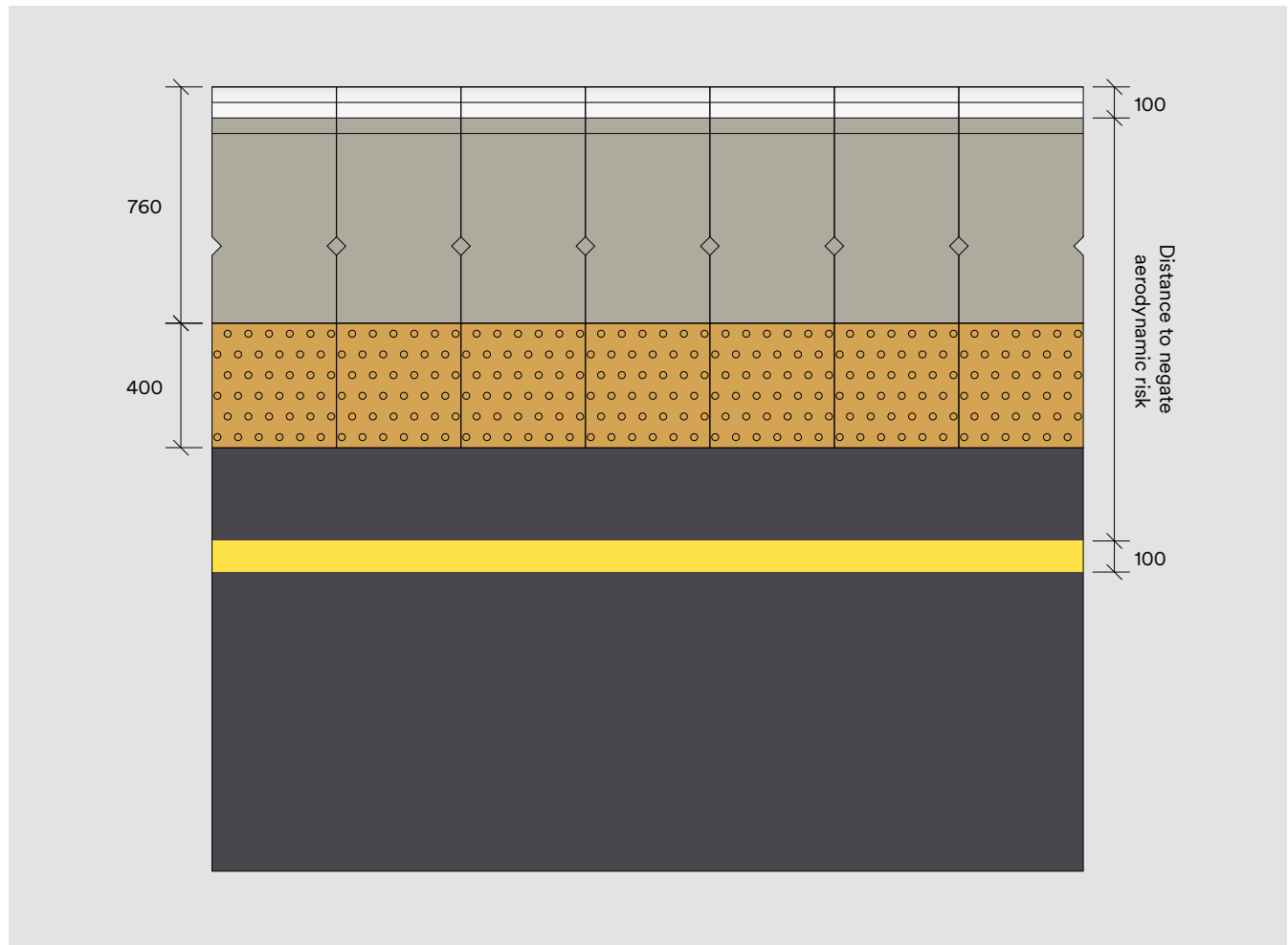


Image 2.2.3.2: Platform edge arrangement with an aerodynamic risk

2.2 Tactile Hazard Warning Indicators



2.2.3 Platform Edge Arrangement

If there is insufficient space for passengers to safely wait on a narrow platform behind the platform edge tactile warning surface, a documented risk assessment using RIS 7016 assessment and mitigation measures could support the high-contrast yellow line being moved closer to the platform edge (see image 2.2.3.4).

In both situations, where the position of the high-contrast yellow line is changed the location and arrangement of the tactile edge warning should always remain consistent at 760mm from the platform edge where possible. This means the tactile platform edge warning surface provides a consistently positioned indicator to warn blind and partially sighted individuals when approaching the platform edge and provides a fixed reference point to aid orientation when boarding the train.

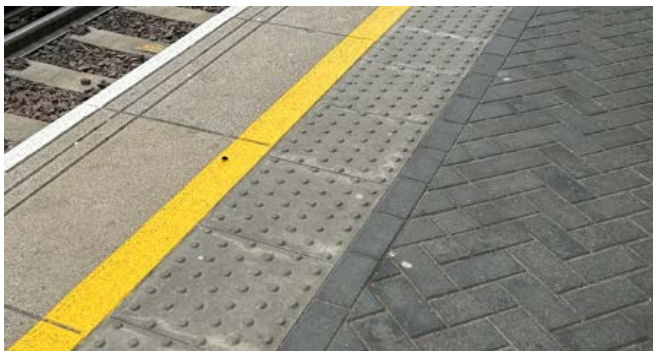


Image 2.2.3.3: London Bridge Station

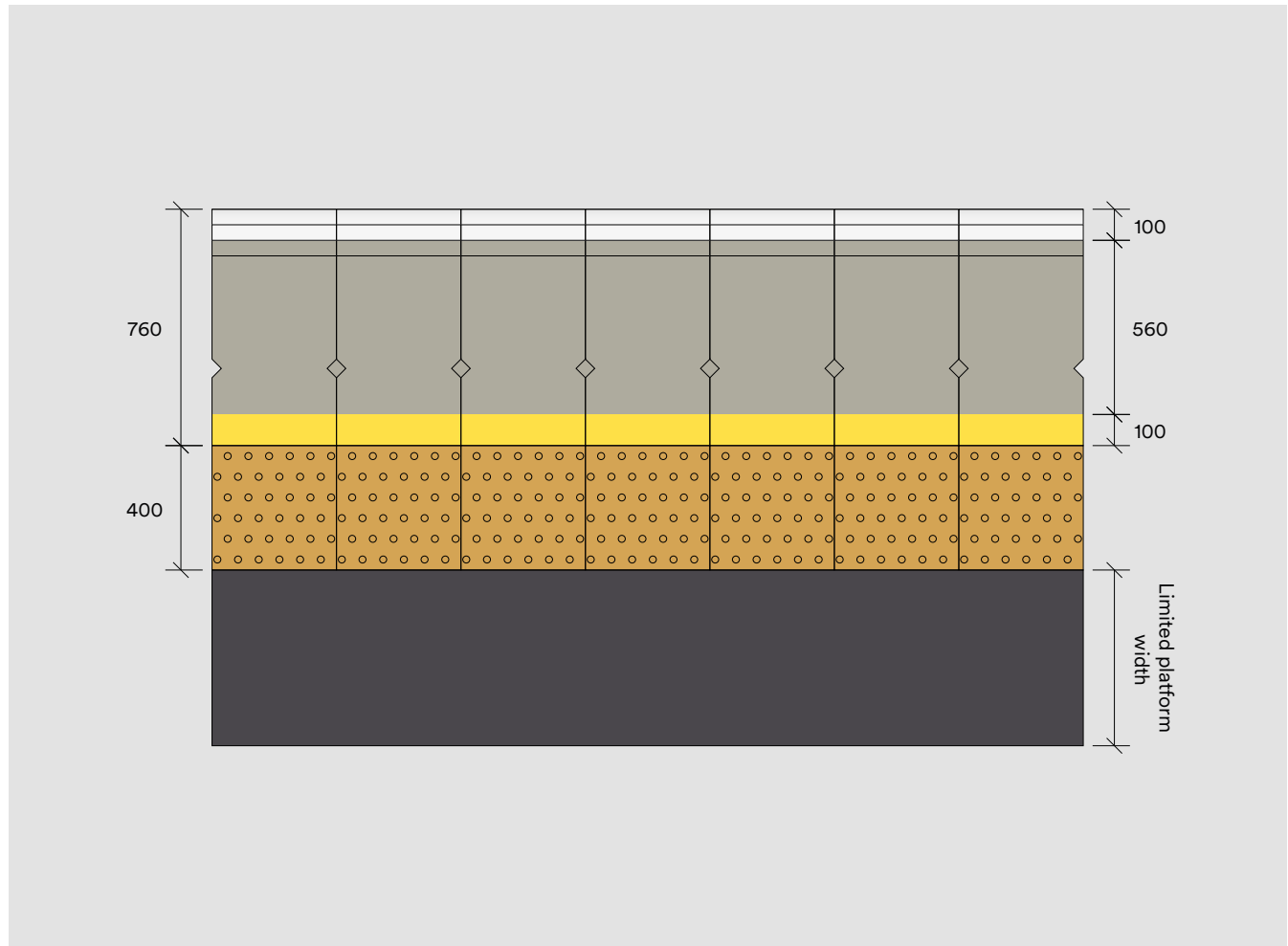


Image 2.2.3.4: Platform edge arrangement for a narrow platform



2.2.4 Pedestrian Crossing Warning

The inline blister surface is used externally at designated pedestrian crossing points. Its purpose is to warn blind and partially sighted individuals who, in the absence of a kerb, might find it difficult to differentiate between where the path ends and the carriageway begins. The blister surface is also used to guide blind and partially sighted users towards the crossing point at controlled crossing points.

At controlled crossing points, the tactile pedestrian crossing warning surface in image 2.2.4.3 should be red, which has been used for this application since 1981, to indicate to blind and partially sighted individuals that the crossing is controlled. Red blister paving should not be used in any other circumstances.

All dimensions in mm

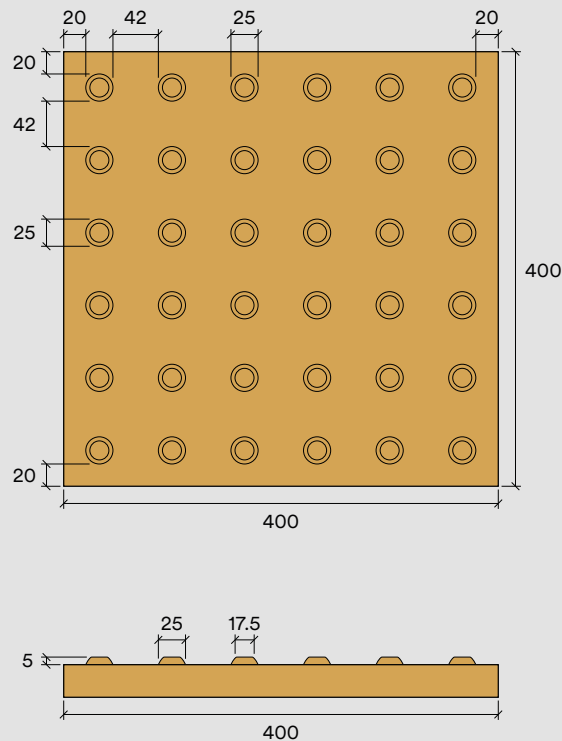


Image 2.2.4.1: Pedestrian crossing warning tile dimensions



Image 2.2.4.2: Uncontrolled pedestrian crossing, Shoreditch



Image 2.2.4.3: Controlled pedestrian crossing, Stevenage

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021
Department for Transport

Section 2: Usage and Planning

2.3 Tactile Guidance Paths



2.3.1 Guidance Indicator

A tactile guidance path surface is used to lead blind and partially sighted individuals along a defined route supported by traditional building cues, such as a property line, kerb edge and high-contrast floor finishes. It can also be used to guide passengers around obstacles, such as station furniture. The surface is designed so blind and partially sighted users can be guided along the route by walking on the tactile surface or maintaining contact with the path with a long cane.

The profile of the guidance path surface comprises raised, flat-topped bars running in the direction of travel. The bars are 5.5mm high, 35mm wide and spaced 45mm apart. There are five bars on a standard 400mm tile.

Standards Reference

Assistive Products for Blind and Vision-Impaired Persons -
Tactile Walking Surface Indicators, ISO 23599:2019
International Organisation for Standardization (ISO)

All dimensions in mm

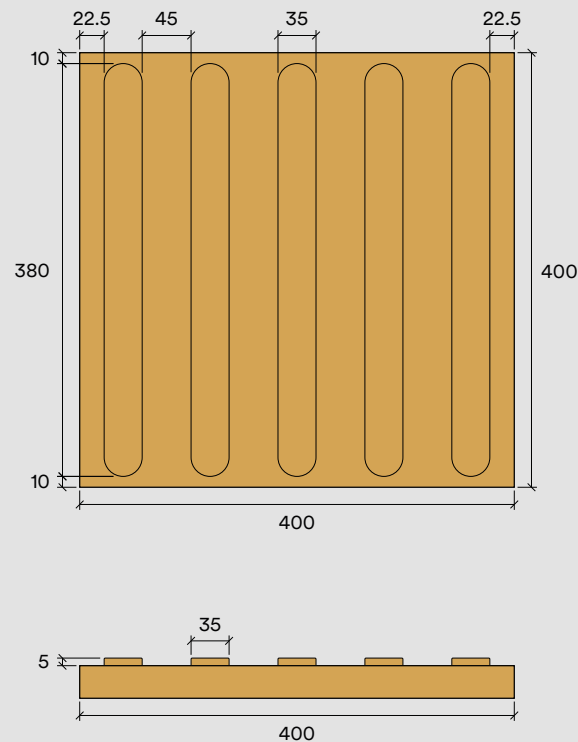


Image 2.3.1.1: Guidance indicator tile dimensions



Image 2.3.1.2: Tactile guidance path at Coventry Station



Image 2.3.1.3: Tactile guidance path at Barking Riverside Station

Section 2: Usage and Planning

2.3 Tactile Guidance Paths



2.3.2 Guidance Path Width and Clearance Zone

When planning the route of a guidance path through the built environment, care should be taken to provide a sufficient clearance zone on both sides of the tactile path, to prevent passengers following the path from colliding with any fixed obstacles.

A minimum clearance zone of 800mm should be provided to either side of the 400mm wide tactile guidance surface. The clearance zone should provide a route free from obstacles or protruding columns. Where there are doorways or exits from station facilities that might introduce an adjoining or perpendicular pedestrian flow into the route of the tactile guidance path, a larger clear width should be provided to mitigate the risk of collisions (please refer to section 3.4.1).

Using narrower 400mm wide tactile guidance paths, as opposed to 800mm set out in the DfT Guidance on the Use of Tactile Paving Surfaces (2021), will allow a more consistent and flexible application inside a variety of station layouts with space restrictions.

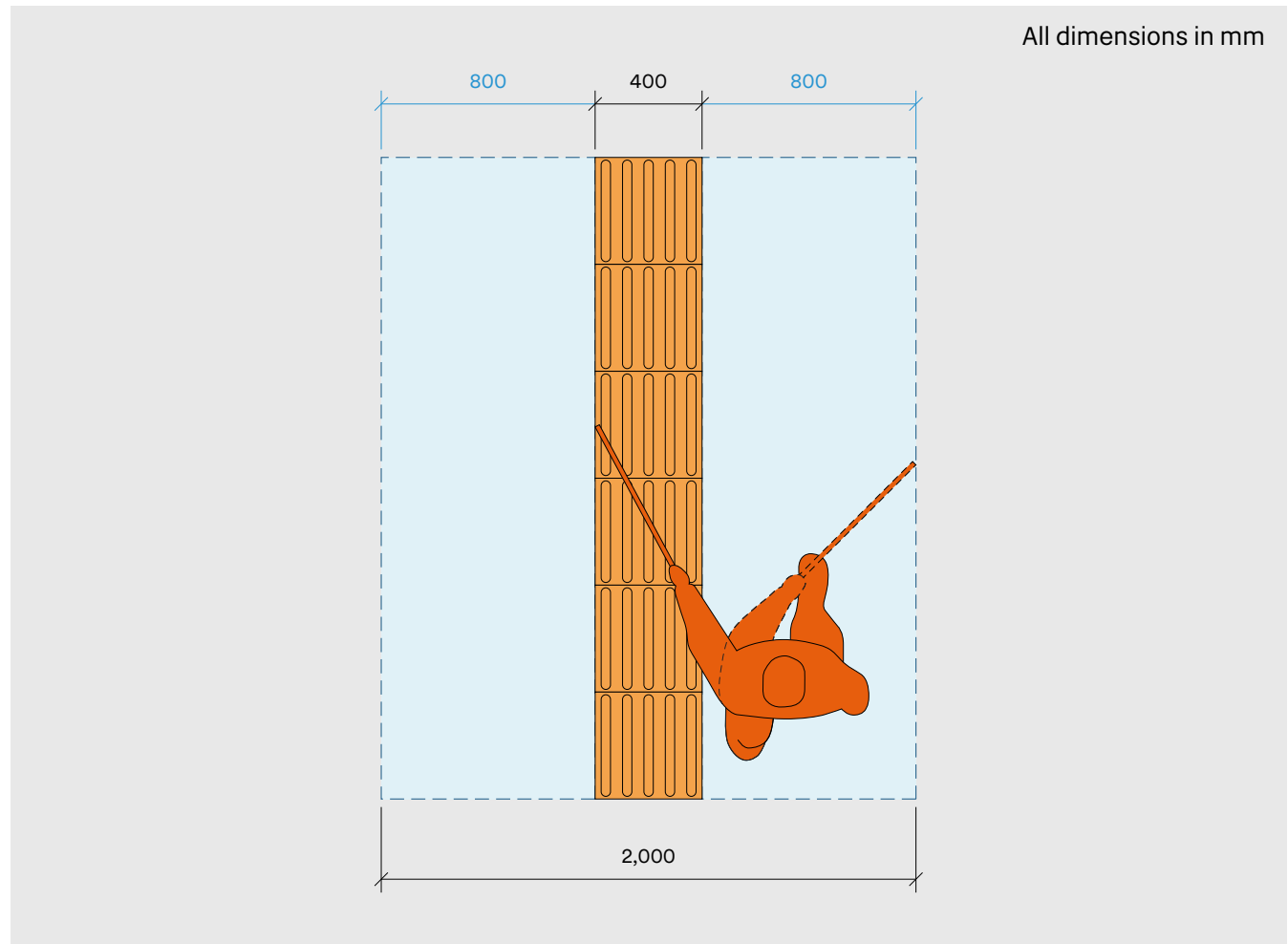


Image 2.3.2.1: Guidance path width and clearance zone dimensions



2.3.3 Building Lines and Changing Direction

The route of tactile guidance paths will depend on the architectural arrangement of the station and the location of its entrance(s), exit(s), platform(s) and key station facilities.

When setting out tactile guidance paths, the aim is to provide safe and intuitive routing. Tactile guidance paths should follow the building line where possible to provide a natural flow through the space, and to avoid unnecessary crossing or conflicts with central areas of the station with a high pedestrian flow. Following the building line may provide additional cues, such as visual contrast between property walls and the station floor, which should provide a supporting navigational tool for partially sighted individuals.

Tactile guidance paths should not cross primary pedestrian flow routes to avoid hazardous situations, particularly at:

- Entrances and exits
- Run-off zones at the top or bottom of stairs and escalators
- Gatelines

The tactile guidance path should be designed with the fewest number of turns and decision points as possible to simplify the route, making it easier to learn for blind and partially sighted individuals travelling independently.

Where there is a change of direction along a continuous guidance path, especially when the path is not following a building line, a 45-degree turn is preferred to make the guidance path easier to use and to feel that it is following a natural flow through a building. 90-degree turns are acceptable in restricted spaces, narrow corridors or when the path follows a building line.

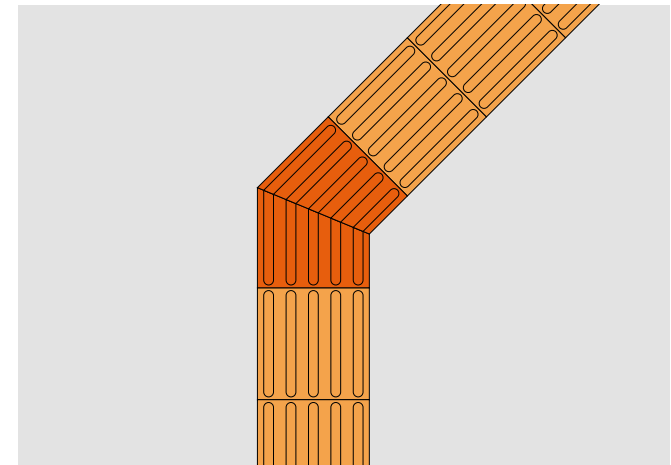


Image 2.3.3.1: 45° turn

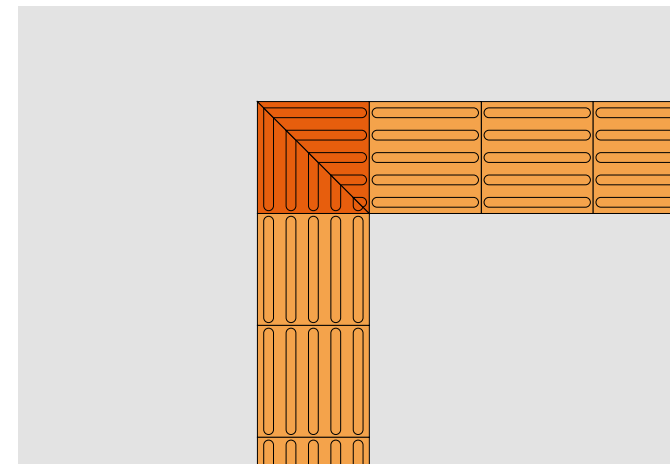


Image 2.3.3.2: 90° turn

Section 2: Usage and Planning

2.3 Tactile Guidance Paths



2.3.4 Decision Junction or Attention Indicator

The inline blister surface is used internally to indicate a decision point on a guidance path where blind and partially sighted individuals may need to make a navigational choice at a junction to reach a destination.

The inline blister surface is laid to create an 800mm square at a decision point. This provides a detectable change in the surface from the guidance path to indicate that a navigational choice needs to be made.

The inline blister surface is also used to notify blind and partially sighted users of their arrival at a destination that requires their attention or action, e.g. at an accessible toilet door or a ticket gateline. In ISO 23599, attention points are to be positioned by the lift control panels to alert blind and partially sighted users. The aim of this guideline is to build on this principle at several points in the passenger journey that may require attention or action.

Standards Reference

Assistive Products for Blind and Vision-Impaired Persons -
Tactile Walking Surface Indicators, ISO 23599:2019
International Organisation for Standardization (ISO)

All dimensions in mm

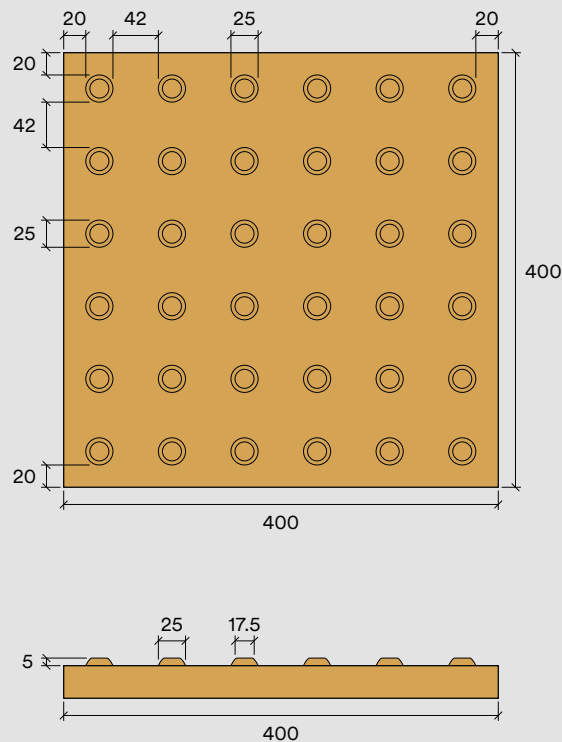


Image 2.3.4.1: Decision junction or attention indicator tile dimensions



Image 2.3.4.2: Decision junction at Coventry Station

Section 2: Usage and Planning

2.3 Tactile Guidance Paths



2.3.5 Decision Point Junctions

A decision point junction should be positioned where a change of direction leads from the primary route to a secondary destination, such as an accessible toilet or waiting room.

Tactile guidance paving has historically been unable to notify a user of where they are going. Only specific signage or technology would be able to provide such detail.

A simple system is built into the decision point to allow blind and partially sighted users to identify and differentiate between the 'spur' route to a secondary destination, such as an accessible toilet, and the primary route towards an entrance, exit or platform.

→ **Primary route:** The guidance indicator tiles are laid parallel to the direction of travel towards an entrance, exit or platform (please refer to section 2.4.1 and 2.4.2 for more information about primary routes).

→ **Secondary route:** The first guidance indicator tile on a 'spur' route is rotated 90 degrees so it is laid perpendicular to the direction of travel at the start of a secondary path towards a station facility. The rotated tile should also be a different contrasting colour as an additional cue to aid partially sighted passengers in identifying a secondary route (please refer to section 2.4.3 for more information about secondary destinations).

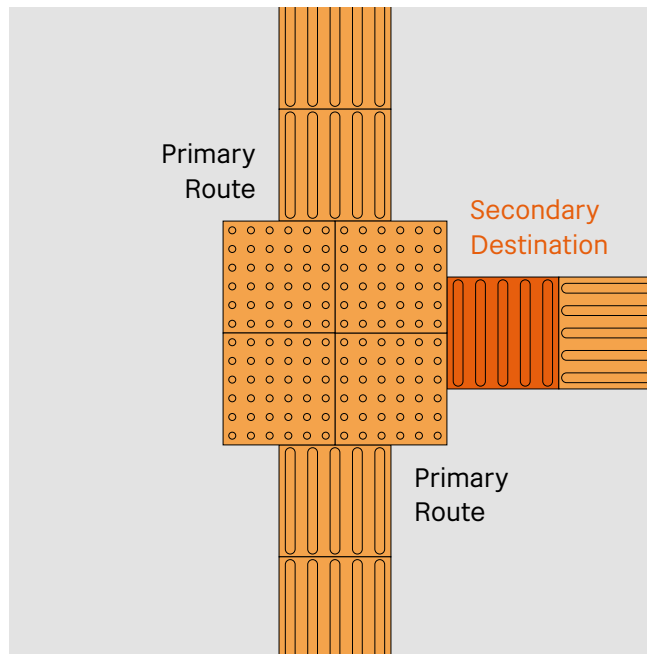


Image 2.3.5.1: 3-way Junction with 1 secondary route

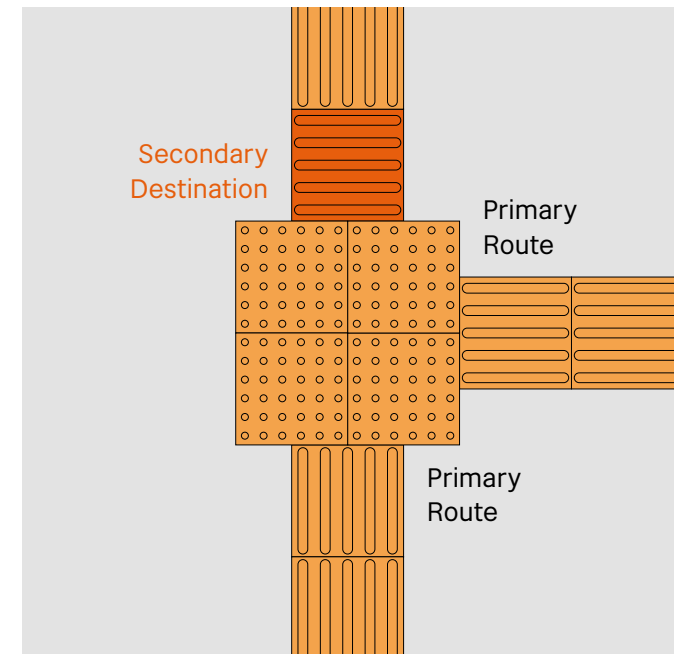


Image 2.3.5.2: 3-way Junction with 1 secondary route

Section 2: Usage and Planning

2.3 Tactile Guidance Paths



2.3.5 Decision Point Junctions

At a four-way junction, the same principles should be applied as described in the previous page for the three-way junction. The primary route guidance indicator tiles should be laid parallel to the direction of travel. For the secondary 'spur' routes, the first guidance indicator tile should be rotated 90 degrees to the direction of travel at the start of a path.

At some decision point/junction scenarios, there may be more than one 'primary' route (see image 2.3.5.3). For example, there may be a primary route from the main entrance leading to a junction that splits the paths to direct towards Platform 1 and Platform 2, both directions would be primary routes. There may also be a secondary spur leading to a staffed ticket office, which would be indicated with a rotated guidance tile.

The inclusion of this system to differentiate secondary from primary routes is an evolution of tactile paving applications. It aims to provide blind and partially sighted individuals with more information when making navigational choices by differentiating a secondary 'spur' path from a primary path at decision points or junctions.

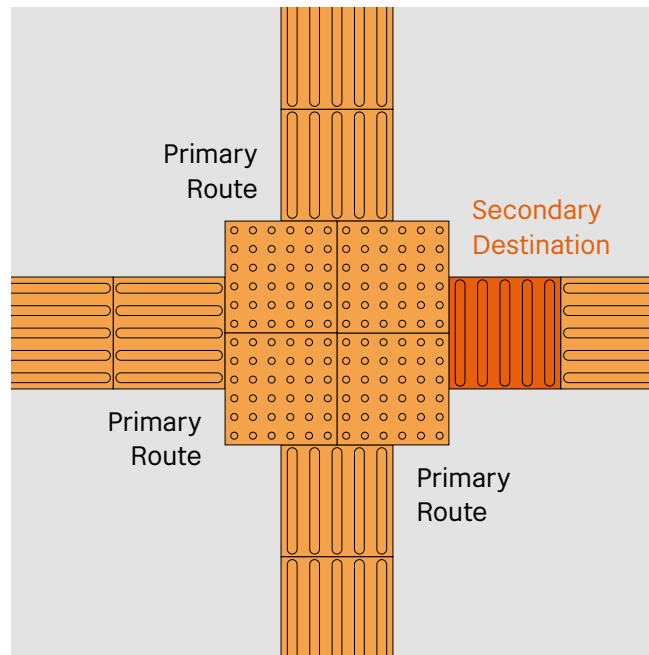


Image 2.3.5.3: 4-way junction with 1 secondary route

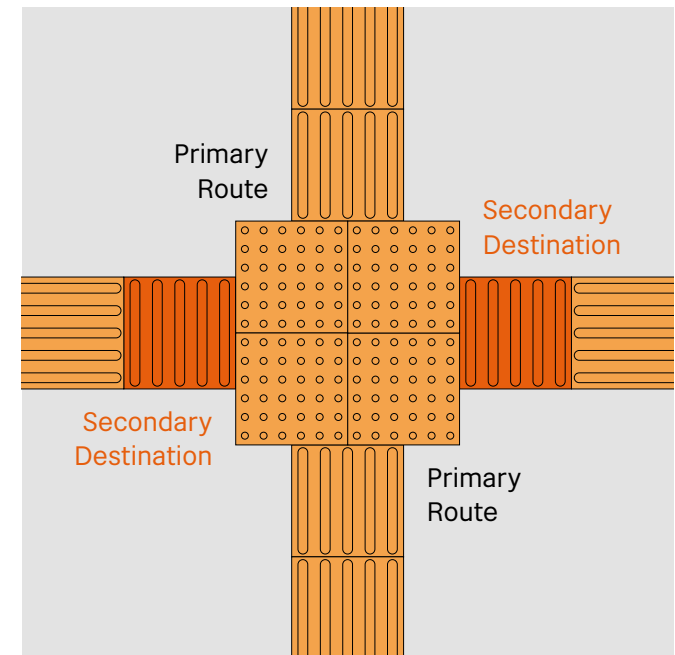


Image 2.3.5.4: 4-way junction with 2 secondary routes

Section 2: Usage and Planning

2.3 Tactile Guidance Paths



2.3.6 Attention Points

When a tactile guidance path reaches a destination or touchpoint in a journey, an attention tile should be used to notify users of their arrival at a point that requires attention or action. An example of a touchpoint would be a gateline where the user needs to present a ticket to get through the barrier. Similarly, an example of a destination would be an accessible toilet door (please refer to sections 3.4.4 to 3.4.14 for more information on applying attention points).

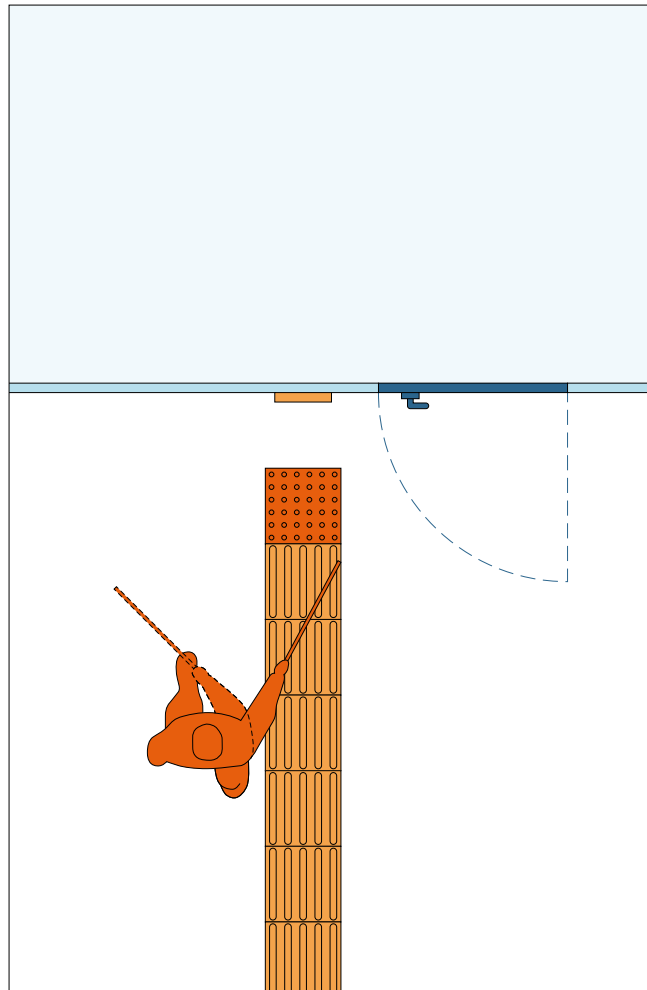


Image 2.3.6.1: Attention point at a toilet entrance

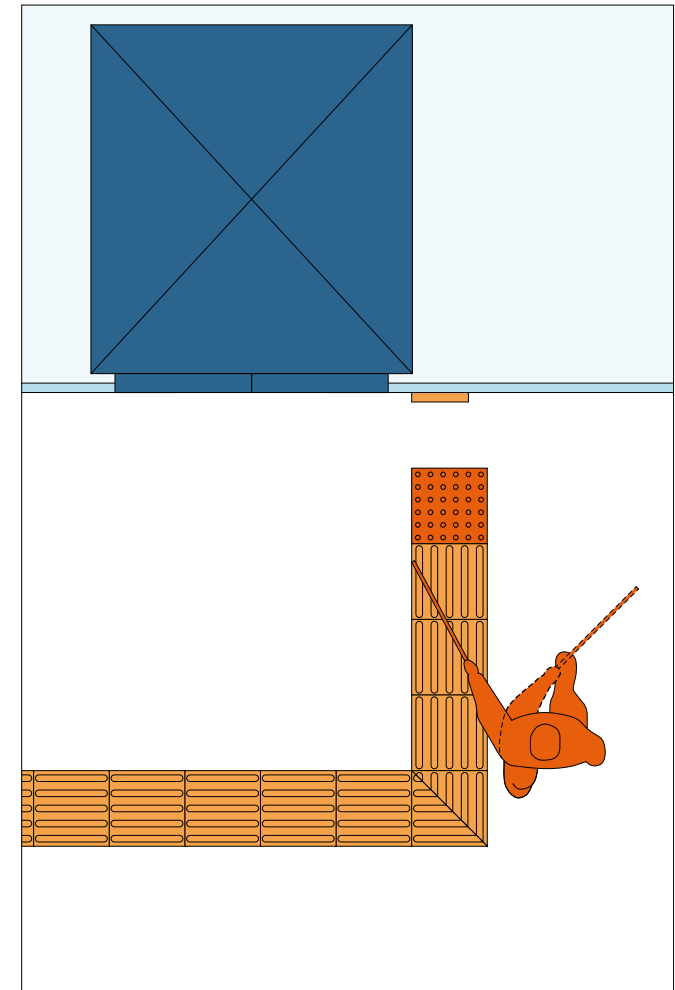


Image 2.3.6.2: Attention point at a lift control panel



2.4.1 Primary Routes

At unstaffed stations or stations with a simple layout, tactile guidance paths should be provided to lead blind and partially sighted individuals from the entrance(s) to the platforms and from the platforms to the exit(s). Tactile guidance paths should be routed via the gateline utilising an accessible wide aisle gate.

Lived experience consultation has found that some blind and partially sighted users reported that in staffed stations, the gateline could be a helpful touch point to interact with staff for travel information, to notify of an assisted travel booking or request assistance to get to the correct platform and board the train.

Guidance paths should be provided to lead passengers to each platform at a station. However, they should terminate safely at the entry point to the platform.

The guidance path should not:

- Continue on the platform to lead to the platform edge.
- Continue on the platform leading up to the platform edge warning tactile.
- Run along the entire length of the platform parallel to the platform edge.

These guidance path applications should be avoided as they can lead to unsafe and potentially hazardous situations, which may confuse blind and partially sighted individuals on the platform. It should also be noted that tactile guidance paths running along the entire length of the platform in close proximity to the platform edge can conflict with the deployment and use of boarding ramps for mobility assistance.

Once blind and partially sighted users have followed a tactile path to the platform, existing environmental cues and the platform edge warning tactile can be used to understand the platform layout and to enable passengers to wait in a safe space or to board the train.

There are some instances where tactile guidance paths may be continued onto wider platform sections, leading to stairs or lifts used on a primary route to access other platforms in the station. The guidelines provide a minimum separation that would need to be maintained to avoid creating an unsafe situation (please refer to section 3.4.2 for more information on platform exclusion safety zones on a platform).

Primary route in smaller or unstaffed stations

Entrance to platform or platform to exit

Entrance (s)

Ticket gateline via wide aisle gate

Platforms

Avoid laying tactile guidance paths the entire length of the platform.

Exit(s)



2.4.2 Primary Routes in Large Stations

Large and complex train stations with multiple platforms, extensive concourse areas, frequently departing train services and a high volume of passengers may present a challenging environment for many blind and partially sighted passengers to navigate via a network of complicated tactile guidance routes, which may lead to hazardous situations.

Therefore, installing a tactile guidance path from the entrance(s) to a staffed assistance point is recommended as a minimum requirement on an obstacle-free route. Tactile paving installations in large station projects should appoint a tactile wayfinding steering group to advise on the tactile guidance routing to platforms and secondary destinations specific to the station layout and operations to avoid hazardous situations.

Tactile guidance routes at large complex stations to a staffed assistance point should be assessed in relation to the station layout and number of entrance(s). To simplify the network of tactile paths, it could be appropriate to run guidance routes from selected station entrances because they are designated accessible entrances close to accessible drop-off bays, bus stops and taxi drop-off areas. The station tactile wayfinding steering group should review and advise on the entrance selection for tactile guidance routes.

Primary route in large stations

Entrance to platform or platform to exit

Entrance(s)

Staffed assistance point

Exit(s)



Image 2.4.2.1: Tactile guidance route at Coventry Station



2.4.3 Secondary Destinations

Secondary (spur) routes leading towards key station facilities should be provided at decision junctions along the primary route. Secondary destinations will be station-specific, depending on the facilities available at each station. When planning the tactile guidance route, the aim should be to minimise the number of decision points and secondary spurs, with a core aim to provide a simple, usable and easy-to-learn tactile paving system that can be used to navigate the station.

Considering the experience and needs of blind and partially sighted users, it is recommended that secondary spurs are provided to the key facilities below when they are located inside the station and safe to access:

- Accessible toilet
- Staffed assisted travel desk
- Staffed ticketing facility
- Waiting room
- Information help point
- Tactile station map

Secondary destinations Station facilities

Toilet

The preferred route would take passengers to an accessible toilet

Staffed assisted travel desk

Staffed ticketing facility

Waiting room

Information help point

At unstaffed stations or stations which may be unstaffed some of the time

Tactile station map



Image 2.4.3.1: Tactile guidance path leading to an accessible toilet



Image 2.4.3.2: Tactile guidance path leading to a waiting room



2.4.4 External Destinations

When onward travel connections are located within the boundary of the station's urban realm, tactile guidance paths should provide a route from the station's entrance(s) or exit(s) when connecting to another transport network. The provision of external tactile guidance paths from each station entrance(s) or exit(s) should be assessed separately, depending on the individual environment.

Tactile guidance paths leading to an end destination outside the station's property boundary should only be provided if an agreement can be reached with the adjoining land owner to continue the tactile guidance path consistently to the end destination e.g. bus stop or taxi pick-up bay using the guidance set out in this document.

Installing a tactile guidance path that ends abruptly, without warning or reaching an end destination should be avoided. Routes have been identified where tactile guidance paths run along a pavement towards a bus stop, but then cease to be maintained, or worse, are cut short when a pavement is resurfaced.

If an upgrade or renovation project changes any infrastructure that impacts the existing tactile hazard warnings or the route of a guidance path, the project team will be responsible for reinstating the tactile paving to meet the standards specified in this guideline.

External destinations

Onward travel connections

Bus stops for interconnecting services within the station boundary

Taxi pick-up point within the station boundary

Accessible passenger pick-up point within the station boundary



Image 2.4.4.1: Tactile guidance path leading to a taxi pick-up area



Image 2.4.4.2: External tactile guidance path at Coventry Station

2.5 When to use Tactile Guidance Paths



2.5.1 Applying Tactile Guidance Paths in Stations with Platforms Accessed via a Concourse

The schematic diagrams in section 2.5 indicate the routing principles for tactile guidance paths in small and large station layouts. These diagrams are not to any architectural scale, the spacing of tactile guidance paths in relation to environmental elements such as walls and stairs may vary in each diagram. Scale application diagrams for tactile guidance paths are located in section 3.4.

The station arrangement in image 2.5.1.1 shows an elevated concourse that passengers can use to access all platforms when entering the station. There is no need to provide tactile guidance paths on the platforms if the platforms can all be accessed directly from the concourse.

In unstaffed stations or stations that have a simple layout, tactile guidance paths should lead from the entrance(s) to the platform(s) via a wide aisle gate at the ticket gateline, and from the platform(s) to the exit(s). Secondary 'spur' routes should be provided to key station facilities as appropriate (please refer to section 2.4.3 for more information on secondary destinations).

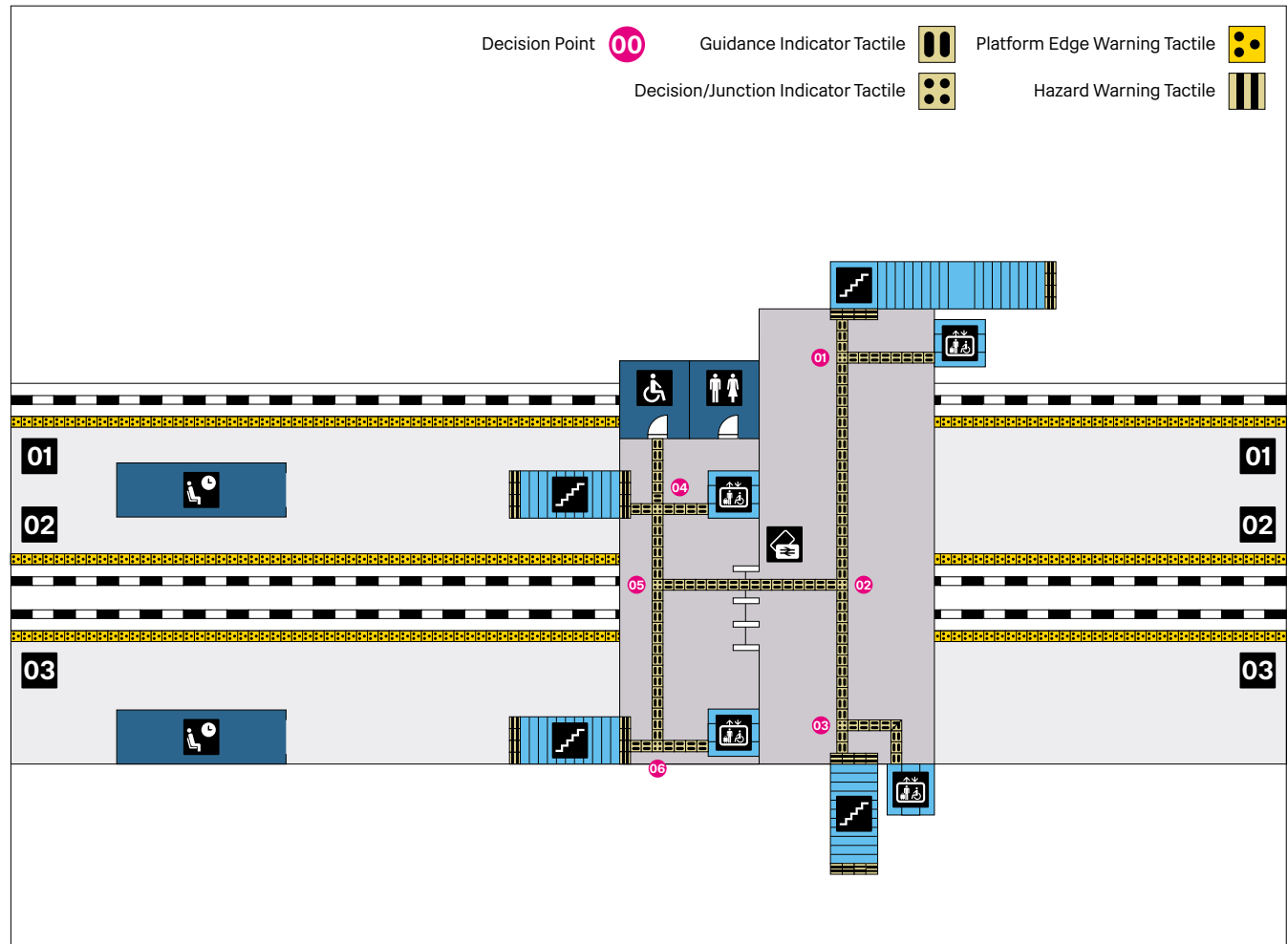


Image 2.5.1.1: Tactile guidance route in a small or unstaffed station with platforms accessed via a raised concourse

2.5 When to use Tactile Guidance Paths



2.5.2 Applying Tactile Guidance Paths in Stations with Platform Access via Another Platform

The station arrangement in image 2.5.2.1 shows two entrances at grade/street level leading passengers straight onto a platform where a footbridge or underpass is used as the primary route to access another platform. There could be a need to provide a tactile guidance path along a section of platform.

Tactile guidance paths and hazard warnings should be provided via the stairs on a primary route. Stairs often offer the most direct route to a platform, and many blind and partially sighted users are confident stair users and find them more intuitive to navigate and less disorientating than lifts.

However, where the station provides step-free access via lifts, the tactile guidance path should also provide a route via the lifts to encourage choice, equitable access and safety. This will also support blind and partially sighted users with mobility impairments and those travelling with luggage.

Where more than one lift serves the same destination, one tactile guidance path should be provided towards a lift or to a single shared lift call button rather than having multiple tactile guidance paths leading to multiple lift entrances that serve the same destination.

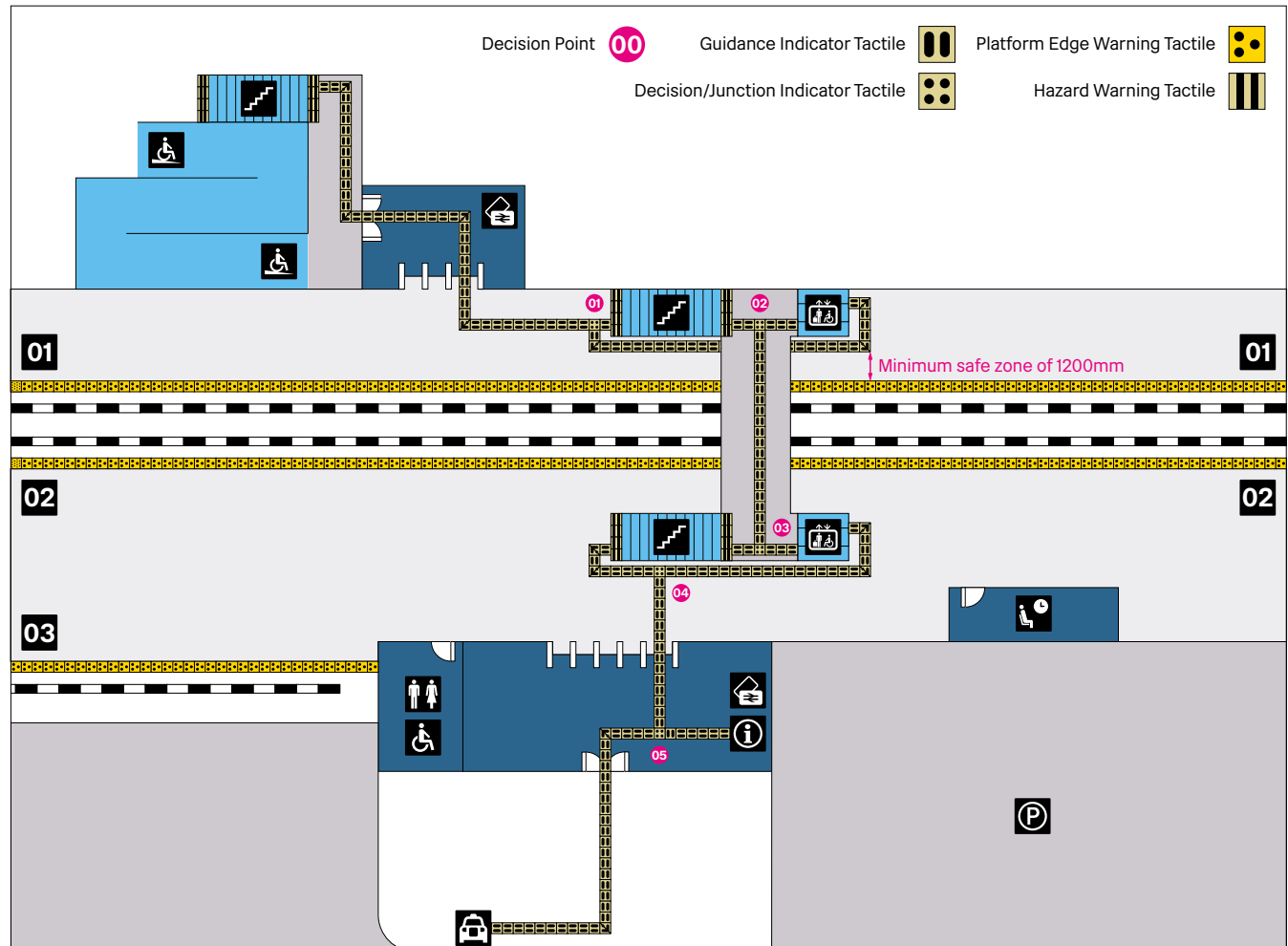


Image 2.5.2.1: Tactile guidance route in a small or unstaffed station with platforms accessed via a footbridge

2.5 When to use Tactile Guidance Paths



2.5.3 Applying Tactile Guidance Paths in Stations with Secondary Destinations on a Platform

Whilst the guidelines advise against running a tactile guidance route along the length of a platform, there may be some instances where a short length of tactile guidance path is appropriate and necessary to provide a route to:

- Stairs leading to a footbridge or underpass for access to another platform.
- Lifts leading to a footbridge or underpass for access to another platform.
- An accessible toilet.
- An enclosed waiting room.

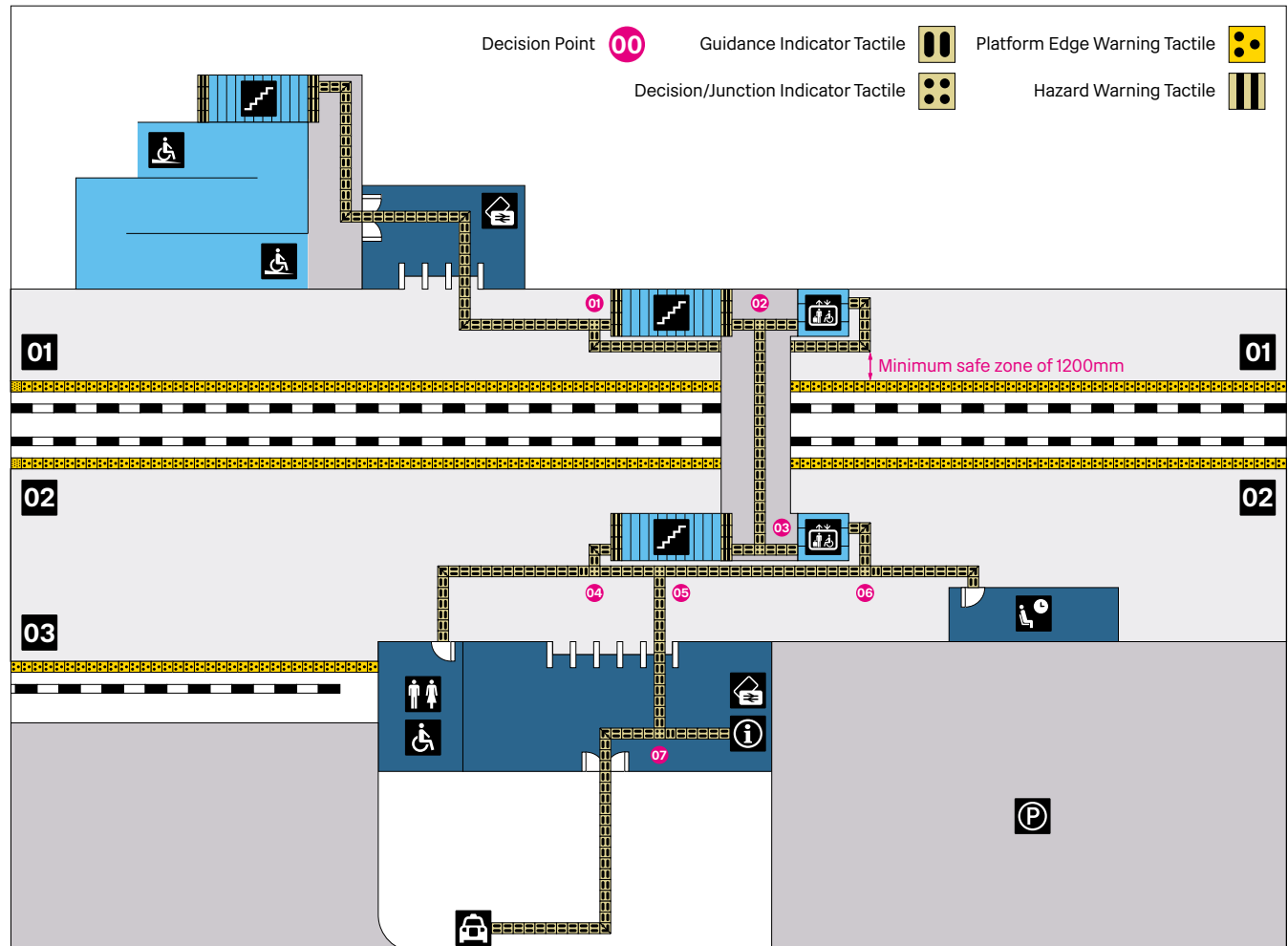


Image 2.5.3.1: Tactile guidance route in a small or unstaffed station with secondary routes in the platform area

2.5 When to use Tactile Guidance Paths



2.5.4 Exclusion Safety Zones on Platforms

A tactile guidance route along the platform towards a footbridge or underpass to another platform should only be applied if a tactile path can be installed whilst maintaining clear separation from the platform edge warning tactile, with a minimum distance of at least 1200mm.

Providing this minimum clear separation is important to reduce the risk of confusion when identifying the tactile guidance path and the platform edge warning tactile. This will often mean that a tactile guidance path can only be provided at stations where the ticket hall or gatelines lead onto a wider section of the platform.

Where the platform width does not permit the provision of a guidance path to be applied on the platform, additional building cues and tactile/braille signs should be provided to support navigation.

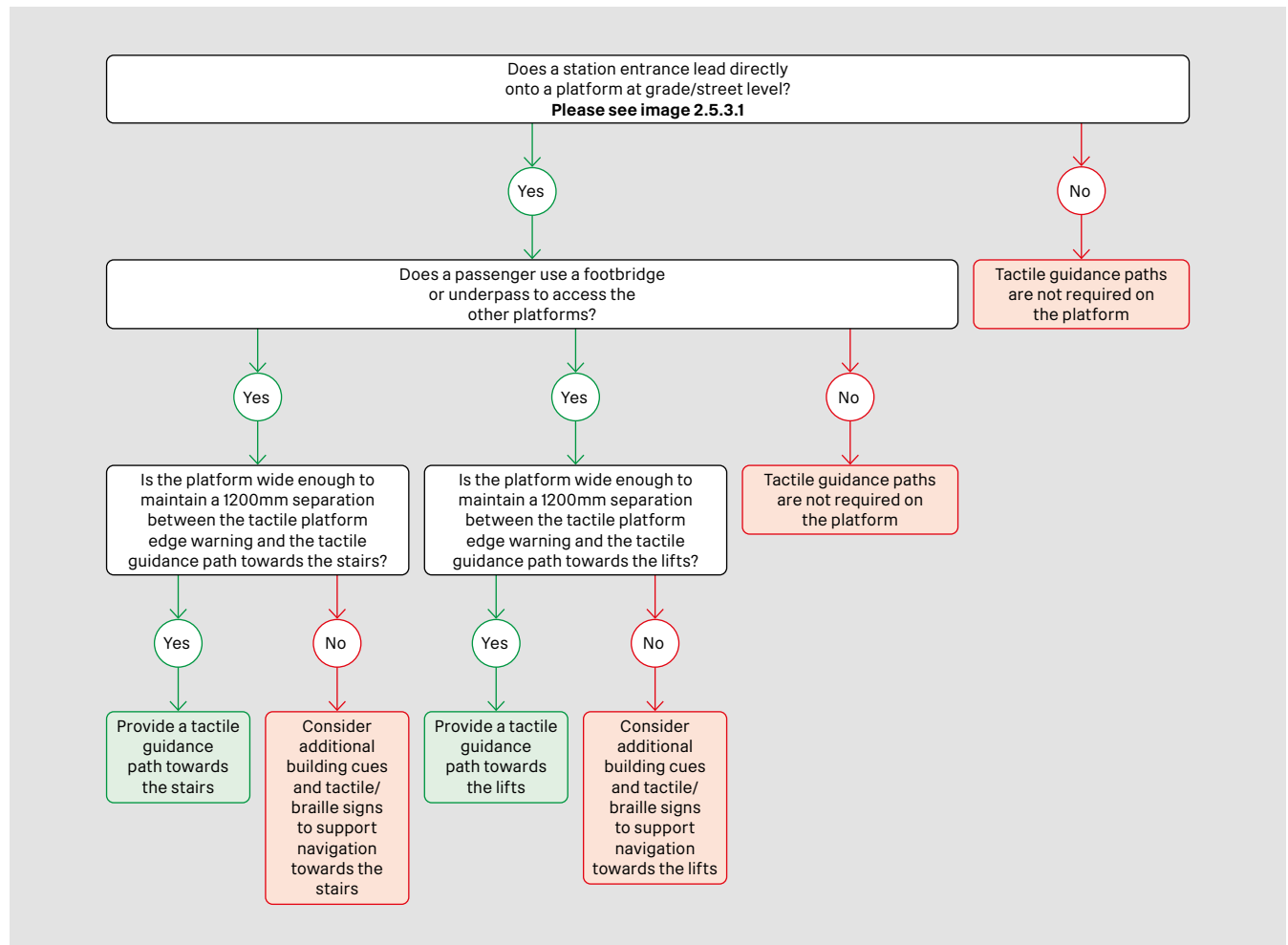


Image 2.5.4.1: When to apply a tactile guidance path along a platform towards a footbridge or underpass to access another platform



2.5.4 Exclusion Safety Zones on Platforms

A tactile guidance route along the platform towards a secondary facility should only be applied if a tactile path can be installed whilst maintaining clear separation from the platform edge warning tactile, with a minimum distance of at least 1200mm.

Providing this minimum clear separation is important to reduce the risk of confusion when identifying the tactile guidance path and the platform edge warning tactile. This will often mean that a tactile guidance path can only be provided at stations where the ticket hall or gatelines lead onto a wider section of the platform.

Where the platform width does not permit the provision of a guidance path to be applied on the platform, additional building cues and tactile/braille signs should be provided to support navigation.

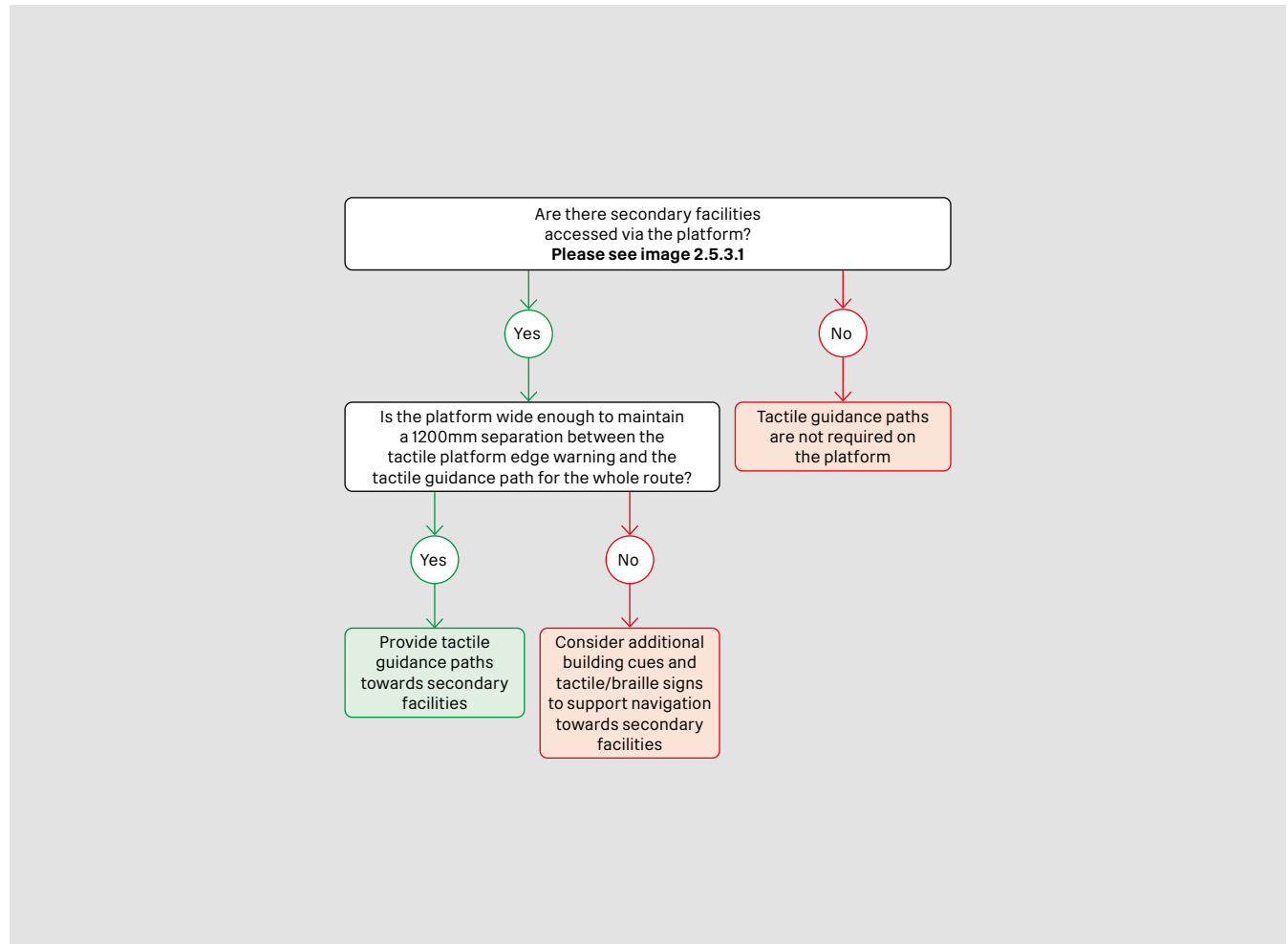


Image 2.5.4.2: When to apply a tactile guidance path along a platform towards a secondary facility



2.5.5 Using Additional Building Cues and Tactile/Braille Signs

There are instances where the station arrangement and/or the platform width determine that a tactile guidance path can not be installed on a platform. A tactile guidance route should only be applied on a platform for the following reasons:

- If the platform is used as a primary route to access another platform using a footbridge or underpass via stairs or lift.
- If the platform is used as a route to access a secondary facility, e.g. accessible toilet or enclosed waiting room on a platform.

There should be sufficient platform width to apply a tactile guidance path while maintaining the minimum safety exclusion zone of 1200mm from the tactile platform edge warning, please see section 3.4.2:

- If there is sufficient platform width, apply a tactile guidance path.
- If there is insufficient platform width, do not apply a tactile guidance path.

Where a tactile guidance path can not be applied, the station project team should endeavour to indicate the route utilising built or natural features that provide tactile and contrasting visual guidance:

- A continuous, mainly unbroken building line/wall that can be used as a tapping feature, providing good visual contrast with the platform surface, please see image 2.5.5.2
- A continuous, mainly unbroken kerb or fence with kickboard or upstand that can be used as a tapping feature, please see image 2.5.5.3.

When a tactile guidance path can not be provided on a platform for a primary route or towards a secondary destination, the project should consider whether an application for an exemption against PRM NTSN may be required. This should be based on a risk assessment undertaken by the project.



Image 2.5.5.1: Do not install a tactile guidance path on a narrow section of the platform without maintaining the minimum exclusion safety zone of 1200mm from the tactile platform edge warning



Image 2.5.5.2: If a tactile guidance path can not be installed on a platform, a continuous building line that is mainly unbroken could be used as a tapping feature



Image 2.5.5.3: If a tactile guidance path can not be installed on a platform, a kerb or fence that runs parallel to the platform could be used as a tapping feature

2.5 When to use Tactile Guidance Paths



2.5.5 Using Additional Building Cues and Tactile/Braille Signs

When tactile guidance paths can not be installed on platforms with a restricted width to guide users to secondary facilities on a platform or towards another platform, additional built environment cues and contrasting building lines should be available. Where the rear of the rail platform is open, there should be a raised kerb or 'kickboard', which may be used as a tapping rail by long cane users, in addition to rails or fencing. There should be no projecting or overhanging items which may pose a hazard to blind and partially sighted users along the route. Kickboards should be a minimum of 150mm in height, and any tapping rails provided should be arranged with the underside no higher than 150mm above ground level.

Tactile and braille signs can also be positioned at the back edge of the platform to provide navigational information directing to vertical circulation points that lead to other platforms or towards secondary facilities.

BS EN 16584:2017 Railway Applications. Design for PRM Use. General Requirements, including Part 1 (Contrast), Part 2 (Information) and Part 3 (Optical and Friction Characteristics), provide additional guidance on the accessible design of rail platforms. Network Rail's Inclusive Design document (NR/GN/CIV/300/04) also offers advice on the design and implementation of inclusive and accessible railway stations.

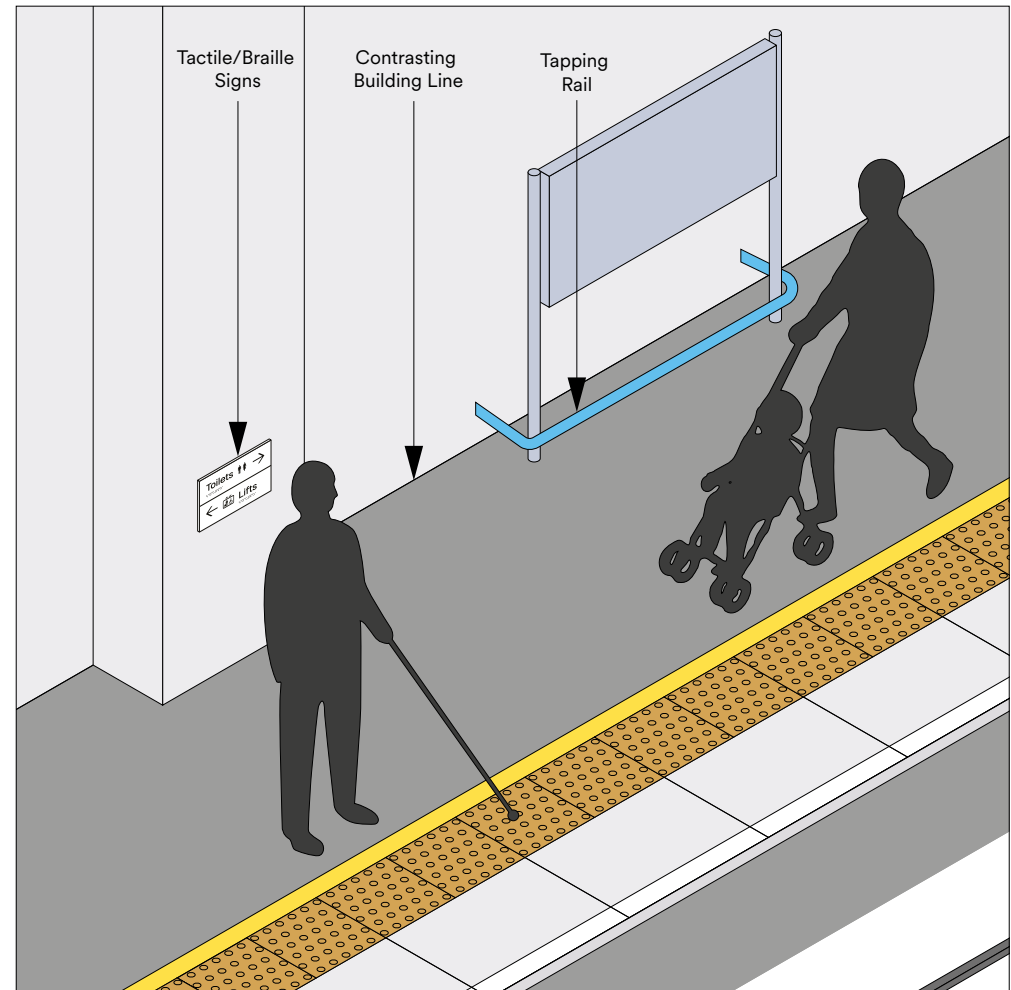


Image 2.5.5.4: Additional building cues and tactile/braille signs

Standards Reference

Inclusive Mobility - A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure, 2021

Department for Transport

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

Rail Industry Standard

2.5 When to use Tactile Guidance Paths



2.5.6 Tactile Guidance Paths to Assistance Points

Large stations with multiple platforms, extensive concourse areas, high volumes of passengers, and frequently departing train services present a challenging environment for blind and partially sighted individuals to understand and navigate safely.

Lived experience consultation resulted in some blind and partially sighted passengers reporting concerns that large stations could become a complex network of tactile paths that are challenging to learn. Large stations require an additional source of navigational information, perhaps delivered via audio navigation technology to provide the necessary directions to facilitate independent navigation. This is a future aspiration but would require development and testing and, at present, is outside the scope of this version of the guidance.

To provide a safe and simplified solution in larger stations, a tactile guidance path should be installed to provide an identifiable route from the entrance(s) to a staffed assistance point, where one is available. This aligns with the recommended minimum guidance path routing in a complex rail environment.

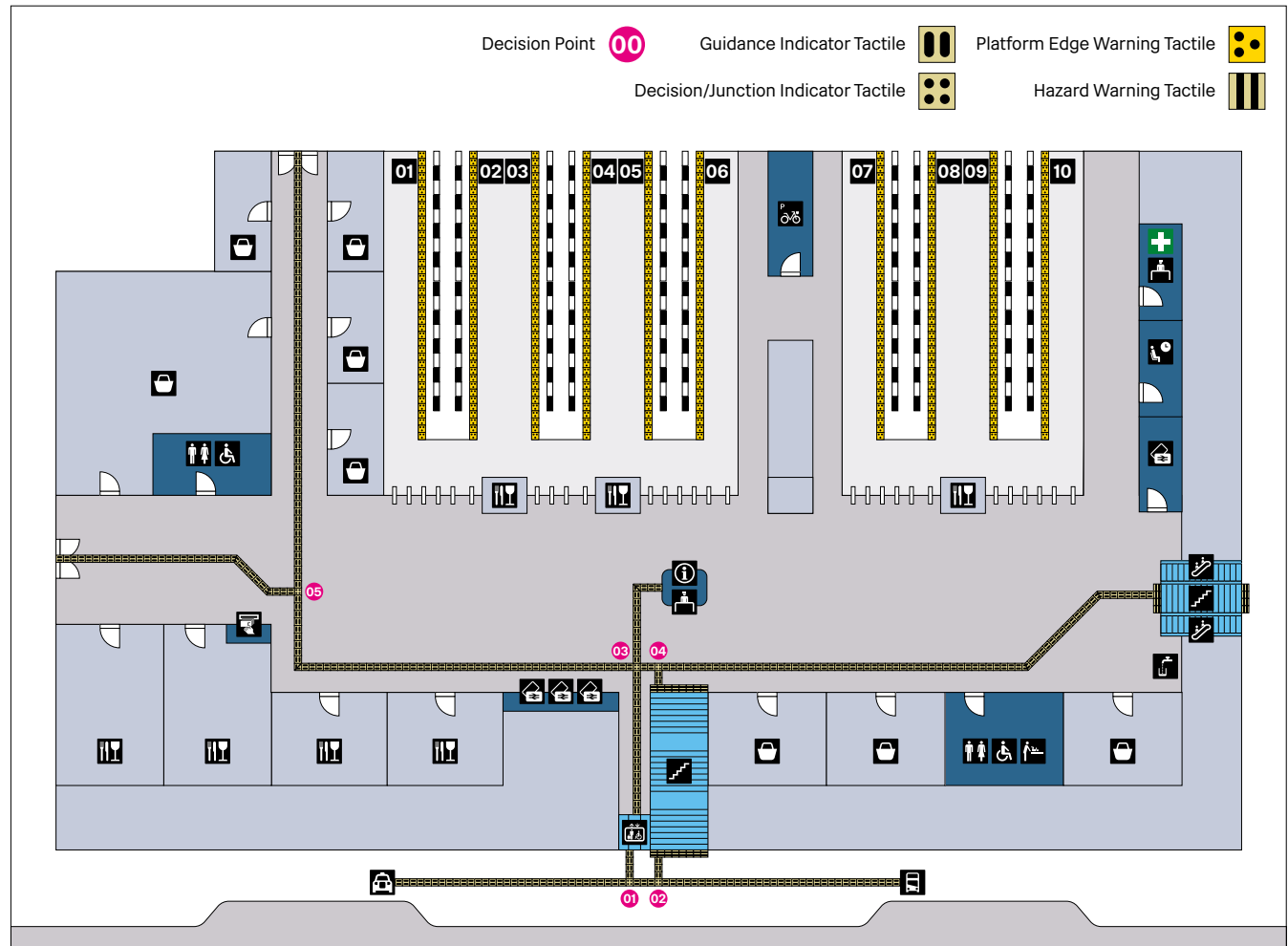


Image 2.5.6.1: Tactile guidance routes to an assistance points in a medium or large station

2.5 When to use Tactile Guidance Paths



2.5.7 Tactile Guidance Paths to Staffed Gatelines

If a large station does not have a staffed assistance point, the tactile guidance path should alternatively lead to a staffed gateline.

2.5.8 Planning Tactile Guidance in Large Stations

The application of tactile guidance paths will be station-specific and heavily influenced by the station layout and arrangement of entrances, facilities and platforms. Tactile guidance paths should avoid conflict with the main passenger flows and the operational processes at a station. Therefore, as per section 2.1.3, it is recommended that a station development project team sets up a tactile wayfinding steering group to decide on the appropriate application of these guidelines, particularly around the arrangement of guidance path routing and destinations. This steering group should involve an accessibility consultant, and those with lived experience of disability.

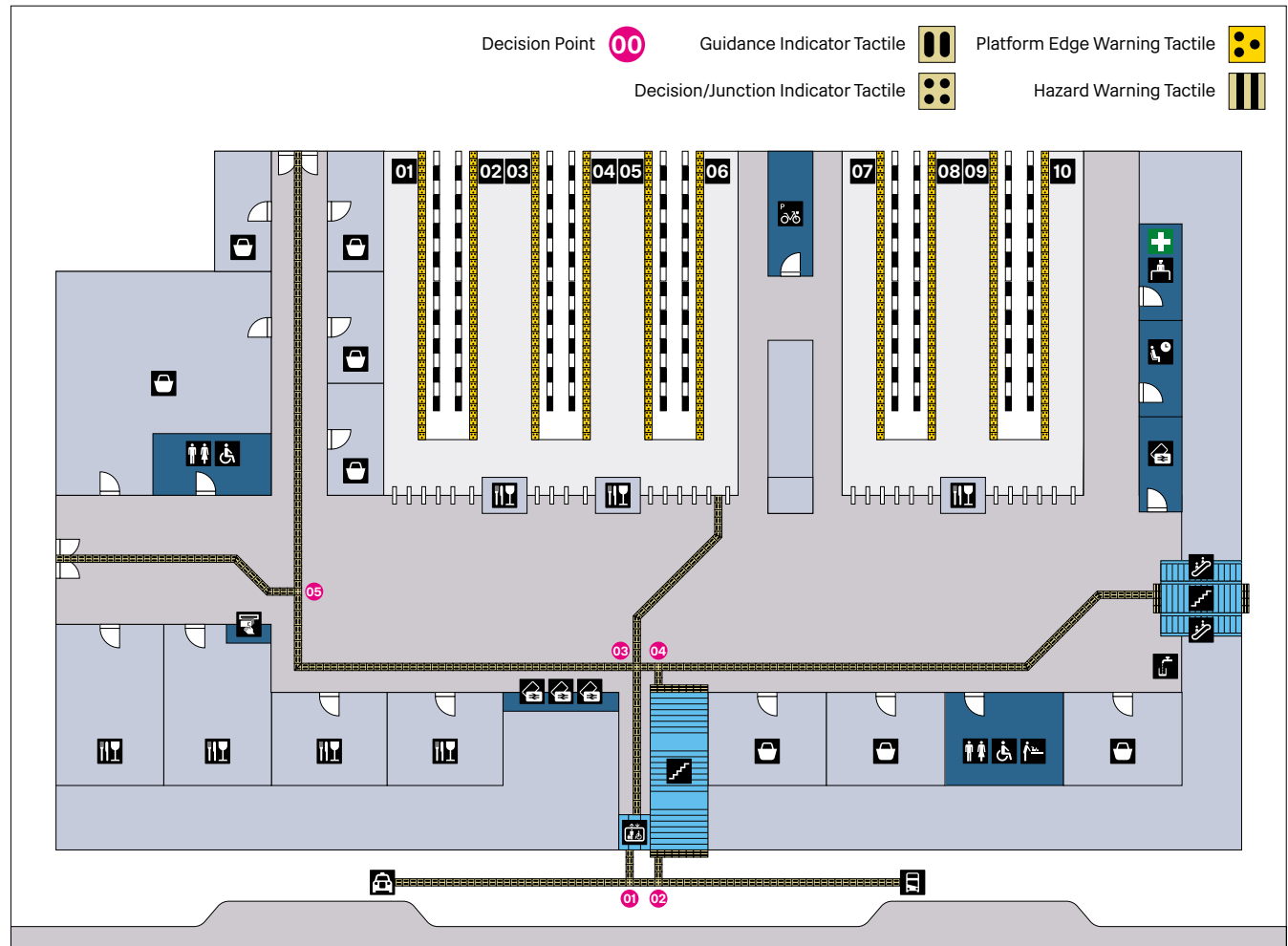


Image 2.5.7.1: Tactile guidance routes to a staffed gateline in a medium or large station



Image 2.6
Barking Riverside Station
Platform edge warning tactiles at a
terminus station with the yellow line
moved closer to the platform edge



Tactile Paving & Wayfinding
Section 3: Application Guidance



3.1 Hazard Warning



3.1.1 Stairs

A corduroy tactile warning surface should be consistently applied at the top and bottom of stairs to warn of the upcoming level change. The following application guidelines should be applied:

- The corduroy surface should extend across the entire width of the steps at both the top and bottom of the flight.
- Where possible, the surface should start 400mm from the first and last nosing to give people time to adjust their walking speed.
- If the steps are in the direct line of walking travel, the surface should be laid to a depth of 800mm.
- If users would have to make a deliberate turn to encounter the steps, then it is acceptable to lay the surface to a depth of 400mm.
- The surface should extend at least 400mm beyond the width of the steps on either side to allow for people approaching the steps at an angle. However, the surface should not extend across adjacent facilities, such as a ramp or lift.
- A continuous handrail, acting as a guide across intermediate landings, will inform the user that the series of steps continues, removing the need for the warning surface to be installed excessively. However, the surface should be installed if the steps can be accessed at the landing.
- Where ramped access is provided immediately adjacent to steps, then care should be taken to provide unimpeded access for wheelchair and other mobility aid users.

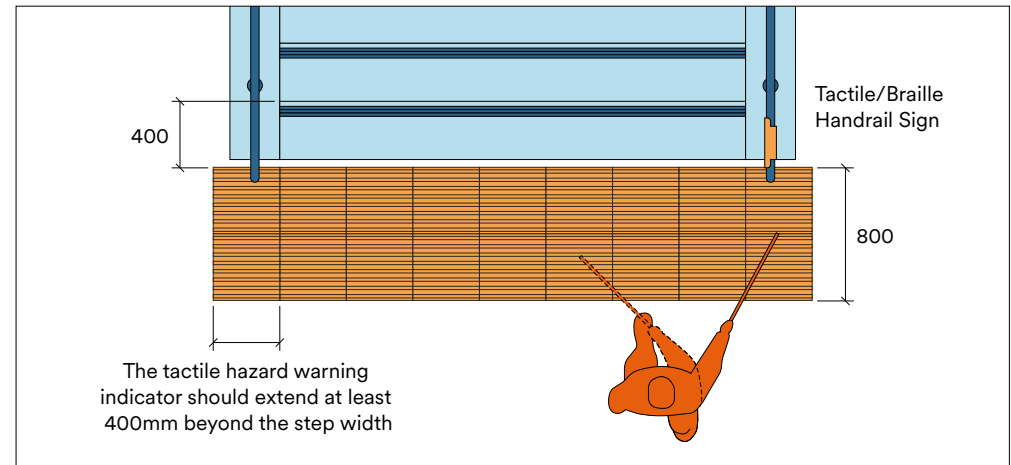


Image 3.1.1.1: Hazard warning at the top of stairs

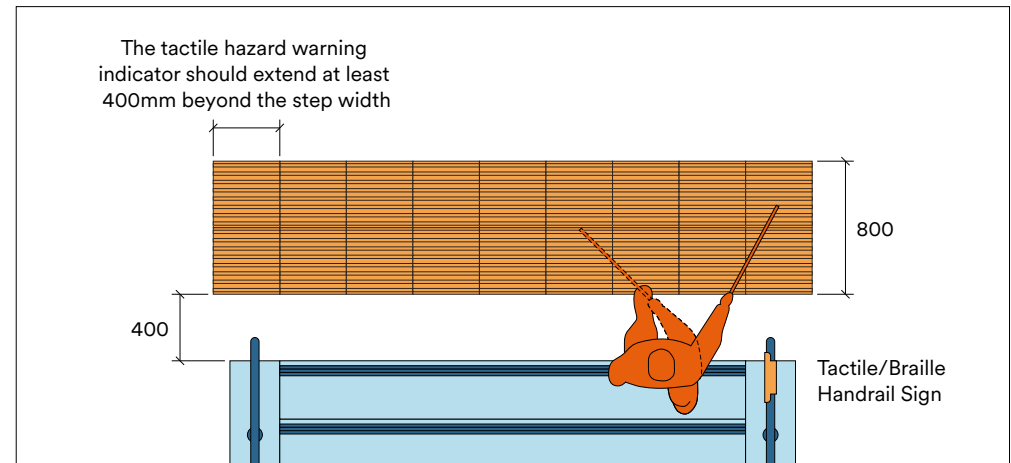


Image 3.1.1.2: Hazard warning at the bottom of stairs

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021
Department for Transport

3.1 Hazard Warning



3.1.2 Level Crossing

At a level crossing within the station boundary, a corduroy tactile warning surface should be provided to warn of the upcoming hazard. The tactile surface should be laid so that the bars run transversely across the direction of pedestrian travel. The following application guidelines, as defined by DfT, should be applied:

- The corduroy surface should extend across the full width of the footway, or for 1200mm if there is no footway.
- The corduroy surface should start 400mm from the barrier or the projected barrier line on the open side. If the corduroy surface is installed closer, users might not have enough time to adjust their walking speed with barriers on both sides. The corduroy surface should be laid to a depth of 400mm.
- With barriers on one side only, the corduroy surface should be installed to a depth of 400mm on the side with the barrier and 800mm on the side without a barrier.
- Where barriers are not present, the corduroy surface should be installed to a depth of 800mm on both sides. The additional depth of tactile paving in the latter two cases is so that blind and partially sighted individuals have sufficient underfoot warning where there is no barrier in place to halt their progress.

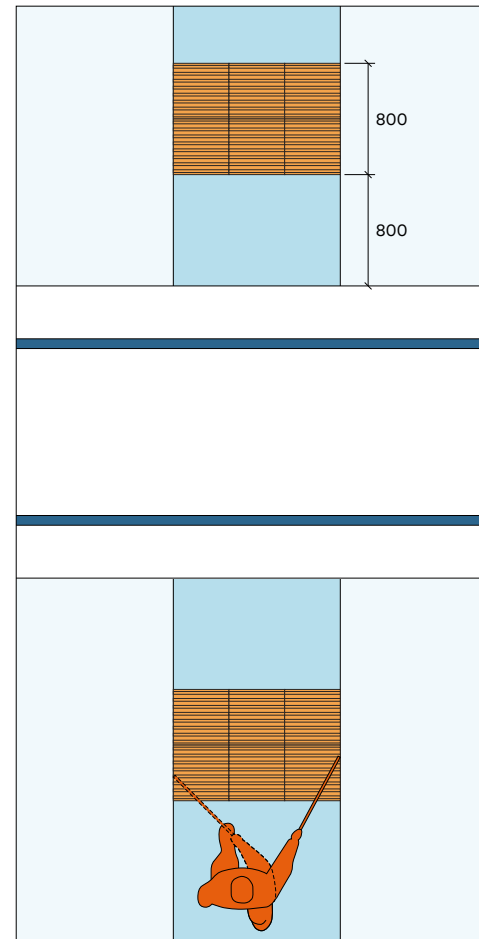


Image 3.1.2.1: Hazard warning at typical level crossing within a station boundary without barriers

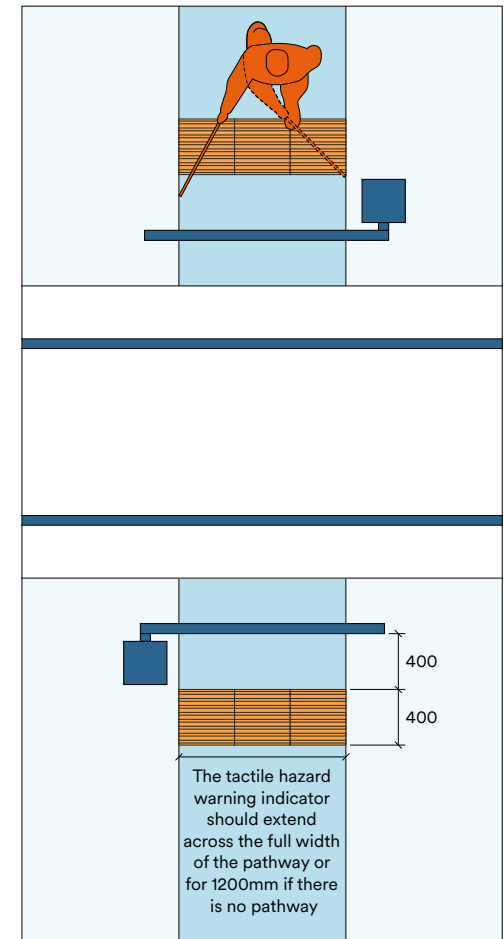


Image 3.1.2.2: Hazard warning at an uncommon level crossing within a station boundary with barriers

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021
Department for Transport

Level Crossing Design Handbook, NR/L2/XNG/30020
Network Rail

3.1 Hazard Warning



3.1.3 Platforms with No Security Gate

The end of platforms should have a security gate and rubber anti-trespass panels installed to prevent public access. At stations without a security gate installed at the end of the platform, the hazard should be indicated by providing visual markings and a tactile hazard warning surface laid at a depth of 800mm from the beginning of the ramp leading onto the track.

PRM NTSN states: 'The end of the platform shall either be fitted with a barrier that prevents public access or shall have a visual marking and tactile walking surface indicators with an attention pattern indicating a hazard'.



Image 3.1.3.1: Platform fitted with a security gate and rubber anti-trespass panels

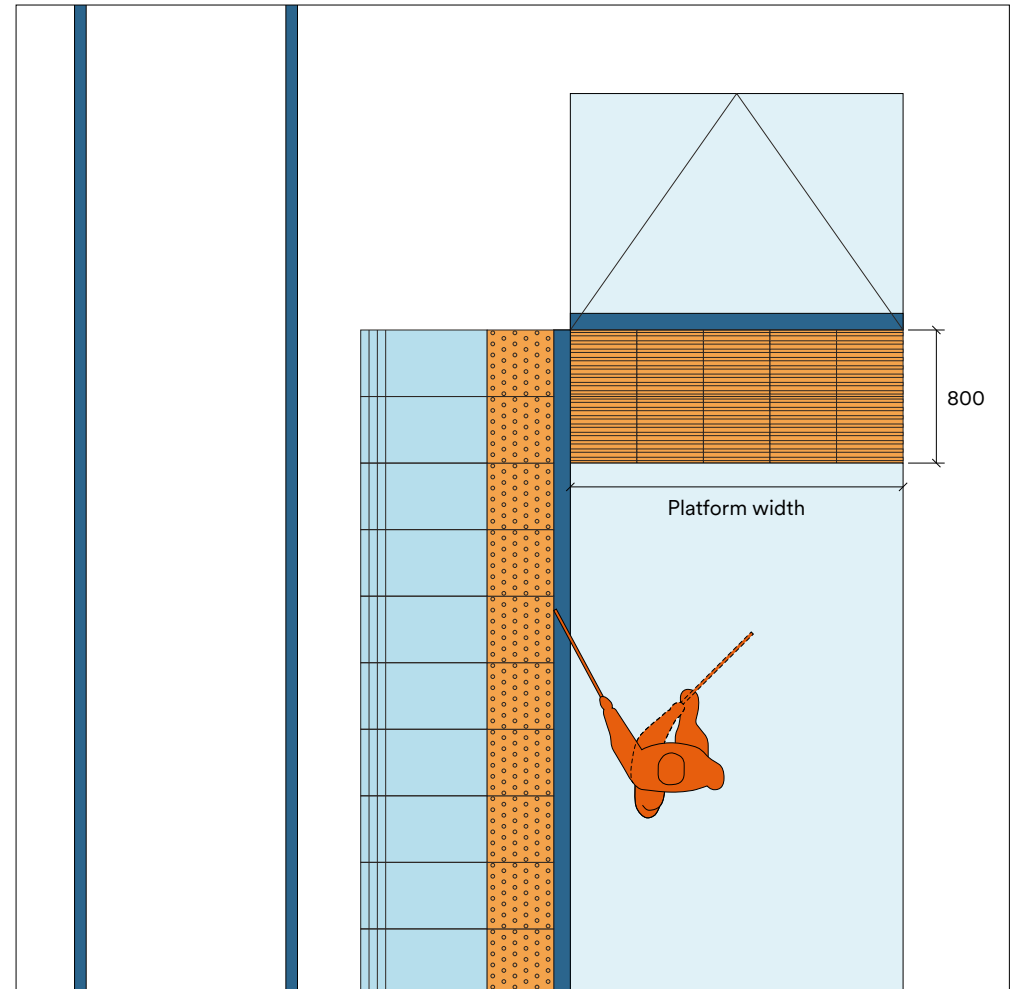


Image 3.1.3.2: Tactile hazard warning surface at the end of a platform

3.1 Hazard Warning



3.1.4 Platforms With A Protective Barrier

A tactile hazard warning surface should be installed on the platform coping where the protective barrier at the platform edge stops and the platform edge warning surface begins. This is to prevent blind and partially sighted passengers from unknowingly entering the danger zone.



Image 3.1.4.1: Platform fitted with a protective barrier leading onto a platform

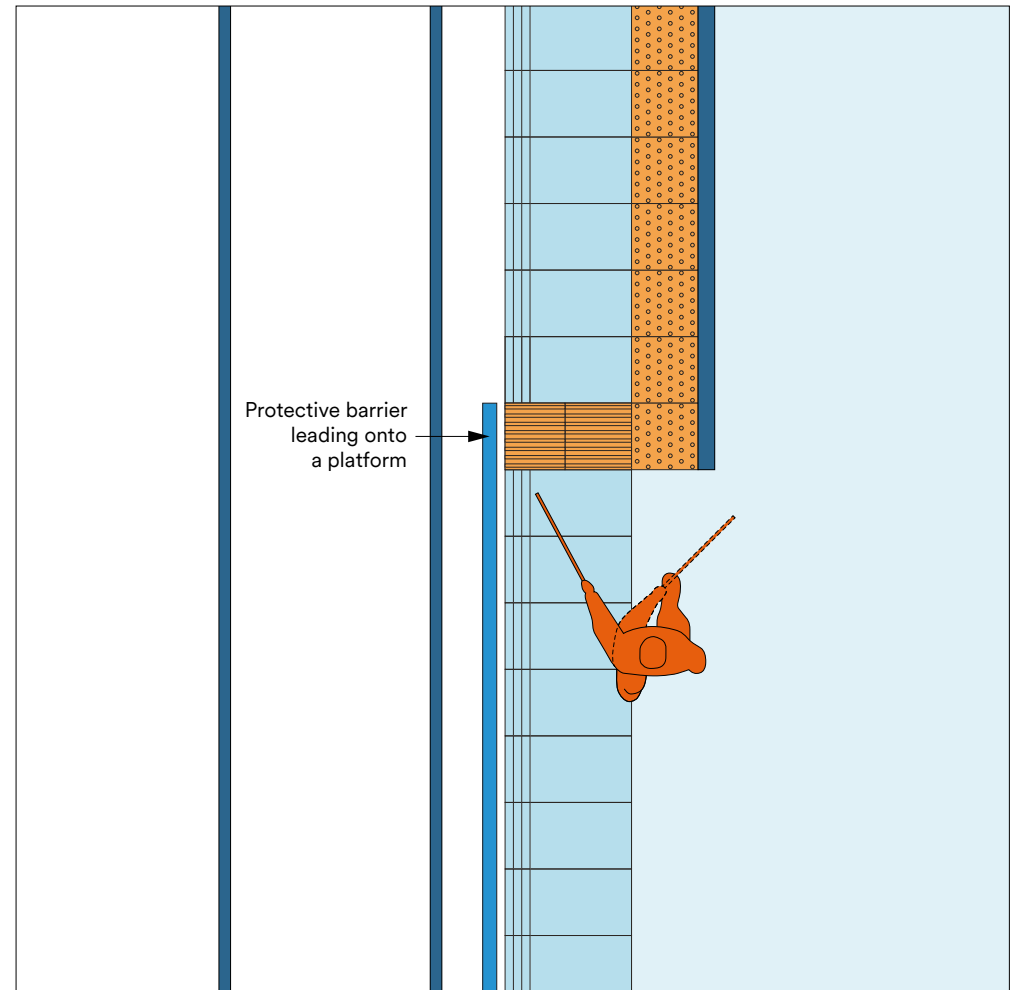


Image 3.1.4.2: Platform edge warning arrangement when a protective barrier leads onto a platform

3.1 Hazard Warning



3.1.5 Platforms Without Protection

In railway stations with unprotected pedestrian entrances, it may be possible for blind and partially sighted individuals to unknowingly walk onto a platform from the street, e.g. in a small station without a concourse and ticket gateline. In such circumstances, the following application guideline should be applied to warn blind and partially sighted users they are entering a platform:

- A corduroy hazard warning indicator should be laid to a depth of 800mm across the entire width of the unprotected pedestrian entrance.

3.1.6 Roads Without Protection

Shared pedestrian and vehicular areas with level access should be avoided where possible, and a kerb stone should always be used to define the edge of a road in new stations and station upgrade projects. Following the 2018 DfT pause on shared surfaces, the use of corduroy tactile warning paving to highlight the edge of a road has been withdrawn.

For existing stations with external areas where pedestrian walkways are not protected from a road with a standard kerb, it may be possible for blind and partially sighted individuals to walk into the road from the pavement unknowingly. In such circumstances, the following application guideline should be applied:

- A corduroy hazard warning indicator should be laid at a minimum of 600mm from the road edge at a depth of 400mm to warn of the road boundary.

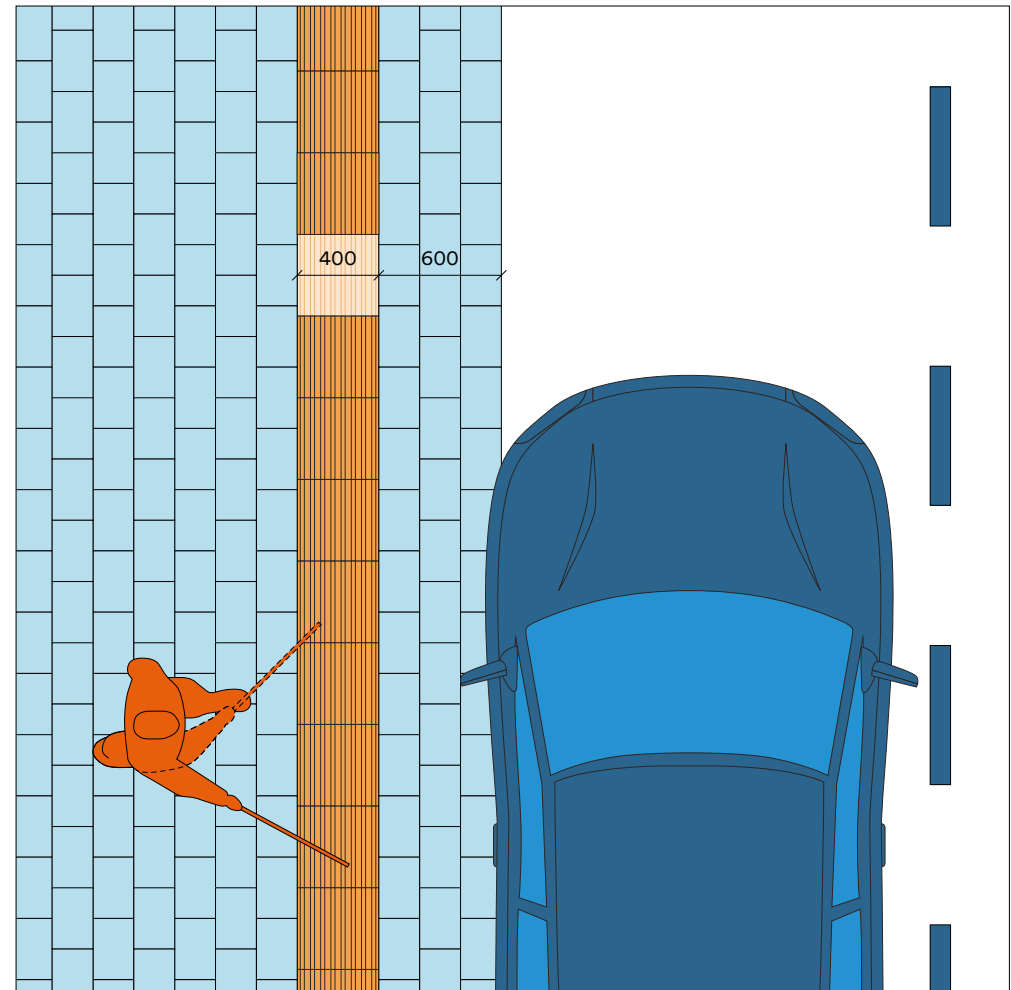


Image 3.1.5.1: Hazard warning on a pedestrian walkway without kerb protection



3.2.1 Platform Edge Warning

A tactile warning surface should be installed along the platform edge to indicate to blind and partially sighted individuals that they are in relative proximity to the platform edge, where more caution may be required.

The off-street platform edge warning surface (section 2.2.2) should be applied in a consistent arrangement at the platform edge. The tactile warning surface should be installed 760mm from the platform edge along the full usable length of the platform. The tactile warning surface should be 400mm wide. The tactile paving should visually contrast with the surrounding platform surfaces.

A 100mm wide high-contrast yellow line should be provided adjacent at the back edge of the tactile warning surface to provide a visible indication at the edge of the 'danger area'.

The application and arrangement of the tactile warning surface should align with the guidance provided in the RIS 7016 (please refer to section 2.2.3 for more information on platform edge arrangement).

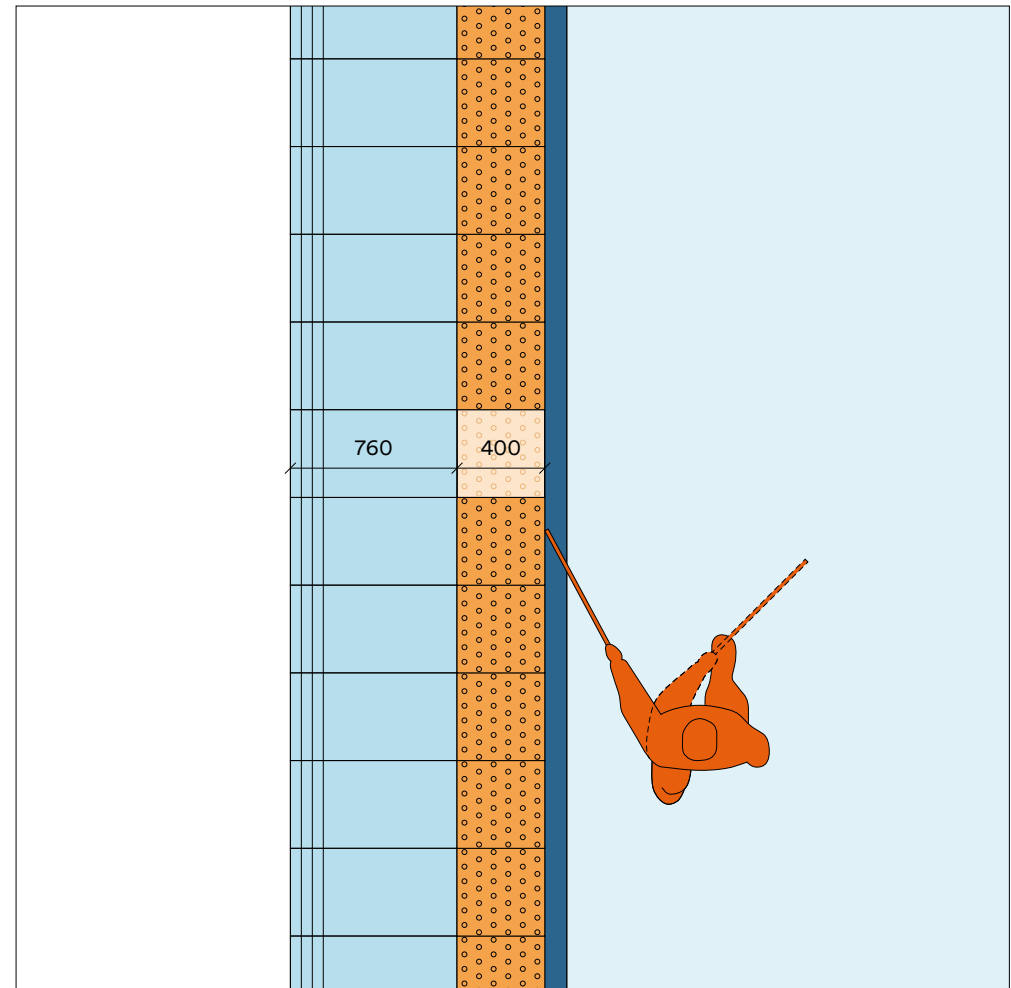


Image 3.2.1.1: Standard platform edge warning arrangement

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021

Department for Transport

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

Rail Industry Standard

Section 3: Application Guidance

3.2 Platform Edge Warning



3.2.2 Staggering Platform Edge Warnings

When applying a tactile platform edge warning surface to existing platforms during upgrade works, the arrangement of platform surface materials and platform width restrictions can lead to some non-standard configurations. Whilst these arrangements are undesirable and should be avoided, it is recognised that some situations might require a 'stagger' in the platform edge warning tactile and yellow line. In these instances, the following application guidelines should be applied:

- There should be at least one-half of a tile (200mm) overlap where the tactile platform edge warning surface joins (image 3.2.2.2 and image 3.2.2.3).
- If there is less than one-half of a tile overlap, another tile should be placed above the tactile hazard warning indicator that runs closest to the platform edge to avoid any changes in platform edge warnings being missed by blind and partially sighted users (image 3.2.2.4 and image 3.2.2.5).

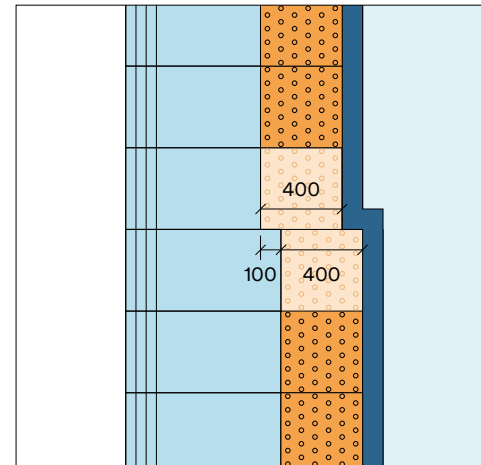


Image 3.2.2.2: Three-quarter tile overlap

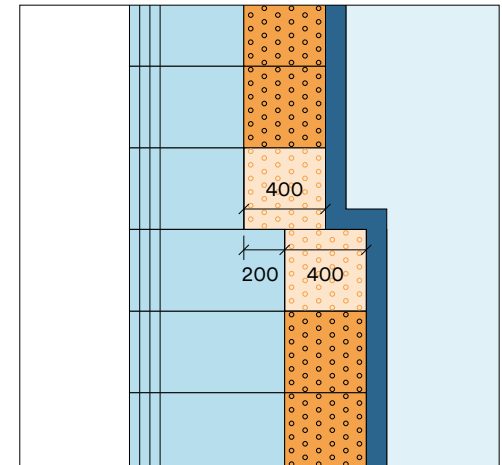


Image 3.2.2.3: One-half tile overlap

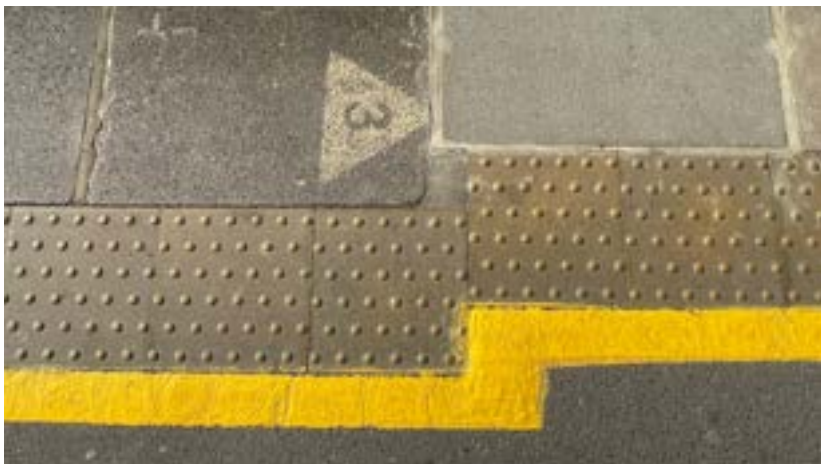


Image 3.2.2.1: Example of a staggered tactile platform edge warning applied to an existing platform

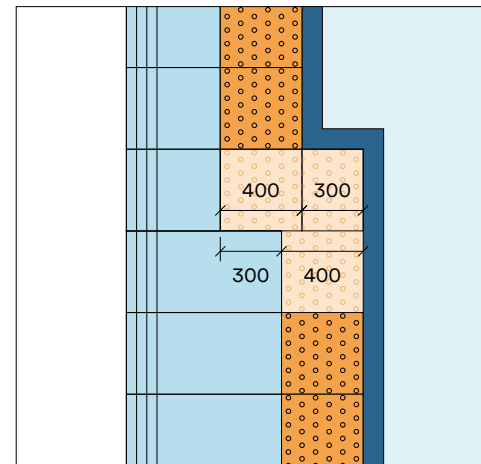


Image 3.2.2.4: One-quarter tile overlap

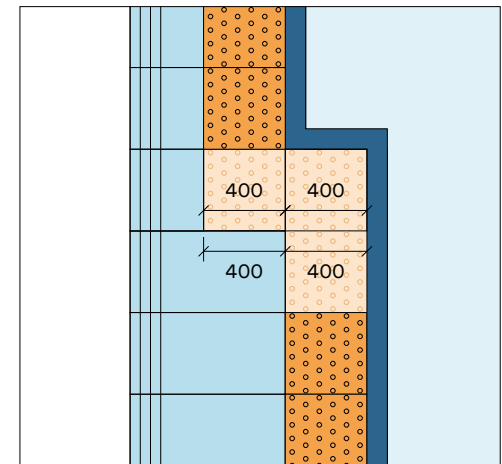


Image 3.2.2.5: No overlap



3.3.1 Controlled Crossings

At controlled crossings, a blister surface warning tile should be laid to a depth of 800mm from the edge of the dropped kerb. To enable blind and partially sighted individuals to detect the surface, the back edge of the tactile surface should extend across the width of the dropped kerb. This is because some blind and partially sighted passengers use the back edge of the tactile surface to align themselves correctly in the direction of crossing.

Where the back edge is not parallel to the kerb and, as a result, the depth of the tactile surface varies, it should be no less than 800mm at any point. Please refer to DfT Guidance on the Use of Tactile Paving Surfaces for more information.

At controlled crossings only, a spur from the surface 800mm wide should extend from the flush dropped kerb to the back of the path and preferably back to the building line or property boundary where possible to create an L shape. Some blind and partially sighted users might use the spur to detect the crossing and align themselves correctly before crossing the road.

The spur should be installed to align with the direction of travel across the road. It will be encountered by blind and partially sighted individuals walking along the path and guide them towards the push button box on a post adjacent to the crossing point.

At controlled crossings only, the tactile pedestrian crossing warning should be coloured red to indicate that the crossing is controlled.

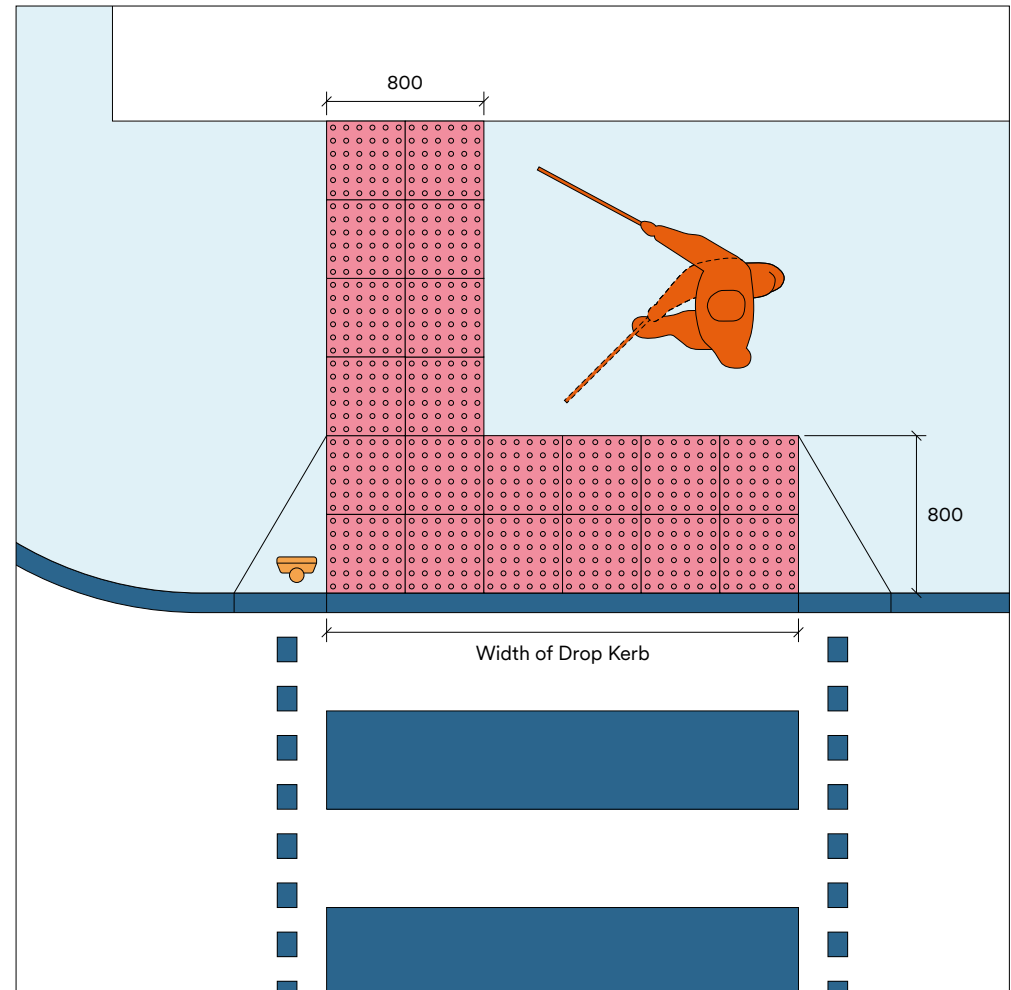


Image 3.3.1.1: Warning tactile paving installed at a controlled crossing

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021
Department for Transport



3.3.2 Uncontrolled Crossings

At uncontrolled crossings, a blister surface warning tile should be installed across the entire width of the dropped kerb. The warning surface should be laid to a minimum depth of 800mm from the edge of the dropped kerb where a crossing is inset into the footway and is not in the direct line of travel for people walking.

At uncontrolled crossings, the tactile pedestrian crossing warning is usually buff coloured, but it may be any colour (other than red) that provides a visual contrast with the surrounding footway surface.

There are several variations in the arrangement of a blister surface warning at uncontrolled crossings. Please refer to DfT Guidance on the Use of Tactile Paving Surfaces for more information.

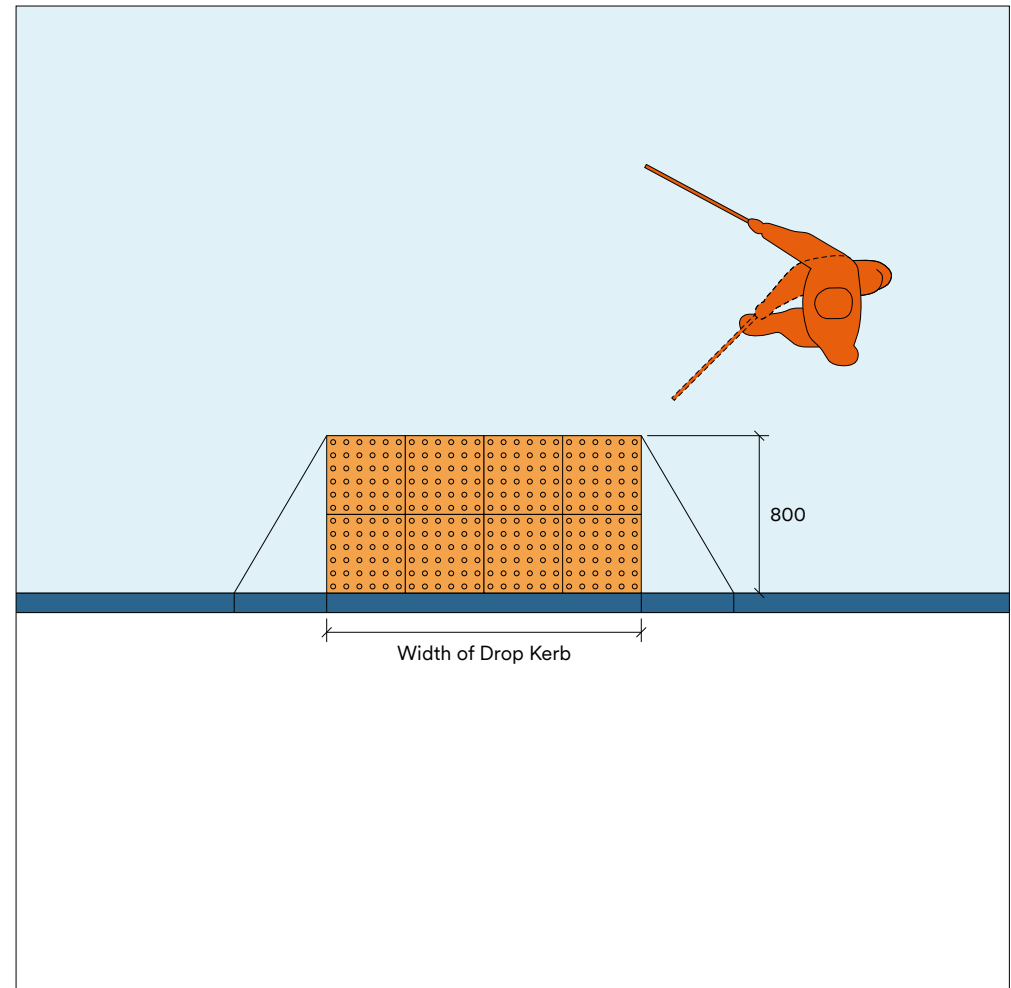


Image 3.3.2.1: Warning tactile paving installed at an uncontrolled crossing

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021
Department for Transport



3.4.1 Following a Building Line

When setting out tactile guidance paths, the aim is to provide safe and intuitive routing. Tactile guidance paths should follow the building line where possible to provide a natural flow through the space, and to avoid unnecessary crossing or conflicts with central areas of the station with a high pedestrian flow. Following the building line may provide additional cues, such as visual contrast between property walls and the station floor, which can act as a supporting navigational tool for partially sighted individuals.

When planning and setting out tactile guidance routes, the path should be offset from the building line at a minimum distance of 800mm. In locations with architectural features or columns that extend beyond the building line (image 3.4.1.1), the guidance path should be straight and offset from the furthest protruding feature.

Tactile guidance paths should not cross primary pedestrian flow routes to avoid hazardous situations, particularly at:

- Entrances and exits
- Run-off zones at the top or bottom of stairs and escalators
- Gatelines

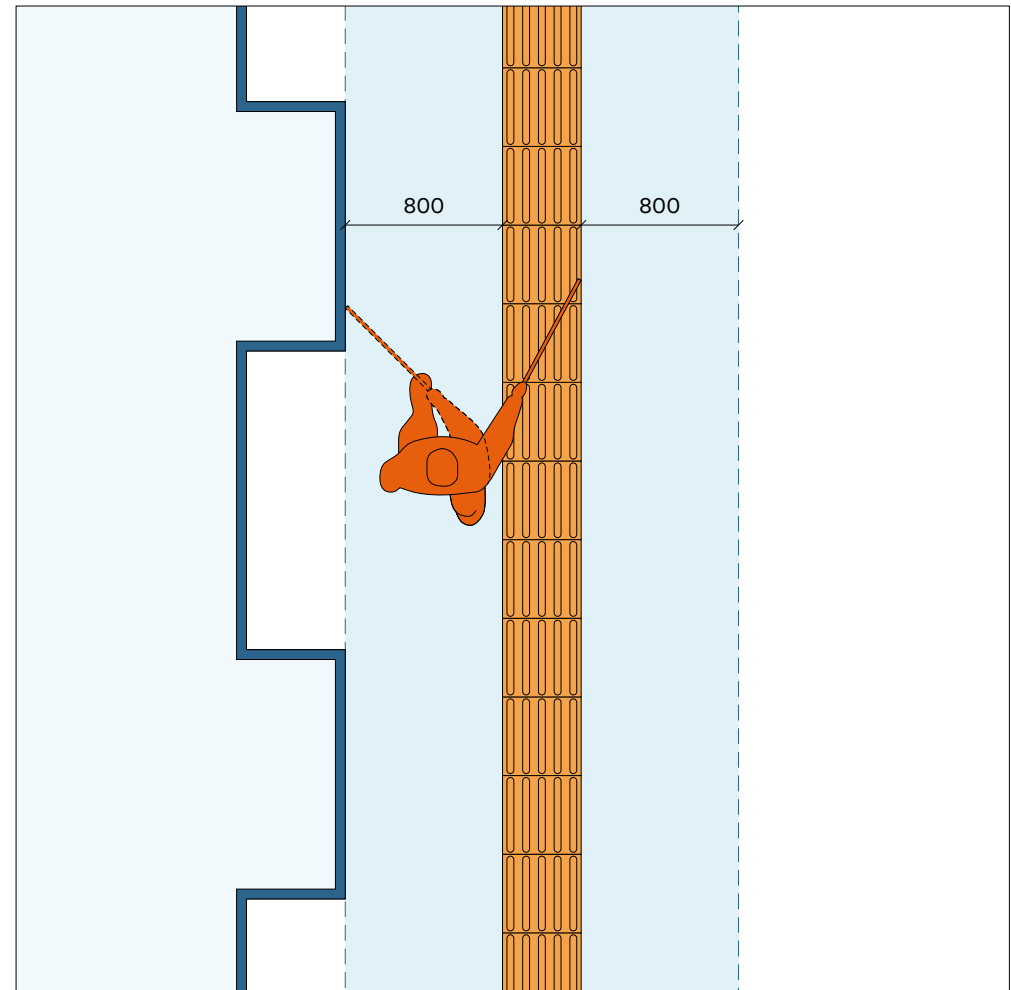


Image 3.4.1.1: Tactile guidance path following a building line with protruding architectural features

Standards Reference

Guidance on the Use of Tactile Paving Surfaces, 2021
Department for Transport

3.4 Guidance Paths



3.4.1 Following a Building Line

When a tactile guidance route runs parallel to a wall that has a door or any other obstruction that opens outwards, the tactile guidance path should be offset from the wall to provide an additional 400mm clearance. This clearance should extend from the leading edge of any opening obstruction to the edge of the guidance path 800mm clearance zone (image 3.4.1.2). This guidance intends to safeguard against any opening elements presenting a hazard to blind and partially sighted individuals walking along the guidance path.

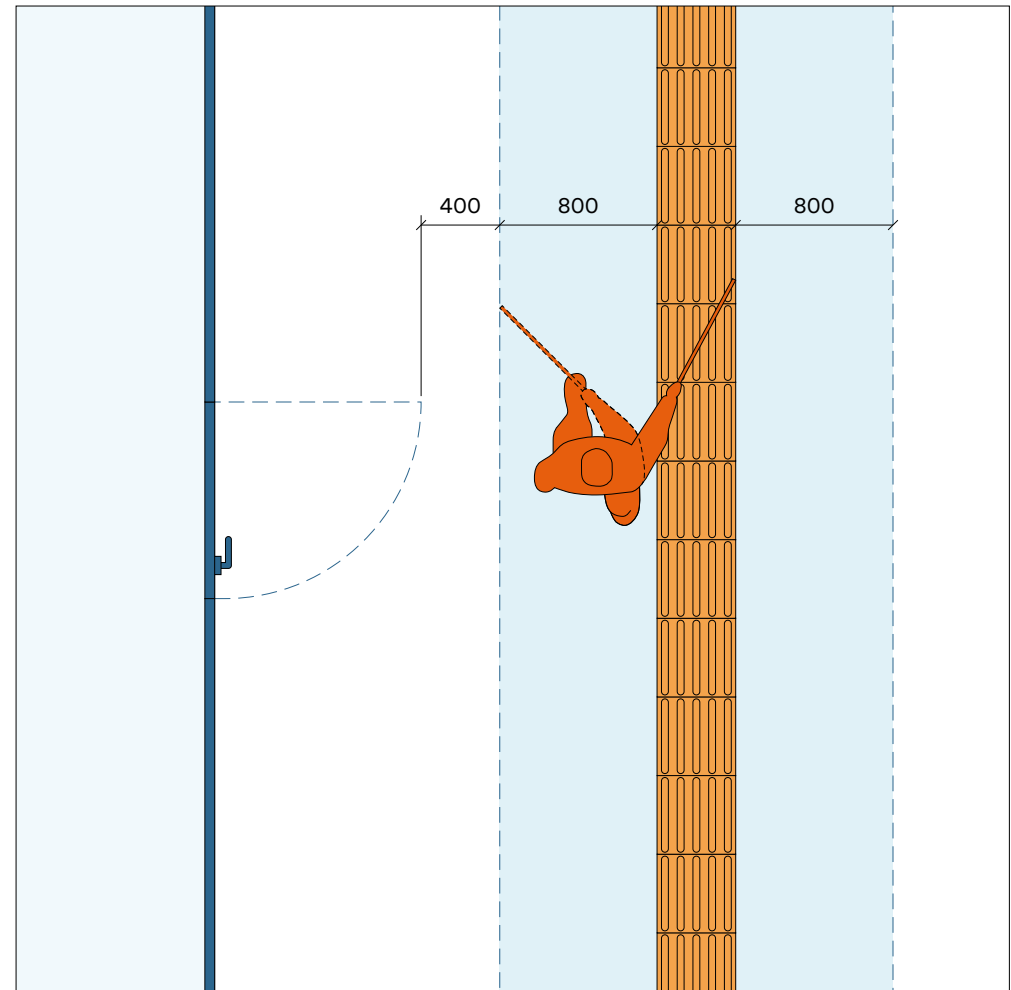


Image 3.4.1.2: Additional clearance for obstructions opening into a walkway



3.4.2 Exclusion Safety Zones on a Platform

Whilst it is not recommended to route a tactile guidance path along a platform, sections 2.5.2 and 2.5.3 describe instances in which running a tactile guidance path for a short distance along a wider section of the platform may be suitable. In these instances, an exclusion safety zone of 1200mm from the edge of the platform edge warning tactile should be applied as a minimum. A wider exclusion safety zone should be provided if the platform width can accommodate a more significant gap between the edge of the tactile platform edge warning and tactile guidance path.

If a minimum exclusion safety zone of 1200mm can not be achieved, then a tactile guidance path should not be applied to a platform.

Where the platform width does not permit the provision of a tactile guidance path to be applied on the platform, additional building cues and tactile/braille signs should be provided to support navigation (please refer to section 2.5.5 for more information on additional building cues and tactile/braille signs).

The exclusion safety zone is necessary to avoid situations where a tactile guidance path and platform edge warning surface are too close together. This can lead to confusion or disorientation for blind and partially sighted users. A tactile guidance path located too close to the platform edge may also lead to issues when deploying and using mobile boarding ramps for mobility assistance.

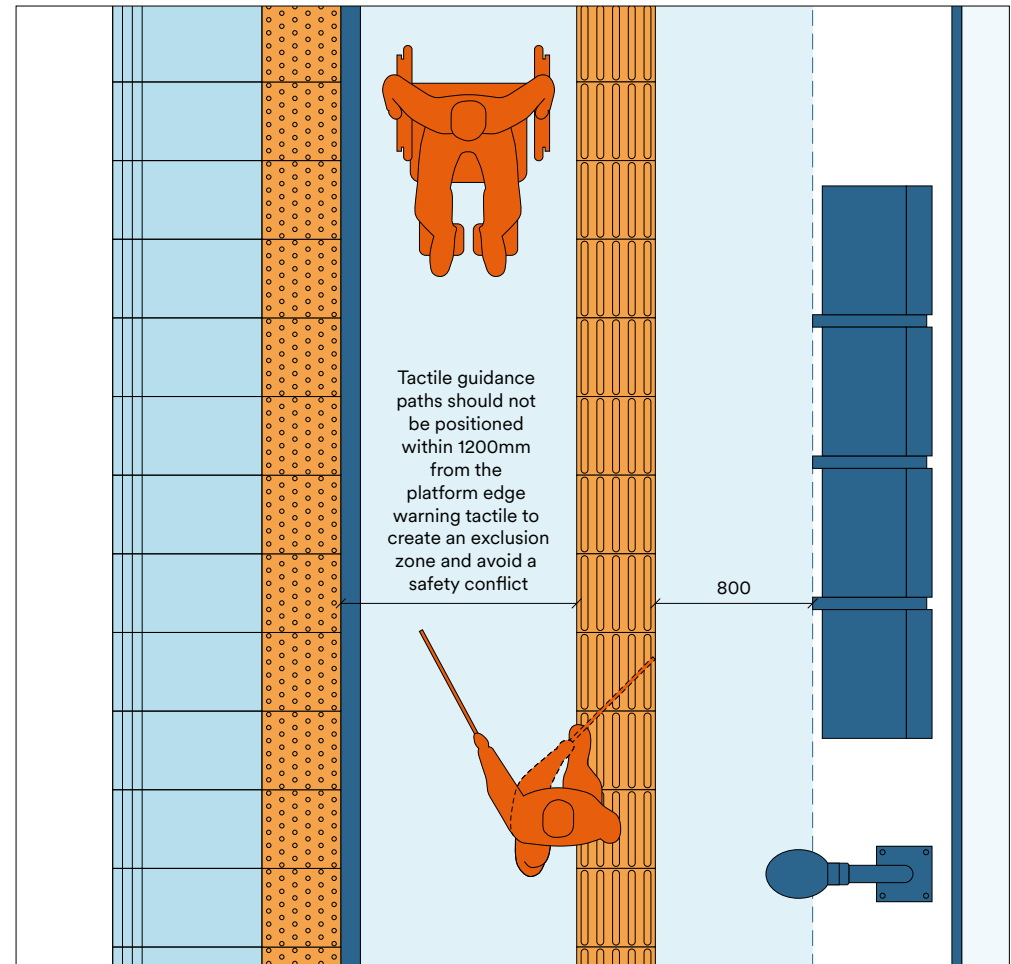


Image 3.4.2.1: Exclusion safety zone only for situations where primary/secondary destinations have to be accessed along a platform

3.4 Guidance Paths



3.4.3 Stairs

When leading a tactile guidance route to stairs, the path should run up to the corduroy hazard warning tactile and align with handrails that are equipped with braille or prismatic signage. Once the end of the flight of stairs is reached and the corduroy hazard warning tactile is navigated, the tactile guidance path should continue from the same side to enable ease of identification and use.

On approach, the tactile guidance path should be coordinated so that it does not cross the run-off zone immediately at the top or bottom of a flight of stairs. Run-off zones are likely to be subject to higher pedestrian flows, and therefore a guidance path that crosses may cause a hazardous situation.

Decision points in the run-off zones at the top or bottom of stairs should be avoided so that blind and partially sighted individuals are not encouraged to pause in high pedestrian flow areas to make a navigational choice.

At the end of a flight of stairs leading onto a footbridge or underpass, there will be less clear space to offset a turn or a decision point. In this scenario, the tactile path should continue straight for a distance at the top of the stairs before turning. The optimum layout will depend on the dimensions of the footbridge or underpass, whether there are lifts and how many platforms the bridge or underpass connects. It is therefore advised to review the arrangement of tactile guidance paths on a footbridge or underpass with a steering group before installation.

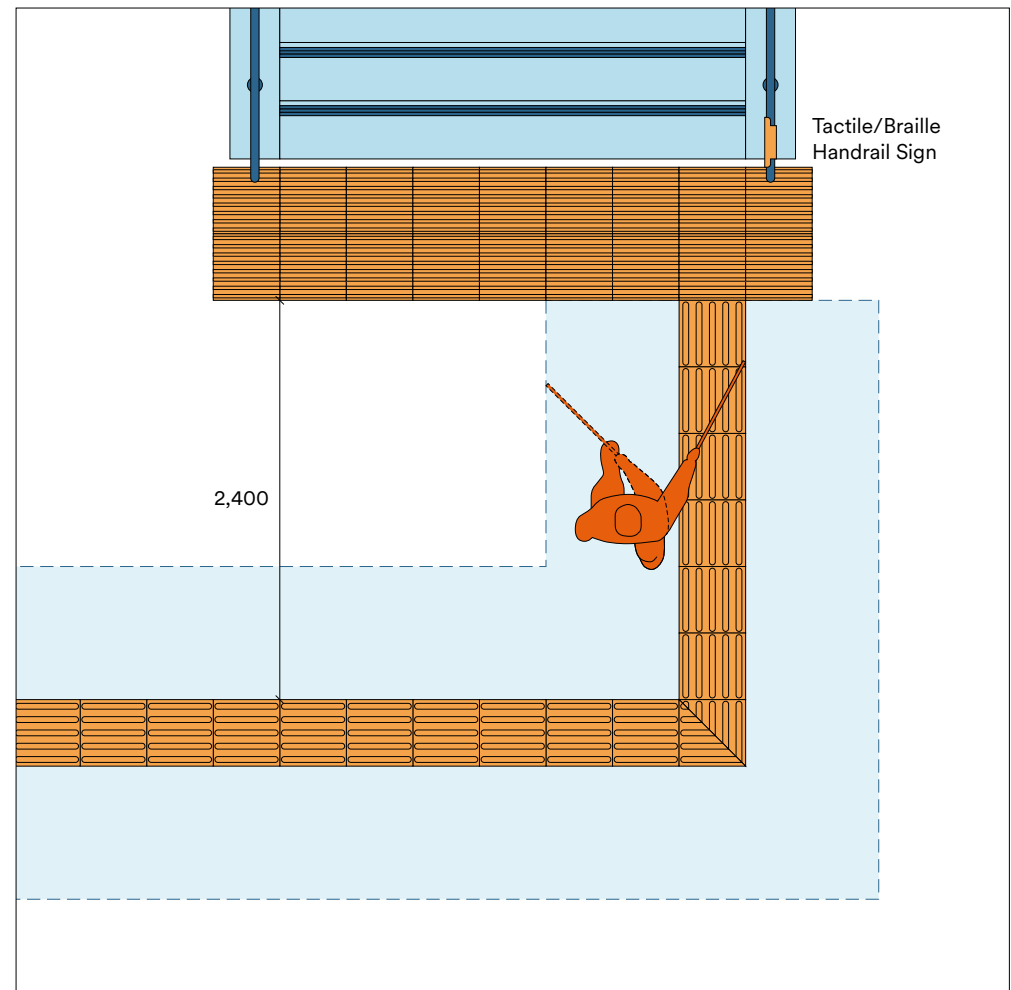


Image 3.4.3.1: Tactile guidance path leading to stairs

Standards Reference

Station Capacity Planning, NR/GN/CIV/100/03
Network Rail



3.4.4 Lifts

Tactile guidance paths should lead to the lift call button and the accompanying directory sign, which lists the levels and destinations served by the lift. The tactile guidance path should stop 400mm before the lift call button, and the last tile should be an attention tile to notify blind and partially sighted users that they have reached the lift entrance.

The tactile guidance path should avoid crossing the space immediately before the lift door, which is used for entering, exiting and manoeuvring by wheelchair and mobility aid users. An exclusion zone of 2000mm that is free from tactile paving should be maintained.

On a footbridge or underpass, there will be less clear space to offset a turn or a decision point in front of a lift entrance. The optimum layout will depend on the dimensions of the footbridge or underpass, so it is advised to review the arrangement of tactile guidance paths on a footbridge or underpass with a steering group before installation.

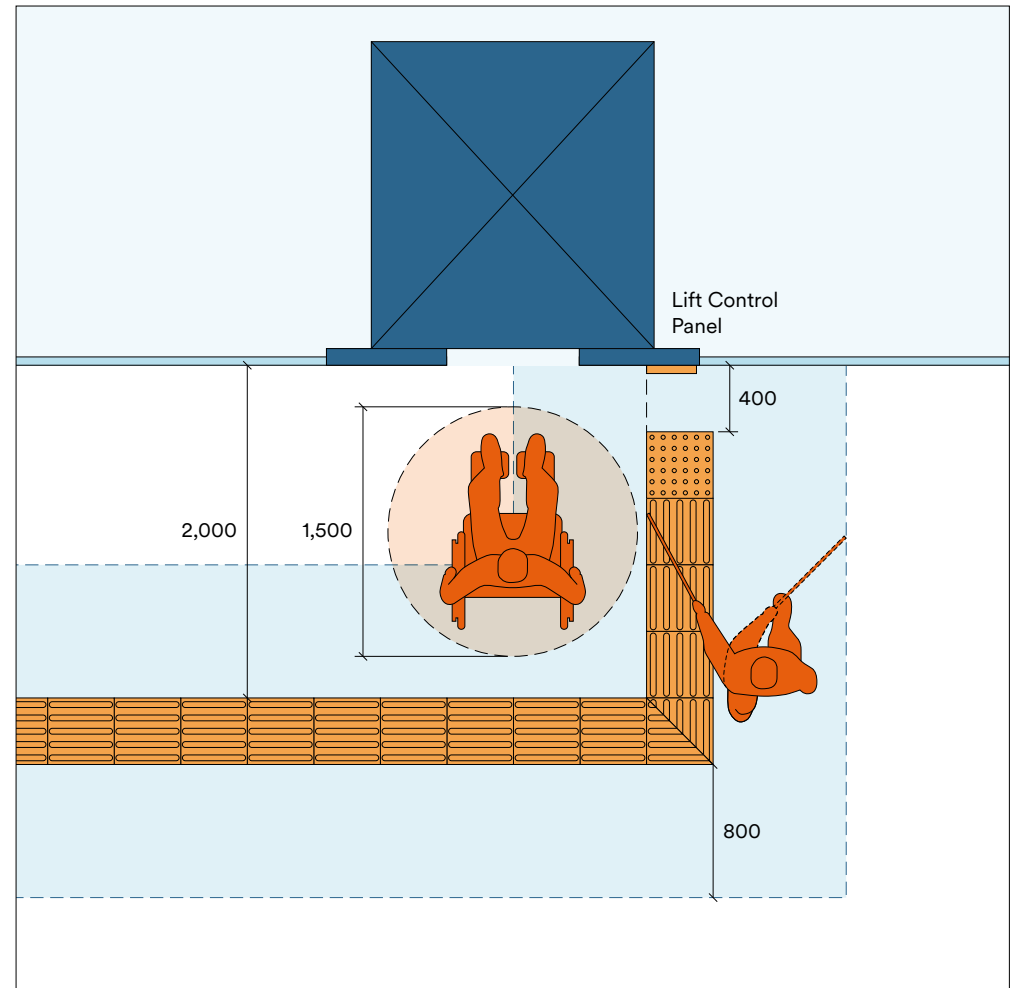


Image 3.4.4.1: Tactile guidance path leading to a lift control panel



3.4.5 Escalator Exclusion Zone

Tactile guidance paths should not lead to escalators.

Tactile guidance paths should not cross the primary pedestrian flow at the top or bottom of escalators. The run-on and run-off zones for escalators should be clear of any tactile paving to avoid a safety conflict. Escalator run-on and run-off zones are defined in Network Rail Station Capacity Planning, NR/GN/CIV/100/03 as a 6 metre minimum.

A tactile guidance path should avoid busy pedestrian flow areas at the exit or the entry point to an escalator where passengers may queue, or need space to disperse, both could lead to a hazardous situation.

In many cases where tactile paving installations are proposed in existing premises, minimum run-on and run-off lengths may be challenging to achieve, in which case a risk assessment should be undertaken so that the risks introduced are as low as reasonably practicable.

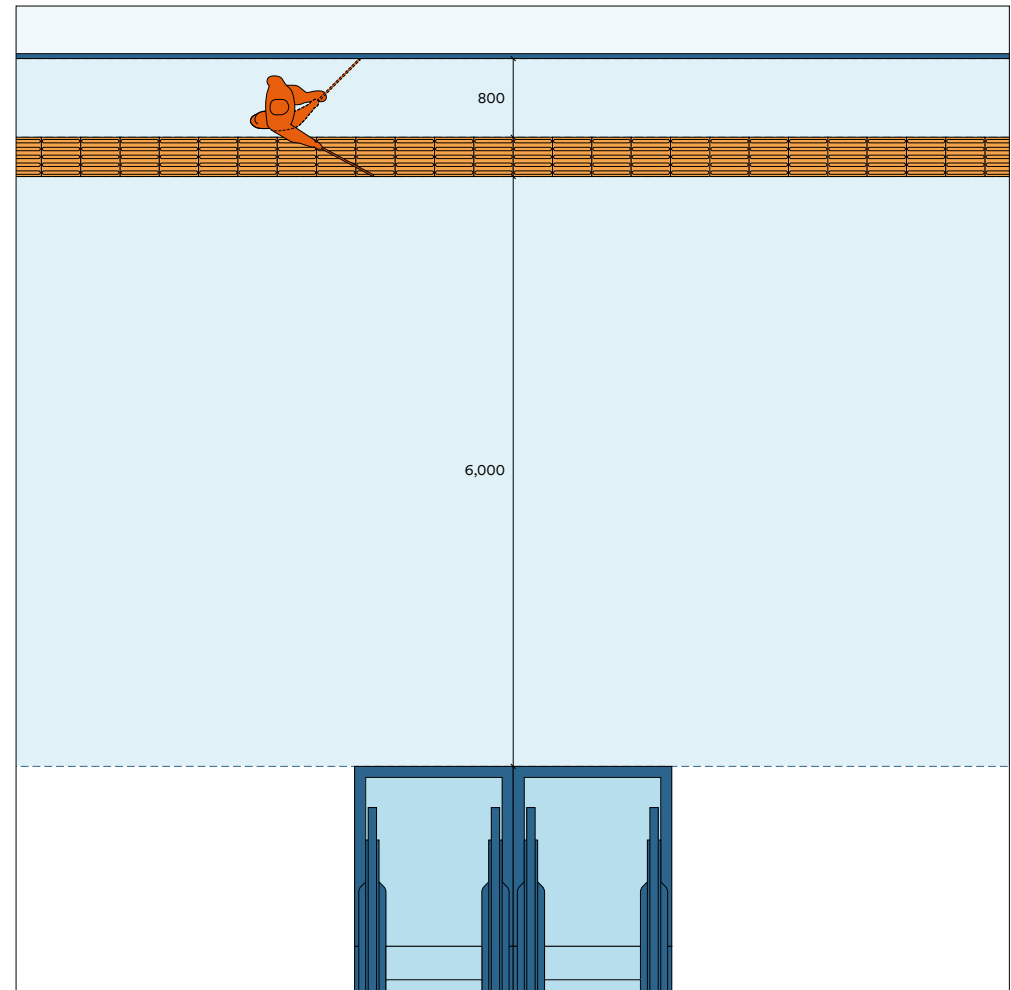


Image 3.4.5.1: Exclusion zones at the run-on and run-off to escalators

Standards Reference

Station Capacity Planning, NR/GN/CIV/100/03
Network Rail

3.4 Guidance Paths



3.4.6 Accessible Toilet Doors

The tactile guidance path leading to an accessible toilet should arrive at the opening side of the door, where the door handle is located. The arrival point should be adjacent to the wall-mounted tactile and braille toilet name sign. The tactile guidance path should stop 400mm before the toilet name sign, and the last tile should be an attention tile to notify blind and partially sighted users that they have reached the accessible toilet entrance.

The tactile guidance path should avoid crossing the space immediately before the accessible toilet door, which is used for entering, exiting and manoeuvring by wheelchair and mobility aid users. This exclusion zone should remain free of tactile paving.

If there is more than one accessible toilet, the tactile guidance path should only lead blind and partially sighted users to one toilet. This is to avoid navigational confusion that might be caused by many secondary guidance routes, and to enable wheelchair users and those with mobility impairments to comfortably access other facilities.

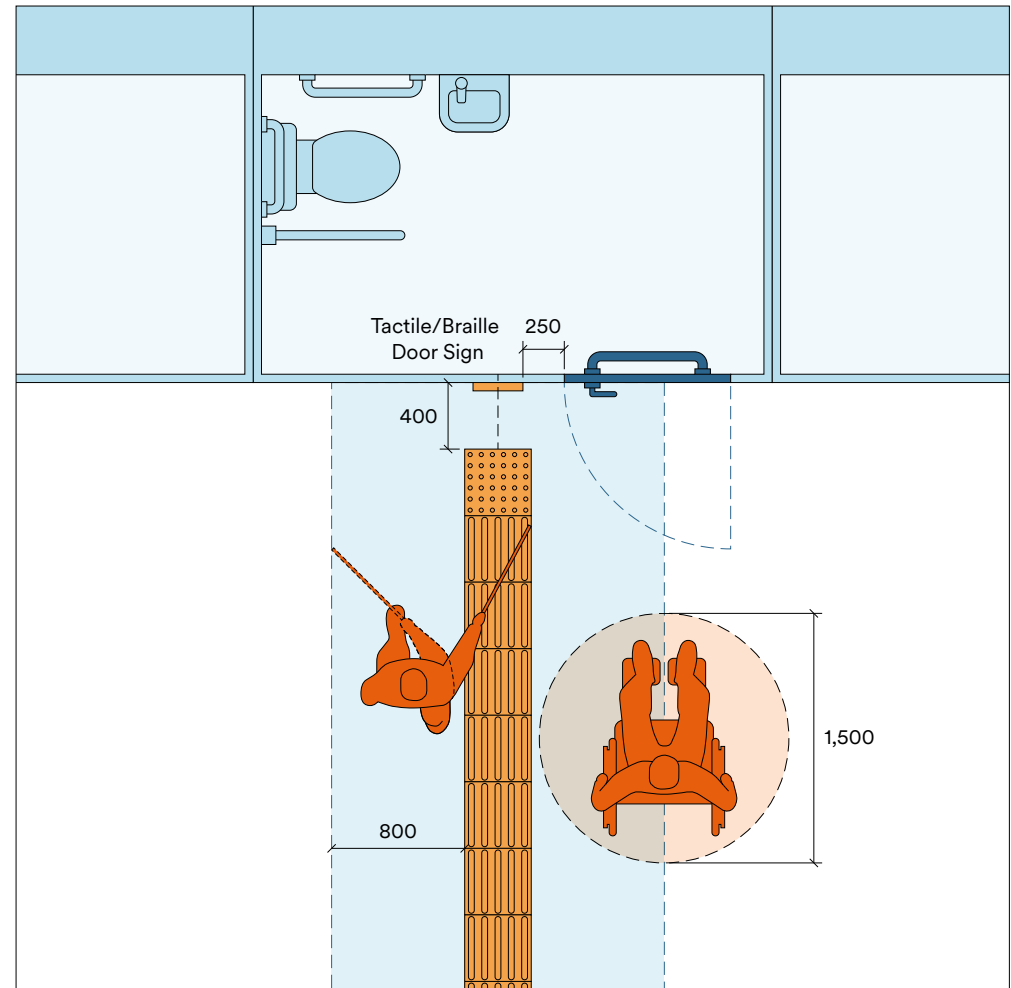


Image 3.4.6.1: Tactile guidance path leading to an accessible toilet door



3.4.7 Doors Name Sign Reach Range

Wall-mounted tactile and/or braille facility name signs should be located adjacent to the door, on the opening side where the door handle is located. The centre of the sign should be mounted at a height of 1450mm to allow blind and partially sighted users to reach and read the tactile and/or braille content comfortably.

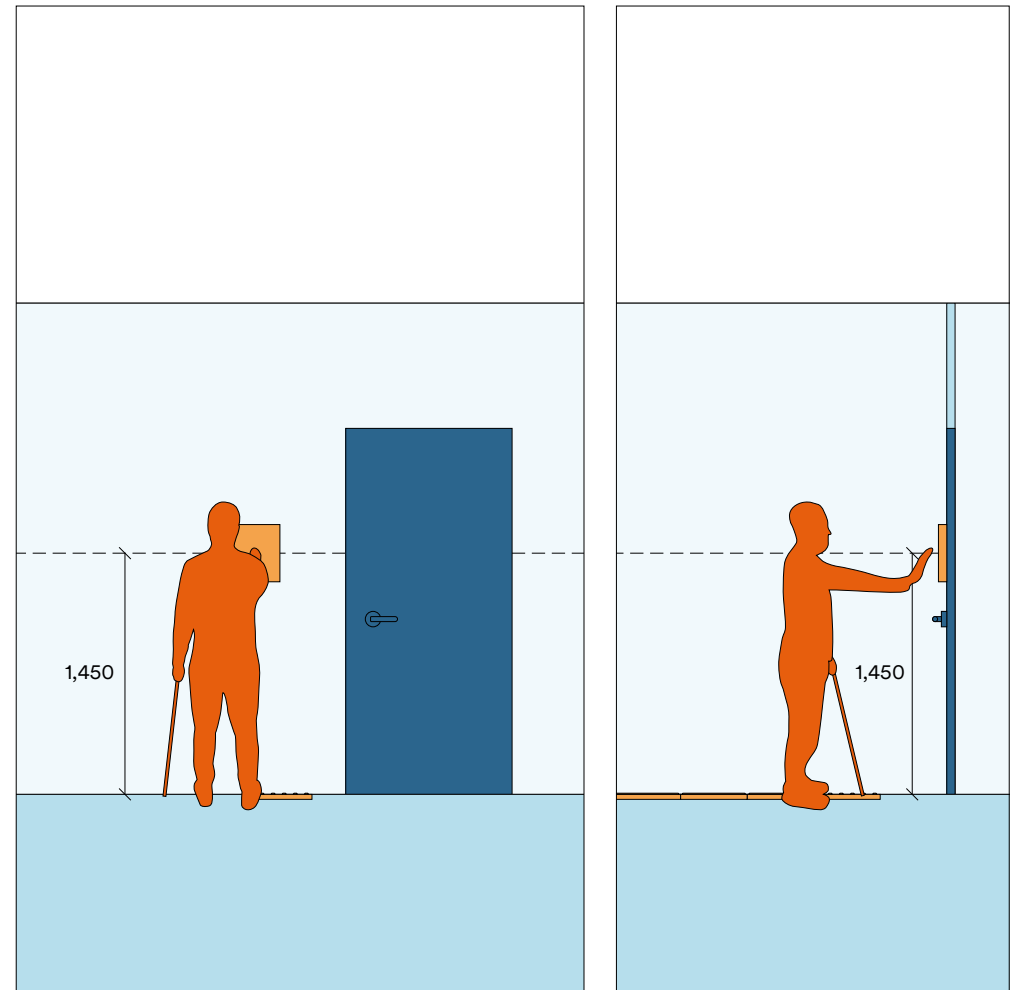


Image 3.4.7.1: Doors name sign reach range

Standards Reference

Persons with Reduced Mobility (PRM), 2021
National Technical Specification Notice



3.4.8 Automatic Doors

Tactile guidance paths should lead to the station entrance and exit. When a sensed automatic door is present, the tactile guidance path should stop 400mm before the door, and the last tile should be an attention tile to notify blind and partially sighted users that they have reached the station entrance or exit.

If the tactile guidance path continues outside of the station and leads to a taxi rank, bus stop or another external facility, the first tile should be an attention tile followed by an external guidance path.

If the station entrance or exit door is hinged, the tactile guidance path should stop clear of the door's swing when open.

If the station design includes a matwell, the tactile path should stop at the edge of the matwell with an attention tile at the beginning or end of the guidance path.

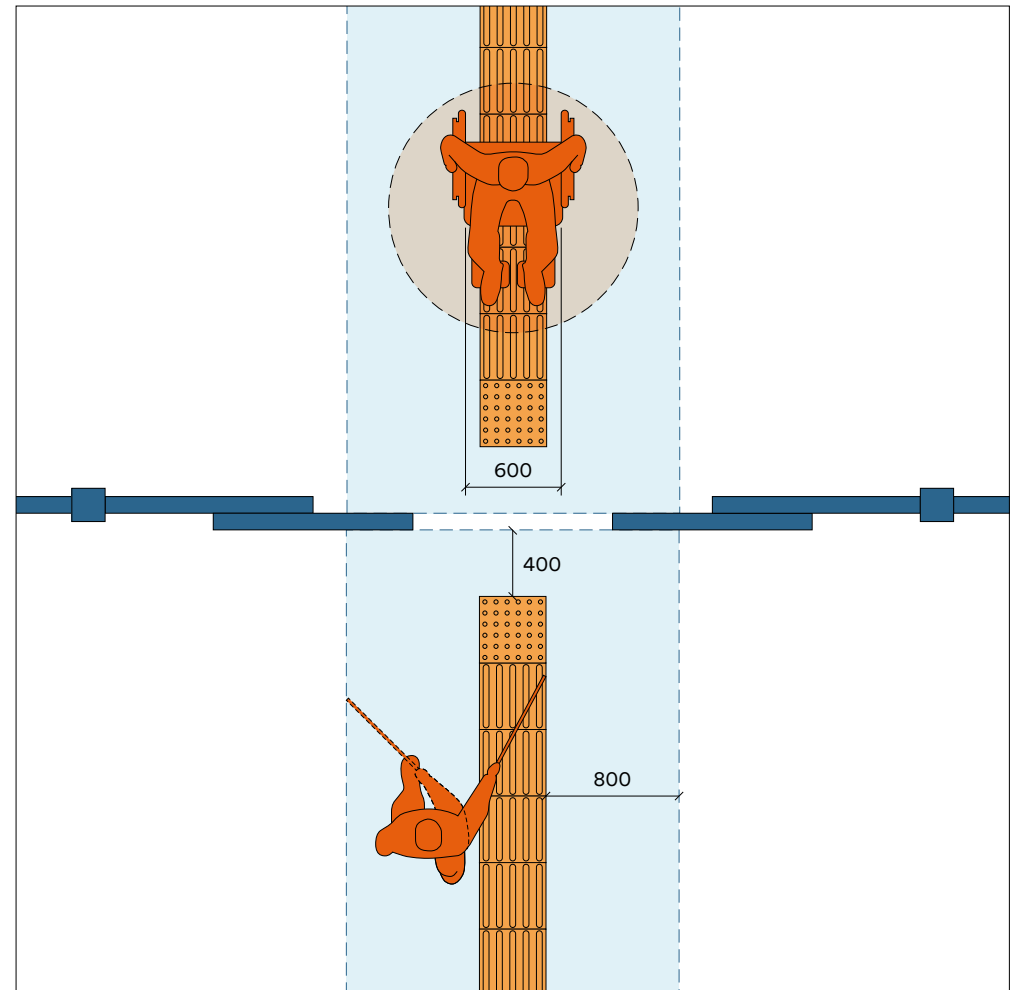


Image 3.4.8.1: Tactile guidance path leading to automatic sliding doors

3.4 Guidance Paths



3.4.9 Ticket Gateline

Tactile guidance paths should lead to a wide aisle gate, preferably the outermost gate in the ticket gateline positioned next to the gateline control unit, so staff are close to assist as required.

The tactile guidance path should stop 400mm before the ticket gateline, and the last tile should be an attention tile to notify blind and partially sighted users that they have reached the wide aisle gate. The tactile guidance path should continue on the opposite side of the wide aisle gate, with the first tile being an attention tile at the beginning of the guidance path.

If there is more than one wide aisle gate in a ticket gateline, the second gate should be free of tactile paving to make it more comfortable for wheelchair users and individuals with mobility impairments to approach and pass through.

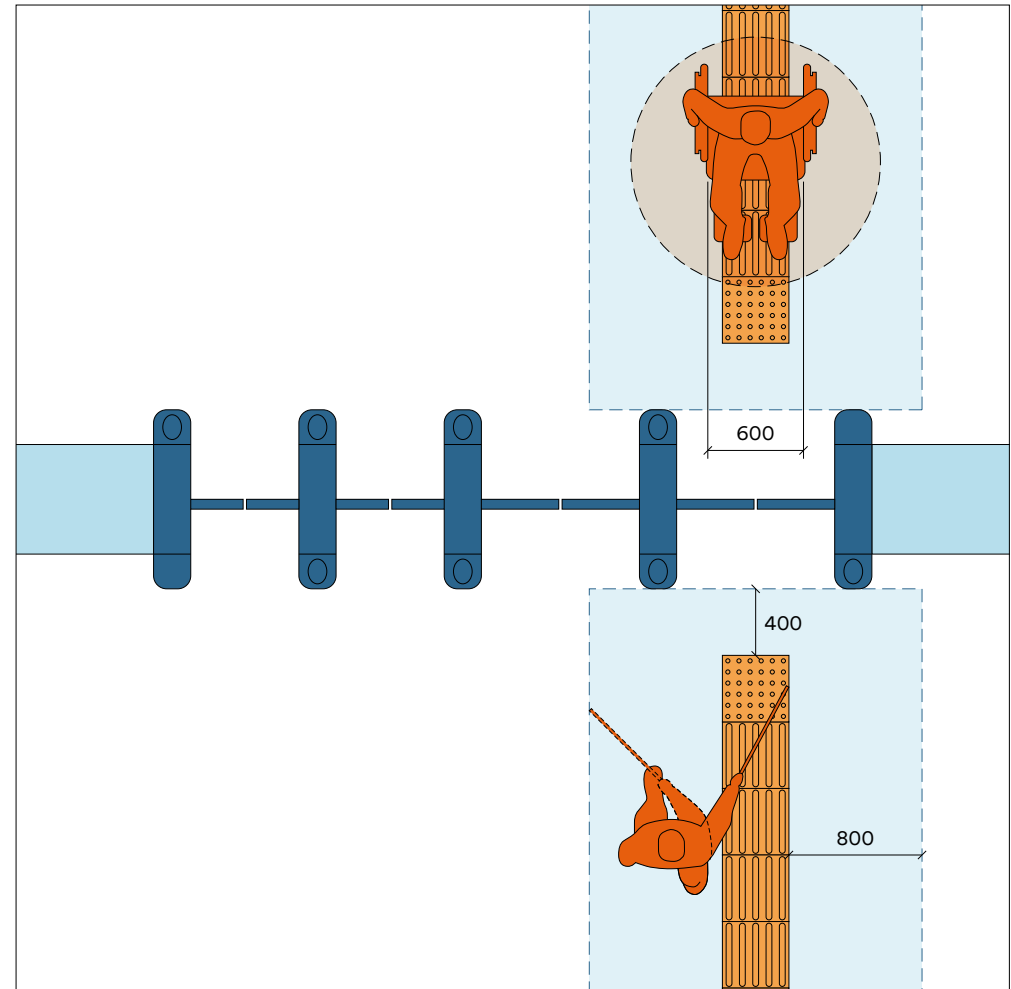


Image 3.4.9.1: Tactile guidance path leading to a wide aisle gate



3.4.9 Ticket Gateline

When a tactile guidance path passes through a ticket gateline, the routing should be planned to continue in a straight line and/or maintain alignment with the primary pedestrian flow. The guidance path should not turn or have a decision point inside the defined run-off zone of a ticket gateline.

In locations where a turn or a decision point is required shortly before or after the ticket gateline because of the building layout, the tactile guidance paving route should continue straight after the gateline for as far as possible within the spatial constraints of the building to provide sufficient clearance before changing direction or making a navigational choice. This is to avoid safety conflicts in busy pedestrian flow areas and provide adequate space for other station users, including wheelchair users and those with mobility impairments to access and manoeuvre near the ticket gateline.

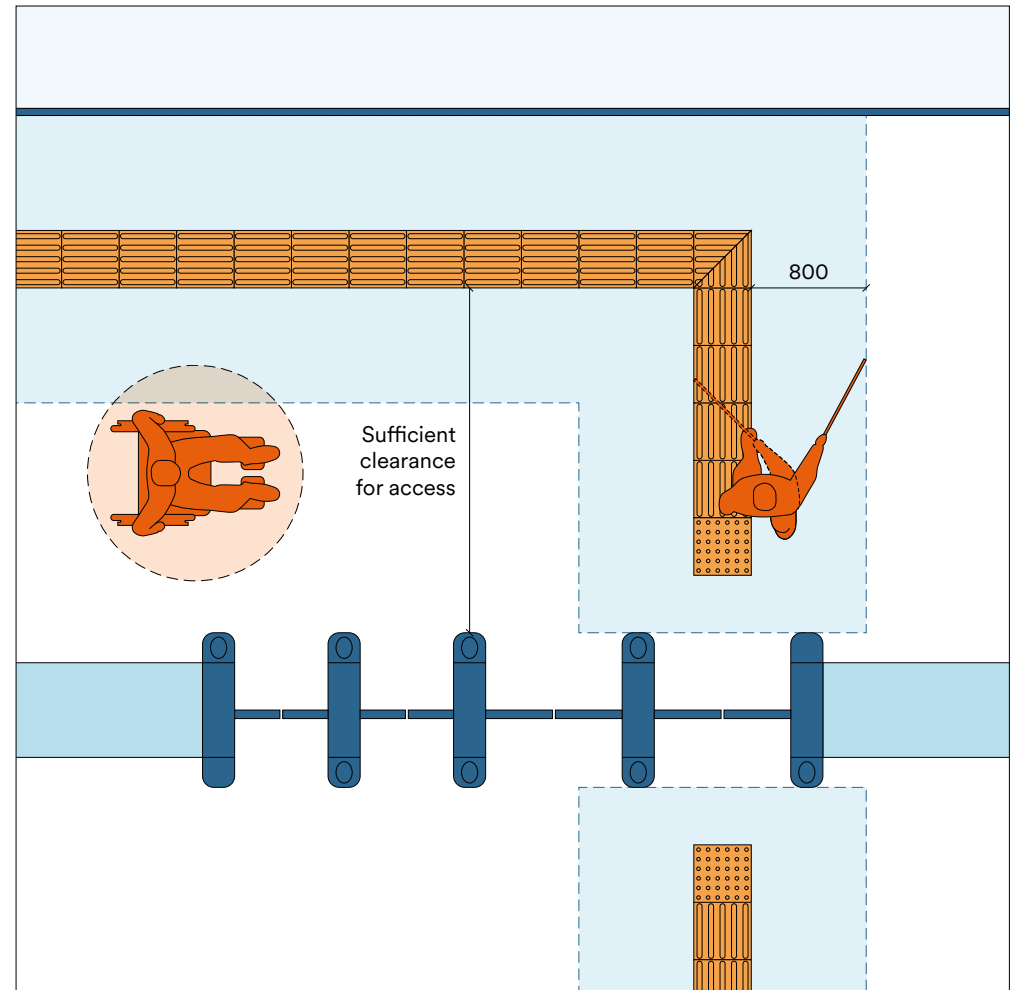


Image 3.4.9.2: Turns and decision points before or after the ticket gateline



3.4.10 Staffed Counters (Tickets, Information and Assistance)

When a staffed ticket office, information or assistance counter is located within a station, the tactile guidance path should lead to an accessible service counter, and be aligned to arrive at one side of the counter, leaving an exclusion zone free from tactile paving for wheelchair users and those with mobility impairments to utilise. The tactile guidance path should stop 400mm before the service counter, and the last tile should be an attention tile to notify blind and partially sighted users that they have reached the counter.

Where the ticket office has a queuing system, the tactile guidance path should lead to the entry point of the queuing system.

The ticket office arrangement and operation of a queuing system for accessible counters is a station-specific item. A tactile wayfinding steering group should review each ticket office to determine the most appropriate application of these guidelines and how best to arrange and route the tactile guidance paths inside a ticket office (please refer to section 2.1.3 for planning tactile paving).

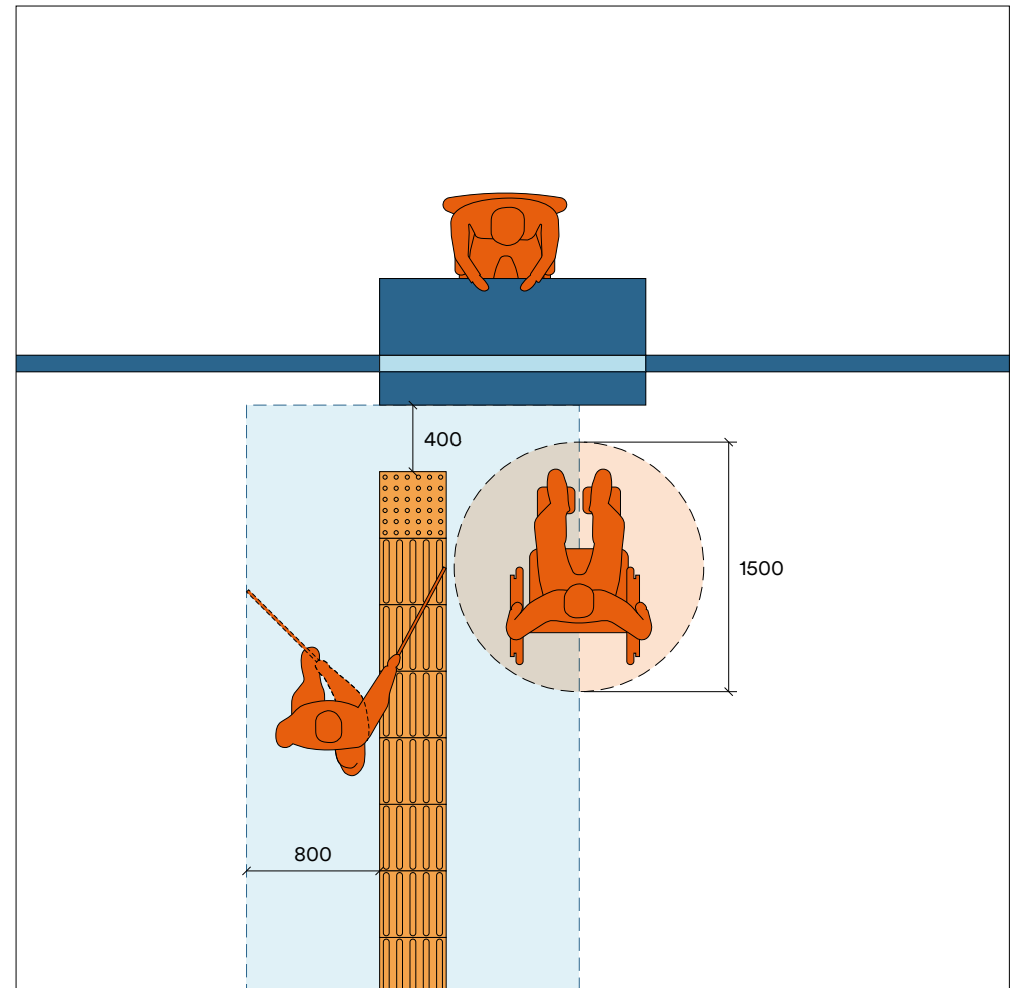


Image 3.4.10.1: Tactile guidance path leading to a staffed service counter



3.4.11 Information Help Point

At unstaffed stations or stations which may be unstaffed some of the time, e.g. early or late services, the tactile guidance path routing should be arranged to provide a secondary route towards an information help point (also referred to as a passenger help point). This should be located inside the station building and/or in a location that is safe to access.

The intent is to direct blind and partially sighted users to a point in the station where they can contact staff for information or announce their arrival to seek assistance to board a train. In larger, staffed stations, the preference is to guide passengers to a staffed assistance desk or staffed information point.

The tactile guidance path should lead to the information help point and stop 400mm before the control panel. The last tile should be an attention tile to notify blind and partially sighted users that they have reached the information help point.

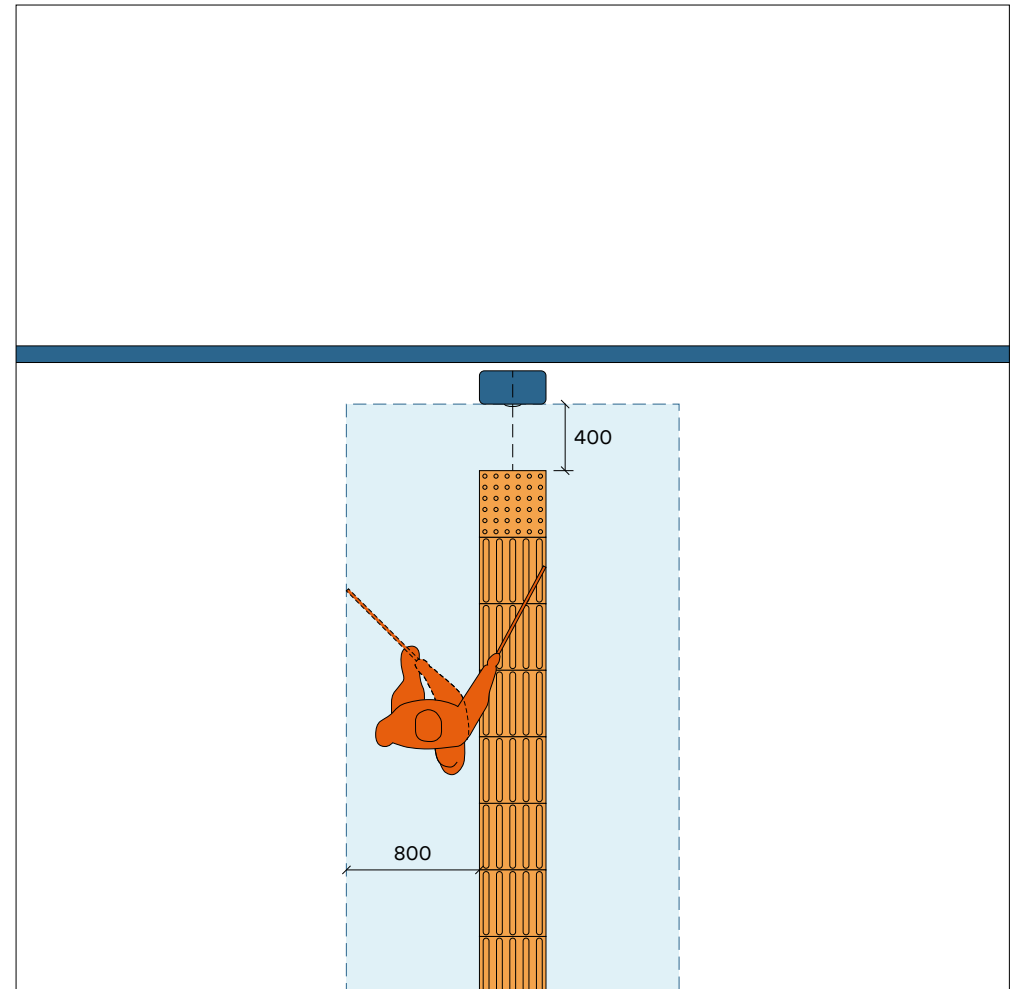


Image 3.4.11.1: Tactile guidance path leading to an information help point

Standards Reference

Inclusive Design Manual, NR/GN/CIV/300/04
Network Rail



3.4.12 Tactile Station Map

If a tactile station map is located at the station entrance or inside the station, a tactile guidance path should be provided that leads to the map. The tactile guidance path should stop 400mm before the tactile station map, and the last tile should be an attention tile to notify blind and partially sighted users that they have reached the map. An exclusion zone should be maintained free of tactile paving to allow wheelchair users and those with mobility impairments to utilise the map.

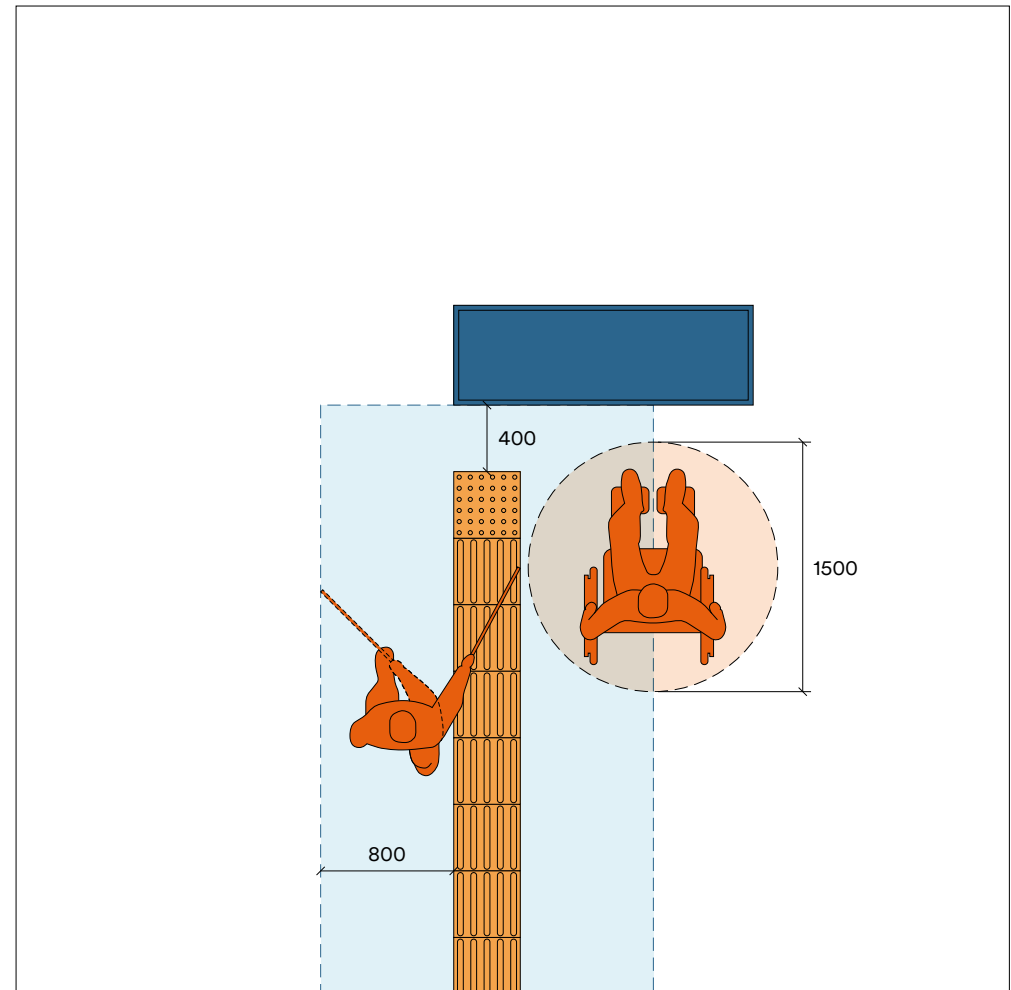


Image 3.4.12.1: Tactile guidance path leading to a tactile station map



3.4.13 Accessible Pick-up Point

When an accessible pick-up point is located within the station boundary, a tactile guidance path should be provided to lead blind and partially sighted users to this destination. The tactile guidance path should stop 400mm before the pick-up point, and the last tile should be an attention tile to notify blind and partially sighted users that they have reached the destination.

3.4.14 Bus Stops

When bus stops are located within the station boundary, a tactile guidance path should be provided to lead blind and partially sighted users to this destination. The tactile guidance path should stop 400mm before a bus stop sign, and the last tile should be an attention tile to notify blind and partially sighted users that they have reached the destination.

Please refer to sections 3.1 and 3.3 for more information about hazard warnings in the external area of a station. The guideline should be applied so that tactile guidance paths to accessible pick-up points or bus stops are safe to follow for blind and partially sighted users.

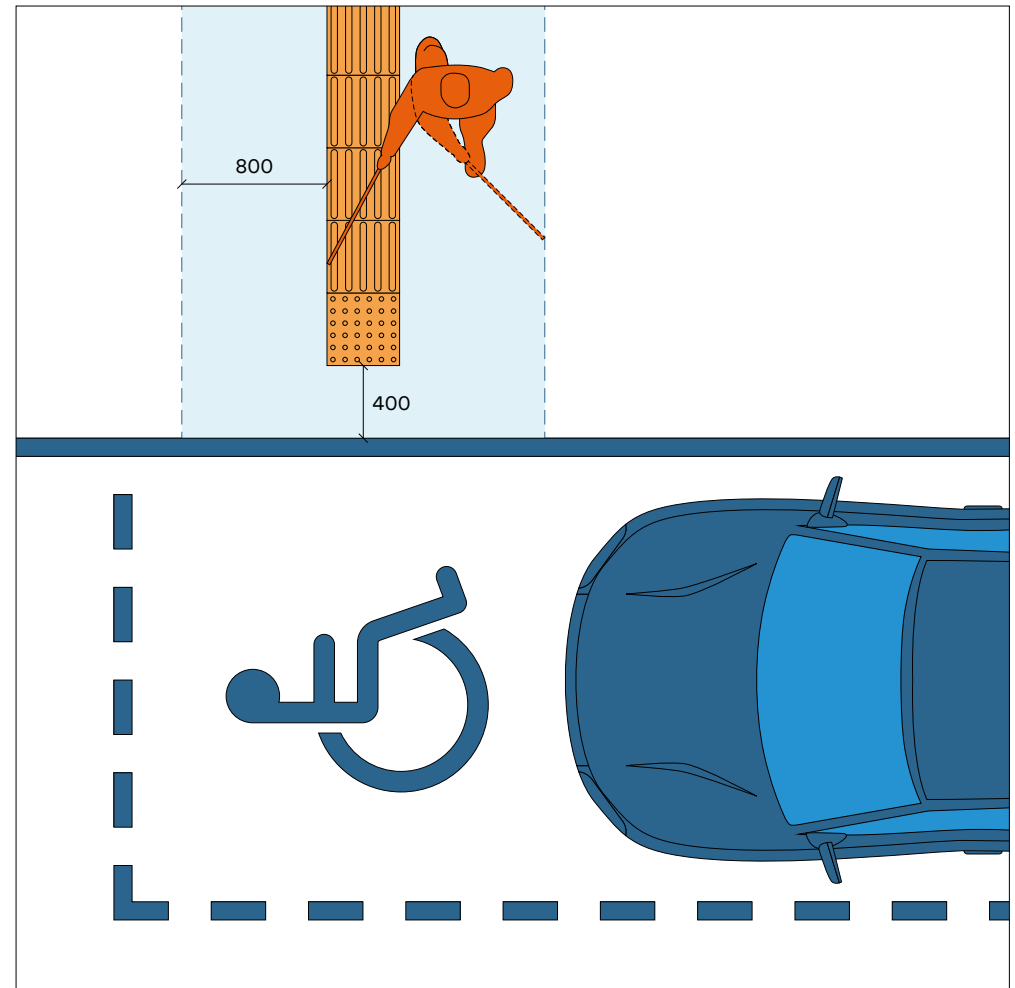
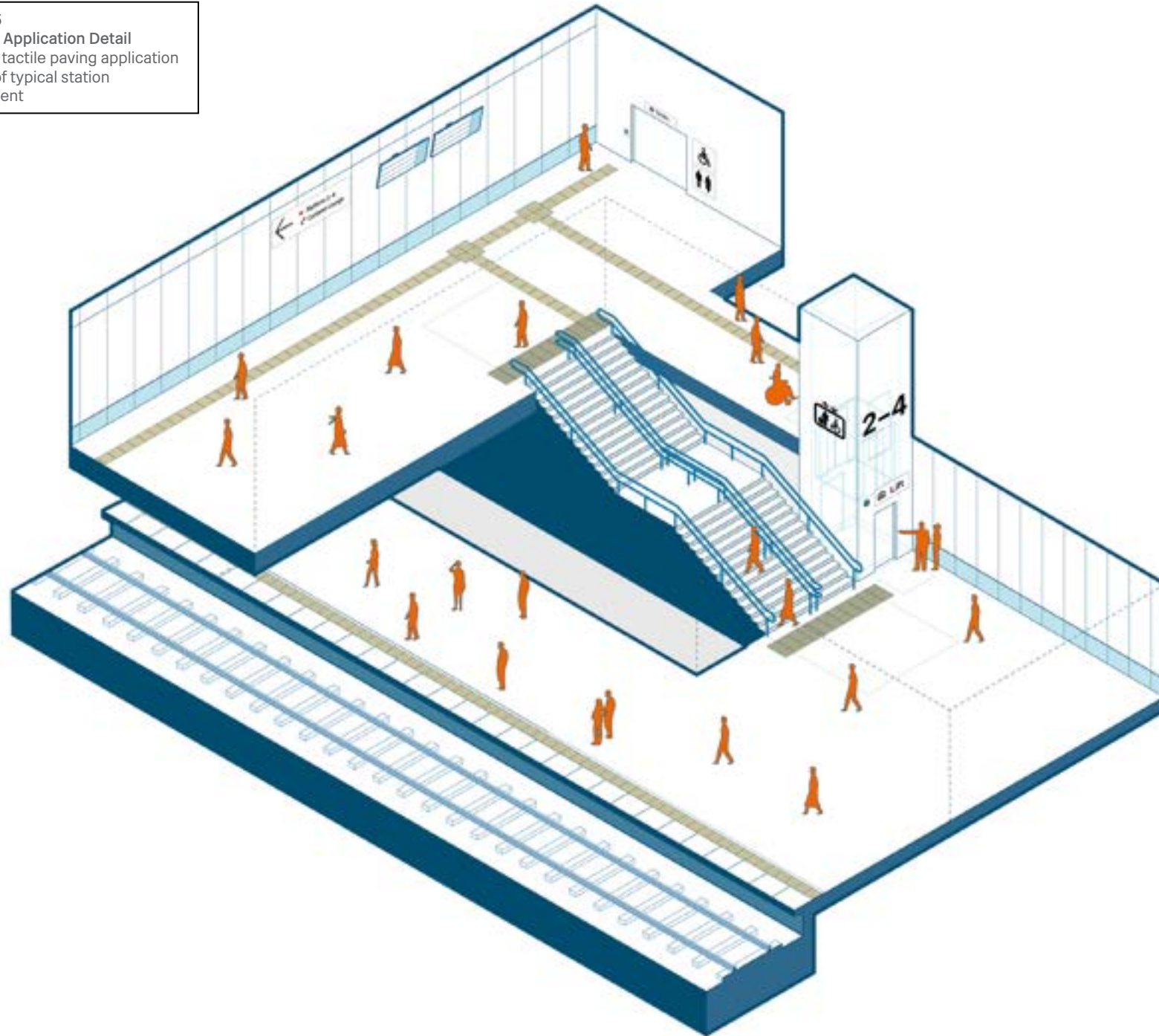


Image 3.4.13.1: Tactile guidance path leading to an accessible pick-up point



Image 3.5
Isometric Application Detail
Isometric tactile paving application
diagram of typical station
arrangement



Tactile Paving & Wayfinding
Section 4: Materials and Finishes



4.1 Tonal Contrast



4.1.1 Tonal Contrast

Tactile surfaces should be easily detectable by those with peripheral or residual vision. This can be achieved through appropriate tonal contrast between the tactile and surrounding surfaces in a clear, uncluttered environment.

Contrast is influenced by two factors; luminance and tone or colour. To provide good visibility, tactile surfaces should be sufficiently illuminated in an even manner without glare. The contrast of building elements is measured by the Light Reflectance Value (LRV). Typical LRVs for different tactile colours are shown in section 4.2. These are indicative. LRVs can be measured with a spectrophotometer. BS 8493:2008 sets out how LRV tests can be conducted with this device.

Elements and surfaces generally provide sufficient contrast when the LRV difference between elements is greater than 30 points. Designers should avoid providing extremely high point differences, as it could be interpreted as a change in level or hole by those with visual or cognitive impairments.

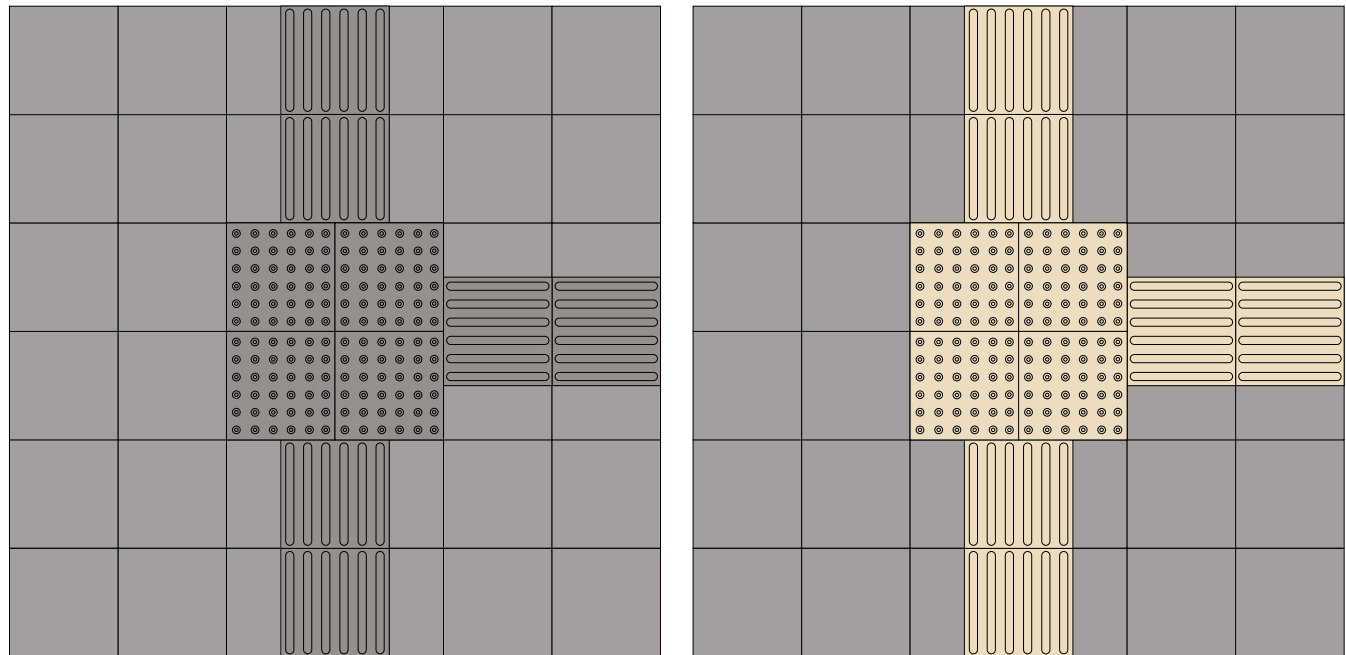


Image 4.1.1.1: Tonal contrast is defined in relation to the surrounding or adjacent surface

Standards Reference

Assistive Products for Blind and Vision-Impaired Persons -
Tactile Walking Surface Indicators, ISO 23599:2019
International Organisation for Standardization (ISO)

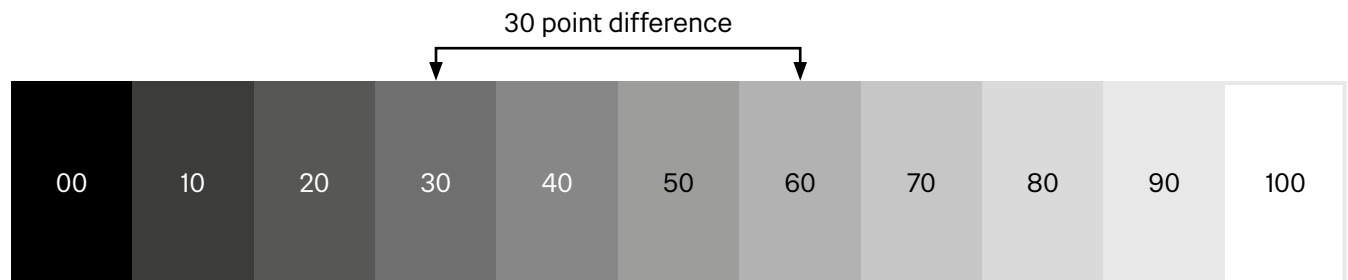


Image 4.1.1.2: LRV is measured on 100 point scale where 0 represents black or no reflection of light, and 100 is white or complete reflection

4.1 Tonal Contrast



4.1.2 Impact of Weathering

When selecting tactile paving units, care should be taken to consider the effect of weathering and visual change to adjacent surfaces over time.

Whilst most interior finishes are expected to be stable and colour consistent, external materials such as asphalt or macadam used on platforms might vary over time, having a big impact on tonal contrast performance.

Additionally, some materials can change appearance and LRV when wet.

4.1.3 Impact of Lighting

Lighting can influence perception of colour and therefore the perception of contrast.

Lighting products can be measured against CRI (Colour Render Index). Modern LED illuminaires can typically achieve better CRI than older legacy sodium and metal halide lamps.

The lighting scheme should be considered when specifying tactile paving units as the level of illumination may impact contrast requirements.

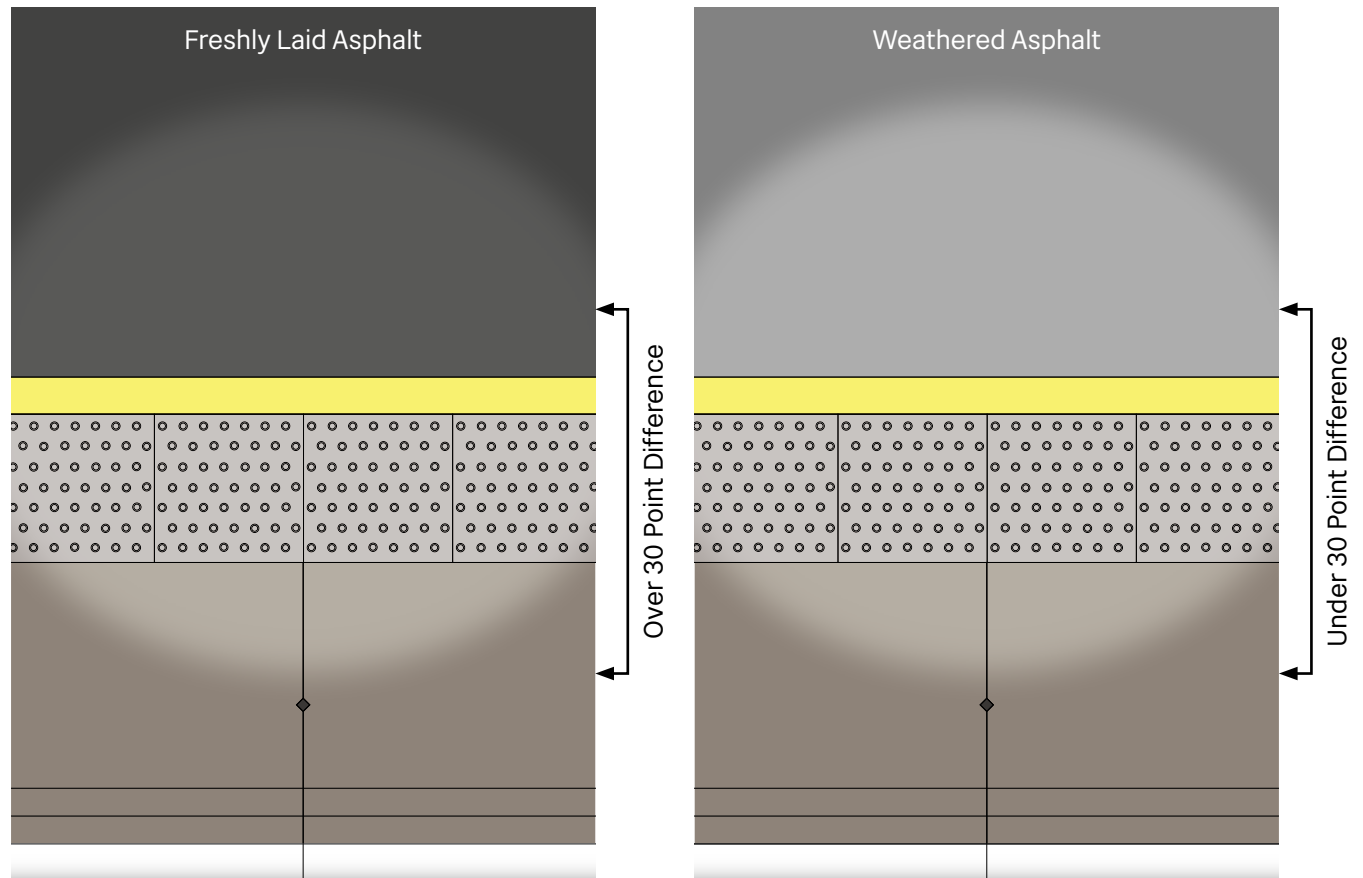


Image 4.1.2.1: Differences in tonal contrast over time as surfaces and materials weather

4.2 Colour



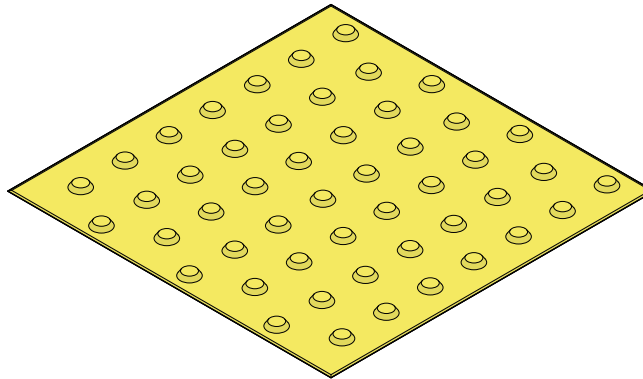
4.2.1 Typical Colour Finishes

Tactile products are available in a variety of colours. However, these are often constrained by material properties. Natural stone and precast solutions are typically offered in a limited palette, whereas composites and plastics are available in a wider range.

Materials should be selected that meet performance requirements for design life, slip resistance and combustibility.

Care should be taken to avoid choosing a colour as a starting point, that may then limit the available choice of materials to meet that performance.

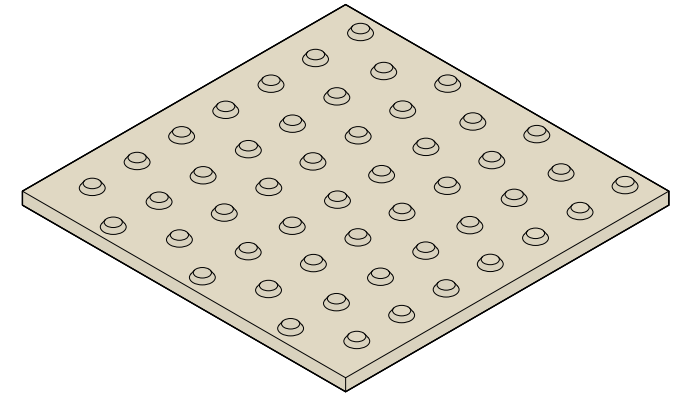
Please note that the typical LRVs shown in this section are likely to vary based on manufacturer, and for natural materials there will be a greater degree of variation. LRVs provided by manufacturers may also vary from the numbers provided once installed in their local conditions, as LRVs can be impacted by lighting and surrounding tones.



Yellow (Typical LRV: 50)

Yellow finishes can provide good tonal contrast but the colour can only be achieved in a limited range of materials.

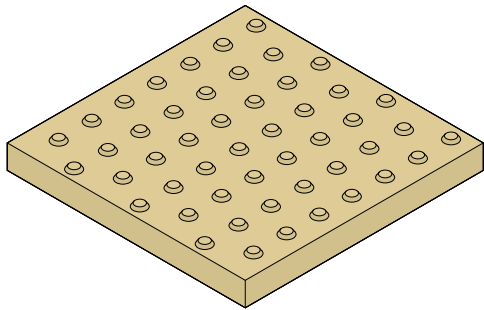
When specifying yellow, check that the material can meet requirements for durability, slip resistance, and that the product is colour stable.



Sand / Ivory (Typical LRV: 46)

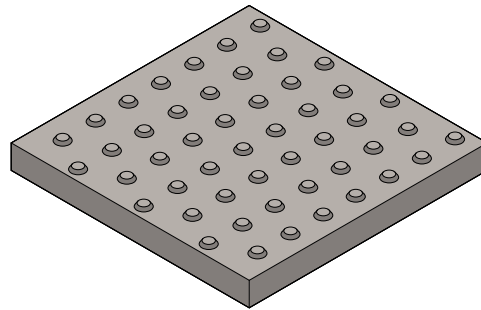
Provides good contrast against dark and mid-tone floor surfaces and is typically used internally, or against very dark surfaces such as asphalt externally.

4.2 Colour



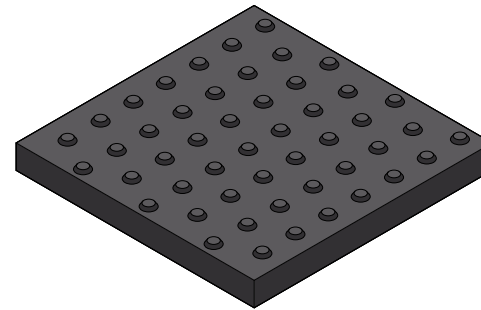
Buff (Typical LRV: 26)

Buff is the most commonly used tactile colour, however care should be taken in proximity to surrounding mid-tones (particularly where these have some variation) as it might be difficult to achieve sufficient contrast.



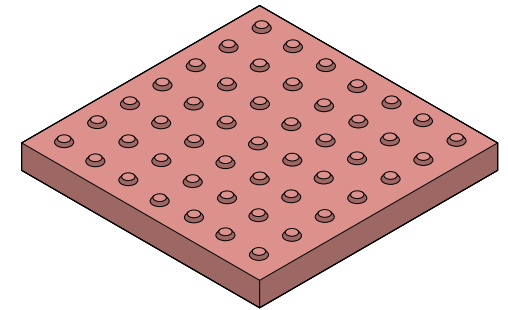
Natural / Grey (Typical LRV: 35)

Natural and Grey finishes work well in a heritage environment, and can provide good contrast against light or dark finishes.



Charcoal (Typical LRV: 8)

Charcoal can provide strong contrast with surrounding finishes which are light in tone.



Red (Typical LRV: 14)

Red tactiles are strictly limited to use at controlled crossings in the public realm and are not permitted to be used for any other purposes.

4.3 Materiality



4.3.1 Typical Materials

Tactile surface paving units are available in a range of natural and composite materials. Natural self-finished materials are typically limited to:

- Pre-Cast Concrete Slabs
- Natural Stone Slabs
- Porcelain Ceramic or Clay Tiles
- Metal Studs

Several composite and proprietary products are available which include surface mounted and adhesive tactile solutions. Many others form part of a larger module intended for platform edges which include copers and tactile surfaces as a complete unit.

Standards Reference

Pavements Constructed with Clay, Concrete or Natural Stone Paving Units - Code of Practice for the Structural Design of Pavements Using Modular Paving Units, BS 7533-101:2021
British Standards Institute (BSI)

Concrete Paving Flags - Requirements and Test Methods, BS EN 1339:2003

British Standards Institute (BSI)

Slabs of Natural Stone for External Paving - Requirements and Test Methods, BS EN 1341:2012

British Standards Institute (BSI)

Tactile Paving Surface Indicators Produced from Concrete, Clay and Stone, PD CEN/TS 15209:2021

British Standards Institute (BSI)



Image 4.3.1: Concrete platform edge warning tactile

4.3 Materiality



Image 4.3.1.2: Precast concrete tiles

Precast Concrete

Typically used on platforms, precast concrete tactiles are highly consistent and widely used, allowing for fast procurement.

Standards Reference

Clay Pavers - Requirements and Test Methods, BS EN 1344:2013
British Standards Institute (BSi)



Image 4.3.1.3: Natural stone tiles

Natural Stone

Stone provides a high quality finish but tonal contrast and slip resistance can vary making consistency difficult to achieve. Lack of consistency can also impact the sourcing of suitable replacements.



Image 4.3.1.4: Porcelain tiles

Porcelain

Porcelain tiles are hard wearing and provide a high consistency of finish. They are particularly suitable for areas with limited floor finish depth.

4.3 Materiality



Image 4.3.1.5: Studs

Studs

Tactile studs can be applied to new and existing surfaces. They are available in 'stud' and 'bar' types allowing for both tactile hazard warning and guidance paths. As they are supplied as elements instead of modules, care should be taken so that they are correctly installed in relation to the tiling grid. In the example above, the spacings between the tactile bars are too wide. In some scenarios, studs might have less visual impact than applying tactile modules.



Image 4.3.1.6: Adhesive tiles and mats

Adhesive Tiles and Mats

Surface-mounted adhesive mat and tile products are widely available. They are suitable in limited circumstances, for example, where it is not possible to alter existing floor finishes or where tactiles are temporarily required around on-going works.



Image 4.3.1.7: Surface-mounted adhesive studs

Surface-mounted Adhesive Studs

Surface-mounted adhesive studs combine the benefits of robust metal studs with the easy application of adhesive tiles and mats. They can be applied to surfaces lacking the necessary depth for pavers, where existing floor finishes cannot be altered or where visual impact is a concern, such as in heritage environments. As a surface-mounted product, they will be prone to wear. A maintenance inspection and replacement strategy should be put in place to preserve their performance.

4.3 Materiality



4.3.2 Composite Tactile Studs

Several innovative products exist for individual applied tactiles that provide colour contrast and a carborundum (or similar) surface for slip resistance.

These are often available in varying colours or tones and finishes, to meet different conditions and performance requirements. These products often also have innovative installation methods to speed up installation and provided consistency of setting out and application.

These products should only be considered for scenarios where tactiles are to be incorporated into an existing floor that is robust enough to be drilled into.

When considering international products, or those developed for other industries, check that they can meet British Standard (BS), DfT and NR requirements.

Image 4.3.2.3, shows an example of AusTact tactile studs installed at York station. Image 4.3.2.2 shows Podotactil composite tiles.

The studs used are made of Ultraviolet (UV) resistant polymer with a barbed shaft suitable for embedment in various substrates. The polymer material allows for the studs to be coloured to meet tonal contrast standards while being resistant to weathering and colour changes. The textured upper surface provides slip resistance.



Image 4.3.2.1: AusTact composite tactile studs (Australia)

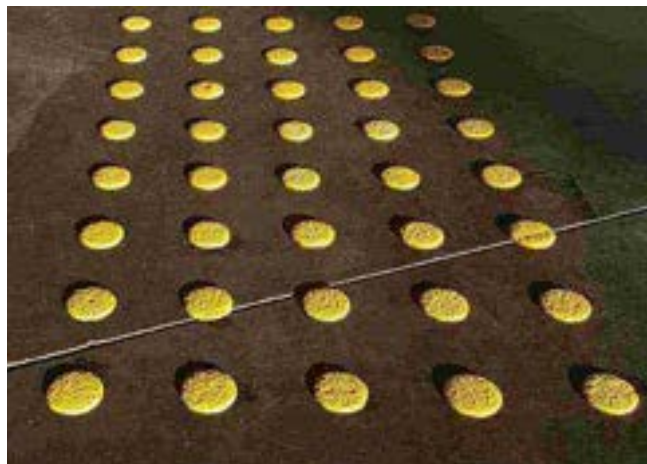


Image 4.3.2.2: Podotactil composite tactile studs (Spain)



Image 4.3.2.3: AusTact composite studs installed at York Station

4.3 Materiality



4.3.3 Materials to Avoid

When installing a tactile surface, self-finished materials should always be the go-to option. Painted and applied finishes are prone to deterioration, quickly attracting marks, dirt, and chips necessitating regular maintenance. Painted and applied finishes might also compromise the slip-resistance of the underlying product.

Care should be taken to check that any composite material solutions i.e, plastics meet requirements for slip-resistance, robustness or design life, and combustibility.

Note that these materials are often employed to achieve a 'hazard-yellow' colour which cannot be achieved by natural materials. However this is rarely required except in the uncommon scenario where platform edge warning tactiles are combined with a yellow line at the platform edge.

4.3.4 Temporary Applications

In limited temporary circumstances, the application of surface mounted adhesive tiles and mats might be considered. These should be avoided where any installation is intended to be or might reasonably become permanent.

Key problems with surface mounted solutions include:

- The inherent inability to be laid completely flush with the surrounding floor finish
- The challenge of getting a firm adhesion and flat finish on surfaces that have a slight texture, or that are uneven
- The potential for deterioration of the adhesive fixing; leading to curled edges and possible trip hazards

As a temporary solution, surface mounted tiles and mats may be appropriate when surrounding or demarcating on-going works, or where a suitably permanent installation is taking place in a phased manner; for example across several entrance openings.



Image 4.3.3.1: Painted finishes should be avoided entirely



Image 4.3.4.1: Self-adhesive tiles should be avoided where a permanent installation is feasible

4.4 Setting Out and Placement



4.4.1 Good Practice

The floor finish and tactiles should appear as a considered and cohesive element.

They should avoid giving an appearance of two separate elements, where tactiles visibly appear to have been added as an after thought, or appear badly integrated, causing awkward cuts or clashes with the surrounding finishes.

Tactile module sizes should be matched where possible, especially with new floor installations. This helps to create a successful and cohesive appearance.

As far as possible, coordinate and align joints with surrounding floor finishes.

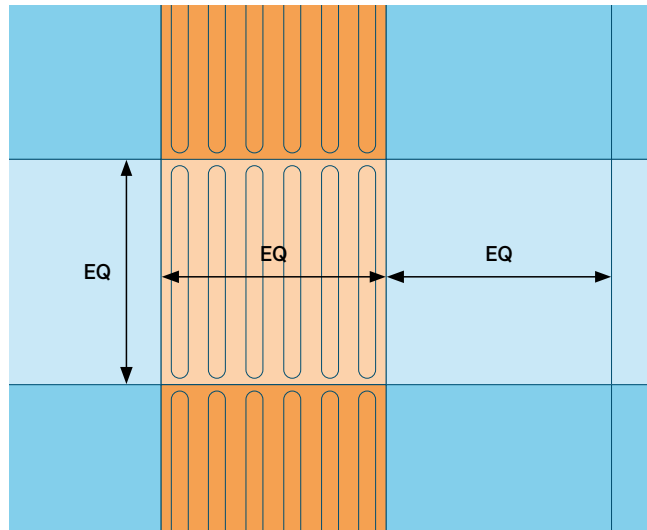


Image 4.4.1.1: Parallel/orthogonal paths

Example of new installation with aligned module dimensions.

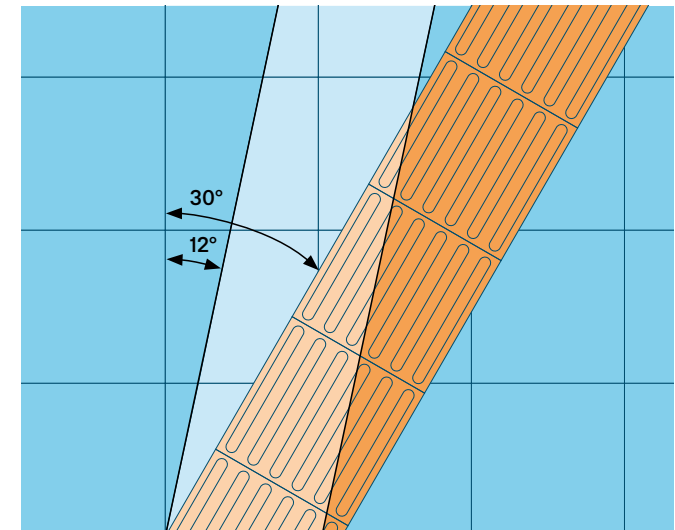


Image 4.4.1.2: Angled/oblique paths

Where tactile paths are tangential to existing floor finishes, coordinate modules to minimise cuts and irregularities as far as is practicable.

Where misalignment cannot be avoided with the existing grid it is preferable to set-out paths with the greatest achievable difference, rather than the smallest. For example, 30° is preferable to 12°.

Section 4: Materials and Finishes

4.4 Setting Out and Placement

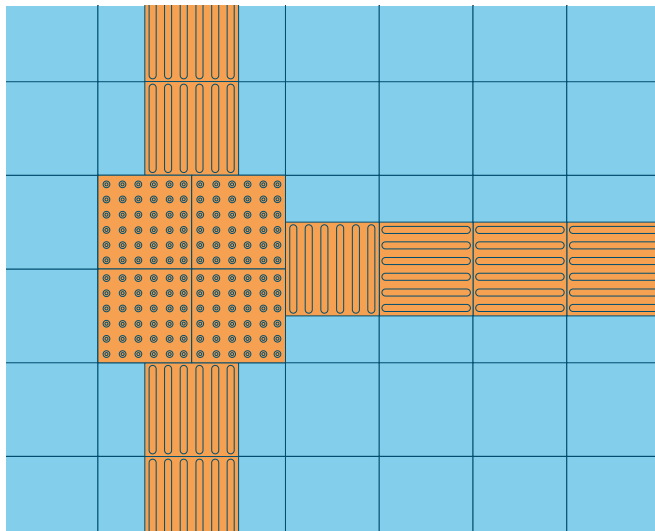


Image 4.4.1.3: Paths and decision points

As far as is practicable, coordinate routes, paths, and decision points with existing surrounding floor finishes for ease of installation.

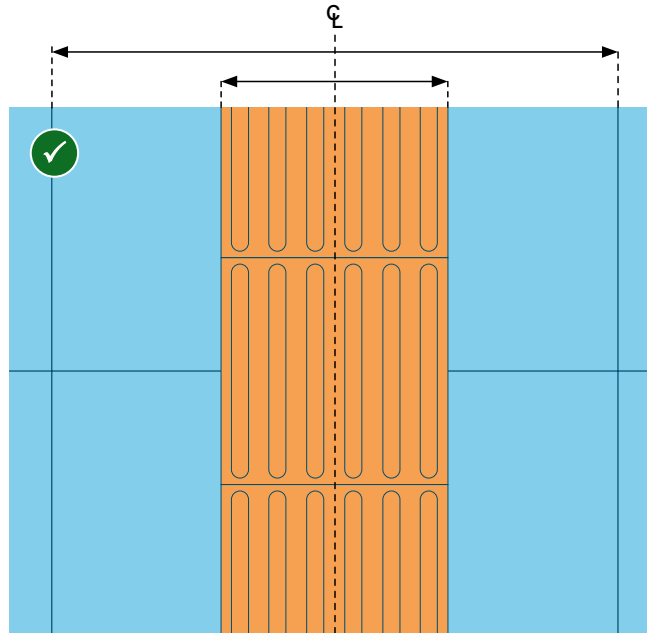


Image 4.4.1.4: Mismatched module sizes

Where proposed tactile modules cannot match the module sizes of adjacent floor finishes in their entirety, coordinate to minimise cuts and irregularities.

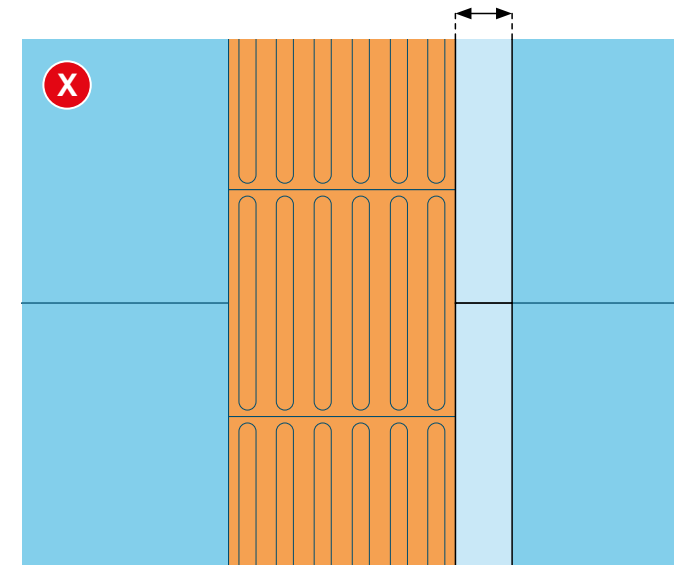


Image 4.4.1.5: Slithers

Where possible, centre tactile paths on existing grids, and avoid offsets that create unequal arrangements or slithers.

4.4 Setting Out and Placement



4.4.2 Surface Applied Tactile Finishes

When installing individual tactile studs and corduroy strips within existing floor finishes, some minor amendment to typical setting out i.e, matching that of fixed paving units, may be permissible, provided it does not impact how the tactiles are experienced.

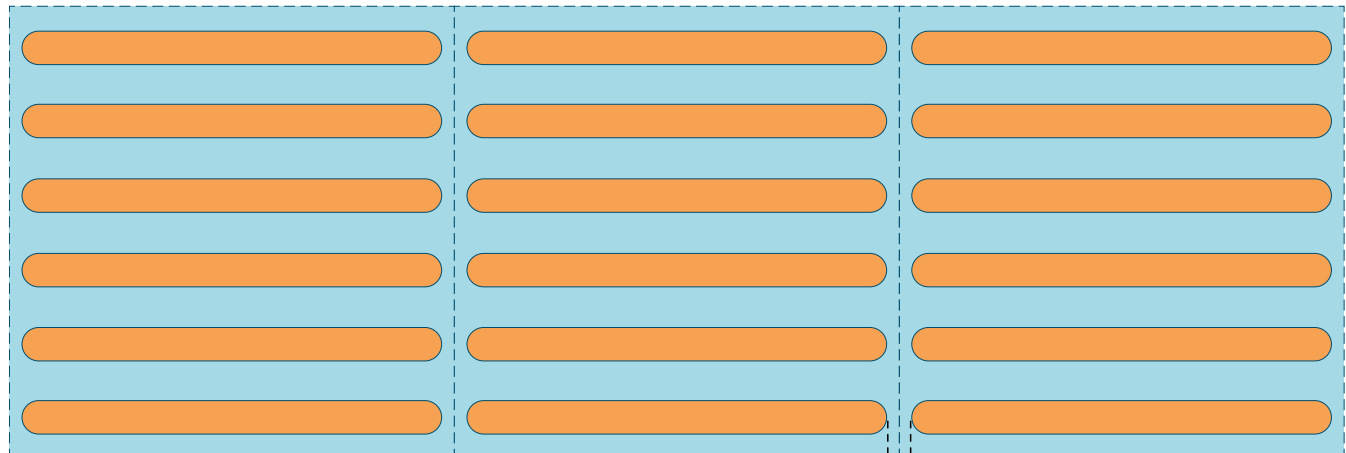


Image 4.4.2.1: Typical setting out

Maximum 30mm

4.5 Specification



4.5.1 Guidance on Specifying Tactiles

This page provides some considerations and prompts for determining the appropriate performance of tactile elements.

Potential products can then be checked against this criteria, so that specified products are suitable for their intended location and use.



Design Life

- Does the product meet the intended design life of the project? (Typically 25+ years)



Slip Resistance

- Does the product meet the required slip resistance value?
- Does the product comply with NR/L3/CIV/030?
- Is the product's slip resistance testing UKAS accredited?



Robustness

- Is the product sufficiently robust?
- Does the product meet abrasion requirements?
- Will vehicles pass over the tiles or just pedestrians? Does the product meet expected loading criteria?



Installation Requirements

- What floor finishes are available, and does this limit the type and thickness of product that can be used?
- Can the product be safely installed in the proposed location?



Fire Performance

- Does the product meet fire performance requirements for combustibility and smoke emission?



Sustainability

- What is the recycled content of the product? Does this value meet the project requirements?
- Can the product contribute to the project Building Research Establishment Environmental Assessment Methodology (BREEAM) assessment (if applicable)?
- Does the product have current and valid Environmental Product Declarations (EPDs)?



4.6.1 Heritage Considerations

Many floor finishes on the network are of historic merit including mosaic and encaustic tiles. These are often more prevalent in smaller stations with less foot traffic.

When applying tactile surfaces to a listed building, the specific details of the listing entry should be read and understood. The listing criteria may or may not include the floor finishes as part of the listing. In many historic stations they will be of less significance and value to the building, as they will have been replaced over the lifespan of the station due to wear and tear.

In listed buildings or significant heritage environments some relaxation of requirements may be permitted, for example tactile surfaces may be provided in a colour which is in keeping with the adjacent materials.

Before any decision is taken, consultation with relevant parties should be sought to determine and agree the most appropriate approach to meet requirements while preserving heritage features. These parties include the Network Rail Town Planning team, local planning authorities, Historic England/ Historic Environment Scotland, Cadw, and the Railway Heritage Trust, as applicable

Where the floor surface is a feature, or is not amenable to replacement, the use of different products such as studs might be appropriate to meet requirements while limiting disruption to existing finishes.



Image 4.6.1.1: Studded tactile installation in conservation area public realm in York (note that this example provides poor colour contrast).

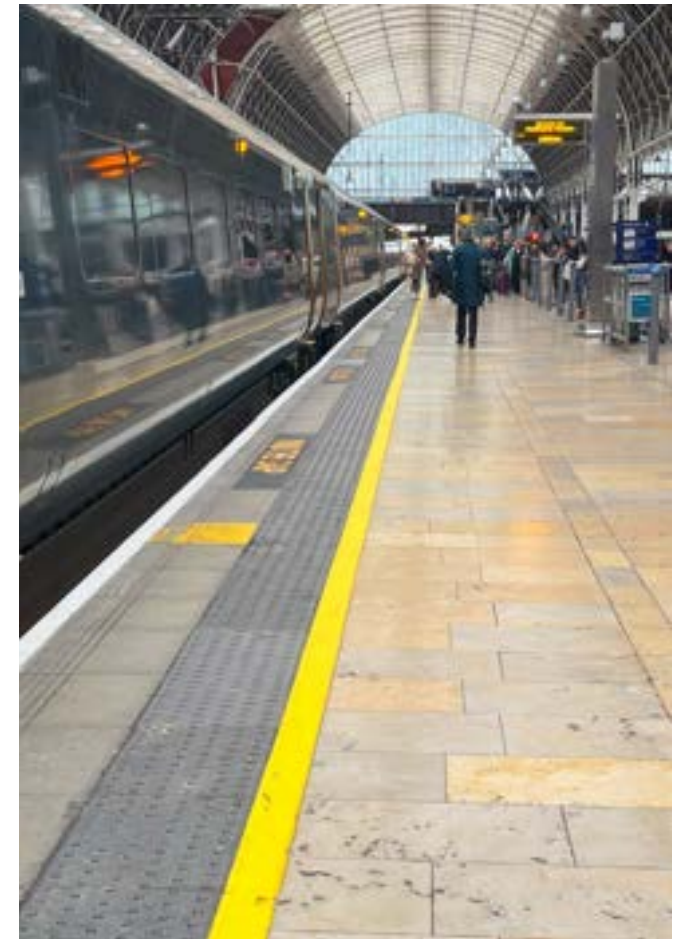


Image 4.6.1.2: Platform edge tactiles at Paddington station. This image demonstrates how a contrasting tactile can be implemented without visual impact to the character of the heritage station.

4.7 Installation



4.7.1 General Guidance

For all products:

- Check with the manufacturer or supplier that they are suitable for their intended location and use.
- Follow recommendations and guidance provided by the manufacturer
- Do not compromise the conditions of the warranty
- Install products flush and evenly against surrounding finishes.
- Minimise cuts and joints, and where necessary carry these out in a neat and consistent way, off site if possible.

4.7.2 Concrete and Stone Paving Slabs

The installation of concrete and stone paving units should conform to BS 7533-101:2021, BS EN 1339, and BS EN 1341.

Check that the sub-base is uniform, of good quality, thoroughly compacted and binded.

Check the manufacturer's advice to determine the most appropriate laying method i.e, whether to be laid flexibly on fine aggregate or bound with mortared joints.

Check paving units are smooth and even with regular joints and accurate to line, level, and profile. Check that the bedding is appropriately firm, so that rocking or subsidence does not occur or develop.

If units require cuts, make cuts cleanly and accurately, without spalling, to give neat junctions with edgings and adjoining finishes.



Image 4.7.1: Example of integrated platform edge coping and warning tactile, that are installed as single integrated product. (It is noted that this example is lacking a yellow line).

Standards Reference

Pavements Constructed with Clay, Concrete or Natural Stone Paving Units - Code of Practice for the Structural Design of Pavements Using Modular Paving Units, BS 7533-101:2021

British Standards Institute (BSI)

Concrete Paving Flags - Requirements and Test Methods, BS EN 1339:2003

British Standards Institute (BSI)

Slabs of Natural Stone for External Paving - Requirements and Test Methods, BS EN 1341:2012

British Standards Institute (BSI)

4.7 Installation



4.7.3 Ceramic Tiles

The installation of ceramic floor tiling should conform to BS 5385-3.

Tiles should be solidly bedded so that, as far as possible, they are free from voids to provide good adhesion.

Tile bedding and adhesive should be suitable for the tile, the substrate and the level of traffic. They should be applied in accordance with manufacturer recommendations and requirements, checking that they are appropriate for the level of floor zone, and do not exceed the suitable depth.

Movement joints should be applied in regular intervals, and extended through the tiling and the bedding to allow movement, and avoid bulging or cracking of the flooring.

4.7.4 Angled Cuts to Tiles

90 degree turns should result in 45 degree tile cuts, and 45 degree turns should result in 22.5 degree tile cuts.

A benchmark for these cuts should be visually approved on site, before tiles are cut and installed, and retained for comparison with installed tiles.

Cuts should be carried out with a diamond blade cutter, and wet cut where the manufacturer recommends to do so. Cuts should be straight, with a smooth finish.

Where less than 25% of a tile is cut away it may be left as a single unit. Where more than 25% of the tile is removed the remaining shape should be mitred from the internal corner of the cut out to the external corner of the tile. Cut tiles should be inserted prior to completion of the working period.

Tiles should be cut and installed so that the resulting joint width remains within the joint width tolerance.

4.7.5 Studs

Studs can be applied to range of substrates, from poured finishes such as asphalt to terrazzo and ceramic floor tiles, both newly installed and historic.

Tactiles should be installed in a firm and secure way which does not damage the surface or structure they are applied into.

Manufacturers should confirm that the product is suitable for the substrate. In many cases, they will offer different spigot profiles and depths to suit different substrates.

When applying to tiled surfaces, studs can generally be applied to the body of the tile or to the grout joint, providing that the joint is not loose and can provide a secure fixing. It is advisable to carry out a test if required.

Standards Reference

Design and Installation of Internal and External Ceramic and Mosaic Floor Tiling in Normal Conditions, BS 5385-3:2014
British Standards Institute (BSI)

4.7 Installation



4.7.6 Surface Mounted Tactiles

The quality of preparation and installation of surface mounted tactiles is crucial to mitigate premature lifting which can cause trips and falls.

Check that installation of surface mounted tactiles is in accordance with the manufacturer's guidance and the specified product has at the very least a minimum guaranteed design life of 10 years.

Slip resistance values of the specified product should meet a minimum in accordance with NR/L3/CIV/030. Slip resistance testing should be United Kingdom Accreditation Service (UKAS) accredited.

The maximum height of the tactile base plate should not exceed 3mm, so as not to create a trip hazard. It should be laid level with the surrounding surface.

Complete adhesion of the tactiles is essential to prevent water ingress, frost heave, and cracked, curled, or fragile edges. Typically provide a 2-3mm gap between tiles to allow for expansion, (unless the manufacturer requirements states otherwise). Any greater might create inconsistent centres between tiles.

4.7.7 Frost Heave

Frost heave is the displacement of paving by the expansion of water freezing in the substrate beneath the paving units, creating a loose and uneven surface. To prevent water ingress and frost heave from occurring, the installation of tactile paving should follow the manufacturer's recommendations and installation process. If paving units become loose due to frost heave, station teams should check all tiles installed simultaneously to remedy all defective tiles.



Image 4.7.6.1: Defective installation caused by lack of appropriately spaced joints



Image 4.7.6.2: Successful installation

Standards Reference

Platform Components and Prefabricated Construction Systems, NR/L3/CIV/030
Network Rail

4.7 Installation



4.7.8 Typical Installation Examples

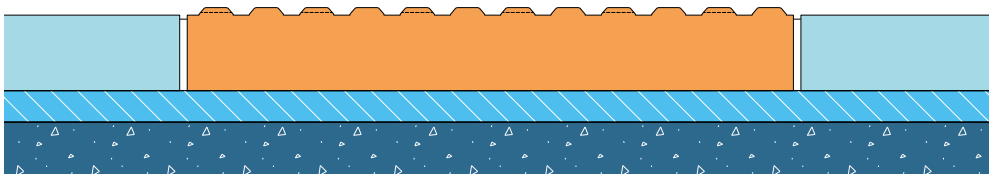


Image 4.7.8.1: Tactile with sufficient bedding zone

Tactile with sufficient bedding zone

The example above represents the most common scenario, where there is sufficient space to bed within the floor finish for tactiles to be installed successfully.

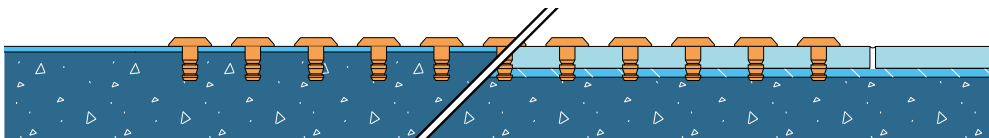


Image 4.7.8.3: Tactile Studs fixed into floor surface

Tactile Studs fixed into floor surface

Tactile studs typically require individually drilled fixings (though other methods of fixing can be used). For blister tiles this requires many individual fixings - though there are methods of achieving this at scale.

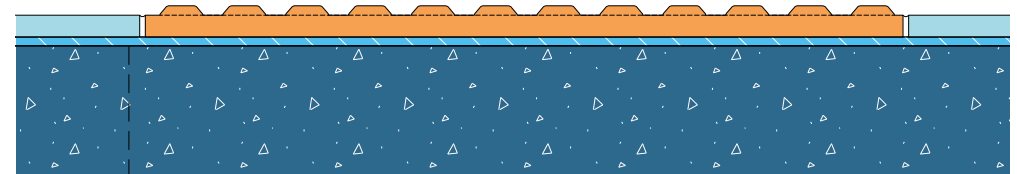


Image 4.7.8.2: Shallow depth porcelain tile

Shallow depth porcelain tile

In areas of reduced floor build-up, shallow 12.5mm porcelain tactiles can be used to provide a high quality and robust integrated tactile surface.



Image 4.7.8.4: Applied tactile, adhesive fixed directly onto finished floor surface

Applied tactile, adhesive fixed directly onto finished floor surface

Applied tactiles are fixed directly on to the floor surface. They should only be used where it is not possible to use an embedded tactile.

4.8 Maintenance



4.8.1 General Maintenance

Cleaning and maintenance should be carried out for all product types in line with manufacturer recommendations.

4.8.2 Concrete, Stone and Ceramic Tactiles

Blisters or corduroy strips may wear down over time in stations with a heavy pedestrian flow. Where this occurs, these units should be replaced where they no longer fulfil their function.

Materials containing cement may discolour due to efflorescence. This will naturally disappear with weathering and usage.

4.8.3 Studs

Individual stud units may become loose. Should this occur, the individual unit should be fixed back, or if this is not possible, removed temporarily to avoid it becoming a trip hazard.

If units become loose, it could be a sign of poor installation or failure of the stud or substrate. Other units should be checked, to identify if it is an isolated failure, or to determine if more units need replacing or re-fixing.

Where inserts become loose, replacements should be sought from the manufacturer.

Where units have carborondum or coloured inserts, these may become lose or lose their colour intensity.

Where inserts lose their colour intensity, they should be checked to determine whether they still provide sufficient colour contrast.

4.8.4 Surface Mounted Tactiles

If surface mounted tactiles begin to lift, become loose or show signs of surface cracking or lose their profile, they should be replaced, with adjacent tiles checked for defects and replaced as needed.

Modern surface mounted tactiles generally have good colour fastness / UV resistance, however where colours fade they should be checked to determine whether they still provide sufficient colour contrast.

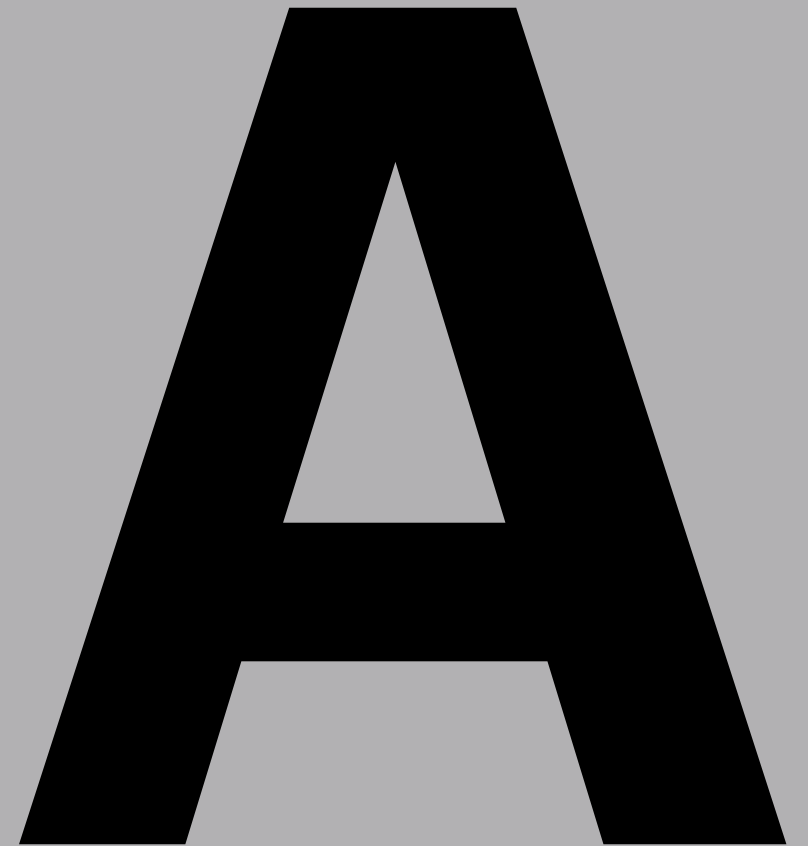
Standards Reference

Materials and Components, NR/GN/CIV/200/01
Network Rail



Image 4.8
Brent Cross West Station
Tactile guidance path leading to
the lifts and stairs on the first floor

Tactile Paving & Wayfinding
Appendix A: Lived Experience
Passenger Profiles



Appendix A: Lived Experience Passenger Profiles

Introduction



Tactile Paving & Wayfinding
Compliance
NR/GN/CIV/300/06
June 2024

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This appendix contains lived experience profiles that describe the journeys of blind, partially sighted and mobility-impaired passengers. The aim of these profiles is to explain to readers how various passengers will interact with tactile paving to navigate through a station environment, so that understanding and empathy can be built.

The profiles are based on user research interviews with individuals who have lived experience as blind, partially sighted and mobility-impaired passengers. Alongside these important interviews, the development of this appendix has been informed by consultation held with RNIB and Blind Veterans Organisation UK.



Image A.1: Long cane user utilising tactile paving when boarding a train



Introduction

Hussein is registered blind and has both central vision loss and heavily restricted peripheral vision. He can make out the outline of shapes and differentiate between light and dark. Hussein also experiences chronic pain, and has Raynaud's in both hands which affects his circulation and temperature sensitivity.

To support him when navigating the built environment, Hussein uses a long cane. Due to the pandemic, Hussein admits he has 'lost some confidence navigating to and around new places'. He uses Google Maps to get around external environments and would like to try out similar applications that can safely direct him within buildings.

Typical Travel Details

Hussein typically makes three to four train journeys per week, and books his tickets in advance. After travelling regularly from his local, unstaffed station for many years, his confidence has now been knocked due to assistance incidents with a train guard. Due to this, Hussein now firstly pays for a taxi to Aberdeen station before making his train journey across Scotland, or to London.

Describing the events at his local station, Hussein states:

“ I had three incidents where the guard did not collect me from the platform, despite me booking travel assistance and waiting on the platform with my white cane. Turns out he waved to me, but I couldn't see him, so he assumed I did not want to board. Another time, he shouted to me, but I did not hear due to train noise. ”



Image A.2: Hussein, a long cane user



Tactile Paving Thoughts

With a station environment, Hussein primarily uses the stairs to go to and from platform level, as he feels 'lifts can be unreliable, often broken and sometimes the route to find them is more confusing'. He acknowledges, however, that lifts are a safer option for some and therefore believes that tactile guidance paving should route to both lifts and stairs to provide personal choice.

Platform Edge Warnings

Regarding tactile warnings on station platform edges, Hussein states:

- “ I know I am on the platform from the sense of the space, the context of where I am, and the sounds. I walk with some caution and as soon as I feel the tactile paving, I stop as I know I am close to the platform edge. I then orientate to get square to platform edge. Then, I take three or four steps backwards to safely wait - listening out for announcements and sound of the approaching train. ”
- “ When getting off a train, I hold the train door edge and feel with my cane for the platform surface, to judge the step. I then orientate myself and use the platform tactiles to move to a safe place. ”
- “ Tactiles on a platform edge are more than just a safety warning to stand behind. As a blind user, I orientate from them, and judge the distance from them. Essentially, I form a muscle memory and innate understanding of the spacing from the tactiles to the platform edge and train. Of course, I still use my cane for close navigation, stepping and my hearing and touch - particularly when boarding and alighting. But it's helpful to have a known, consistent reference point. ”

Tactile Guidance Paving

Hussein has never been to a train station that has full guidance tactile paving installed, although he would be interested in that experience. On this, he states:

- “ I can imagine that it would be particularly useful in navigating large, open concourses - at present they can be very difficult to orientate on and maintain a straight line to a destination. Without this guidance, I currently have to listen for the station barriers and move toward the noise. Even a flooring tile grid can help me navigate, but this isn't present in large stations with bright, smooth floors such as York, Kings Cross and Edinburgh Haymarket. ”
- “ At smaller sized stations where it is possible to 'learn' and 'memorise' the routes, as I currently do now, it could be a great aid to simplify navigation to have tactile guidance paths installed from entrance all the way to the platforms. This would encourage and enable independent travel for those that want it. ”
- “ At large stations that can have a complex layout, with frequent departures and interchanges, it would be hard to memorise the layout of the platforms. I think staff assistance would still be needed to safely find the right platform to board the correct train. It would take a very good reliable technology app to navigate to the train. It could be very challenging. ”

Hussein also comments on how staff can support passengers when using tactile guidance paving:

- “ If tactile guidance routes are provided at stations, assistance staff should make passengers aware and guide them along the tactile path when providing travel assistance. This would help build passenger awareness, knowledge and familiarisation. But it would always be down to the individual if they wish to use it or to request assistance. Staff and train operators need to respect this. ”



Introduction

Daniel lost his sight at the age of 16. He is now registered blind with no light perception. He was previously a long cane user, but has had an assistance dog for two years and finds this support method suits him better. Daniel is tech savvy, and supportive of it as a navigational aid but also feels its safe and effective use poses challenges that need to be better understood.

He states:

“ I use technology every day for work and at home. But on a journey with my dog, I need to concentrate, talk to her and hold her harness. My hearing is also key. I listen out for noises in the environment to support my decision making. Using technology, especially audio navigation, could compromise that. ”

Typical Travel Details

Daniel typically makes one to three train journeys per week for work. He purchases his tickets in advance and loads them on his phone to remove the need to find and use a ticket office when in the station.

On his confidence and comfort when navigating stations, Daniel states:

“ I use my memory of stations and routes that I have familiarised, learnt with a sighted guide and trained my assistance dog to know. I then have set journeys that I know and am confident to travel. Hove, Brighton and then London St Pancras, London Bridge and Farringdon are the stations and routes I use most often for work and in my personal life. ”

When moving between stations in London or completing his journey, Daniel is relatively confident using several modes of transport, including buses, taxis, the underground, and walking.



Image A.3: Daniel and his assistance dog



Within the Station

Daniel's choice of whether to utilise lifts or stairs changes depending on the station's size and layout. In larger stations, he's more likely to use lifts, learning their location with a sighted guide and then using them as landmarks for future journeys. Daniel's assistance dog also learns 'cue words' to take Daniel to certain points. 'Lift' is one of those words.

Daniel is also confident in his use of stairs, and is more likely to use them in smaller to medium-sized stations as they often offer a more direct and convenient route.

Travel Assistance

Daniel books assistance prior to travelling, then goes to the station gateline to find a member of staff, noting 'it's the easiest place to find someone'. On routes he knows well (including stations such as London Bridge and St Pancras), Daniel usually gets off the train and meets a staff member, or waits on the platform for further assistance. He also uses cues with his assistance dog to find the station gateline at familiar stations, if needed.

Platform Edge Warnings

Daniel's reliance on platform edge tactile warnings has changed in recent years. He states:

“ When I used to use a white cane, the tactile platform edge was very useful to feel and orientate. With an assistance dog, I do not rely on these as much. My assistance dog stops at the top of stairs or the edge of the platform. But, I do still feel the tactile warnings at the platform edge with my feet to have my location and proximity to the edge confirmed and feel comforted and reassured. I can also feel the difference between corduroy and blister tactiles with my feet. ”

Tactile Guidance Paving

When considering tactile guidance paving, consistency throughout the end-to-end journey is key for Daniel:

“ At one of my local stations, there is tactile guidance paving leading from the bus stop to the station entrance (and in the opposite direction). However, this has been interrupted by the installation of a new taxi bay, leading to blind and partially sighted people needing to use the kerb line for navigation in that area. There's also no continuation of the tactile guidance paving on the inside of the station, which simply doesn't make sense! ”

“ Sometimes large open concourses and spaces can be the most difficult places to navigate; there is no 'edge' follow, so it's easy to veer off course. Providing tactile guidance paving across open concourses to station gatelines would be very useful, even to those of us with assistance dogs, as they can wander or be distracted at times if there are crowds, for example. ”

Ultimately, whilst Daniel supports the improvement and use of accessible and assistive technologies, his preference would be for:

“ Tactile paving to work as a full analogue system, without the need for technology, audio or similar. This would then give individuals the choice to be independent, and use the system with full autonomy, if this is what they choose. ”



Introduction

Natasha is a manual wheelchair user. She experiences pain which is made worse when pushing over uneven surfaces, e.g. cobbles, uneven pavements or rough surfaces. Natasha does not have any visual impairment.

Typical Travel Details

Natasha uses public transport regularly for work and leisure. This includes trains and the London Underground. Natasha regularly commutes from Bournemouth into London, and has been making this journey for the last two years. Her local station Pokesdown does not have step-free access. This means she has to drive 10-15mins to Bournemouth station, where she parks in an accessible space and takes the train.

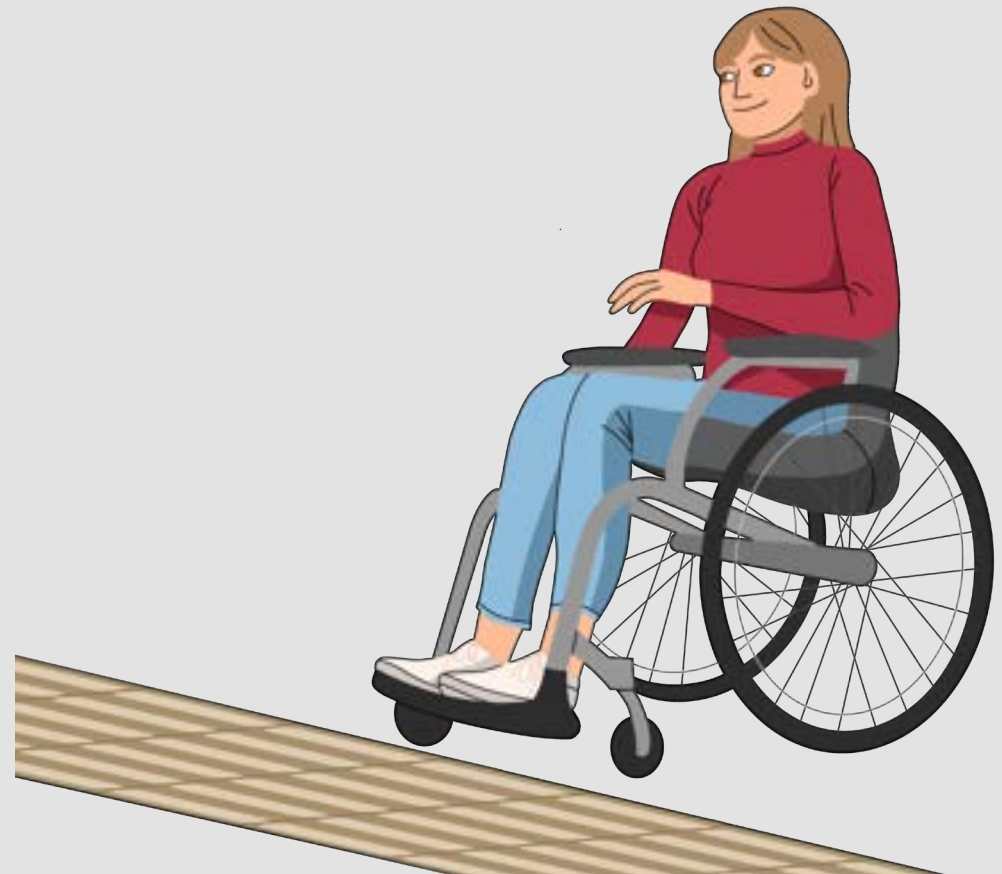


Image A.4: Natasha, a wheelchair user



Within the Station

At Bournemouth Station, Natasha can access a step-free route onto the London bound platform. On her return journey she uses a steep ramp to access an underpass to return to the station and car park. At London Waterloo, Natasha uses the lifts to access the London Underground.

Travel Assistance

Natasha books travel assistance in advance via the Passenger Assistance app to ensure that she gets ramp assistance to board and alight the train in the morning. For her return travel from London Waterloo, it is harder to pinpoint a departure time, so she uses turn up and go travel assistance to be flexible.

Platform Edge Warnings

Natasha advised that in her experience boarding ramps normally span over the tactile edge warning tiles, she hadn't noticed that these tactile surfaces on the platform had ever impacted her journey.

Tactile Guidance Paving

Natasha had experienced tactile guidance paths at Clapham Junction station. She advised that the tactile guidance paths run across the overbridge to the lifts. On this, she states:

“ I have to roll over the tactile paving to access the lift. This is momentarily uncomfortable as I roll over it but not too bad as I only have to cross it once. ”

Natasha recently worked in Dubai and commuted on the Metro daily, the stations all had tactile guidance paths that utilised raised metal studs and bars. She states:

“ There were tactile guidance paths running through all the stations, leading to the lifts, ticket machines and along the length of platforms. The guidance paths also ran through the ticket gateline and to the ticket desk. Crossing the tactile guidance path in my wheelchair was quite difficult because of how raised the metal studs and bars were, and it triggered pain. The discomfort was particularly noticeable as, unlike Clapham Junction, you had to cross the tactile path multiple times to get through the station and to enter and exit the station. ”

“ When the stations were busy I sometimes had to pass over the tactile surfaces more frequently than normal to avoid crowds and pedestrian flows. ”

“ Ramps within the Metro stations had studs at the top and bottom of them. These were quite challenging and uncomfortable to negotiate. ”

Natasha mentioned that the tactile paving she has experienced in the UK is usually made from moulded tiles rather than metal studs. She explained that:

“ These are typically less challenging to push over and less painful than my experience travelling over raised metal studs on the Dubai Metro network. ”

In conclusion Natasha said:

“ If tactile guidance routes allow the option to avoid, or minimise crossing tactile paving on a step-free route this might be beneficial for many wheelchair users, however I also recognise its importance for a blind or visually impaired passenger to have an accessible and safe journey. ”



Introduction

Bryan has been registered blind for 30 years. On a good day he can distinguish between light and dark and recognise someone close to him. On more challenging days he cannot. Bryan works for Blind Veterans UK as a Visionary Help Specialist and Mobility Instructor. He utilises a long cane and is confident with technology, regularly using audio directions on Google Maps or the 'Guides' app to navigate the external environment. Bryan has never used anything similar when inside buildings.

Typical Travel Details

Bryan travels frequently for work and is a confident train user. There are several stations that Bryan is familiar with, has learnt the layout of and feels confident navigating independently. Outside of this, he always prefers to be assisted, and estimates that nine of out ten journeys he makes are done so with staff support.

Bryan is usually dropped off at his local station by a family member, or walks there. When needed, he will take a taxi for longer or less familiar journeys to a station. He purchases his train tickets in the station on the day of travel. At this point, he then books assistance.

Whilst it might take more time and energy, Bryan purposefully uses this approach as he states:

“ I prefer that my assistance journey be fresh in the minds of the assistant staff. ”



Image A.5: Bryan, a long cane user



Within the Station

Once within the station environment, Bryan states:

“ I normally opt for the stairs as the layout and routing is often easier to memorise, with straighter lines. Taking a lift can be disorienting as you enter the lift car and then exit somewhere new. I don't always know which side of the lift to exit and therefore which direction I'm facing going forward. ”

Travel Assistance

Aside from navigating his smaller, local station independently, Bryan usually relies on staff assistance for a safe and stress-free journey. He states:

“ On a good day I can travel through my local station independently, without any assistance. At a very familiar large station such as London Victoria that I used to travel through often, I have learnt the layout to allow me to navigate the concourse independently. I can arrive, get a ticket and find the correct gateline. But even then, I would still always ask for staff assistance at the gateline to find the correct platform and board the train. At any other large station I would absolutely need staff assistance from the point of arrival, large stations are too complex for me to attempt to navigate without assistance. ”

Platform Edge Warnings

Bryan uses tactile platform edge warnings to orientate and navigate along the platform. He states:

“ I use my cane and 'sweep' to assure I am on the safe side of the tactile, they provide a useful and consistent safety marker. When I arrive off the train at a station, the first thing I feel for is the tactile paving, I use it to move to a safe position on the platform and then know I won't wander off the platform edge. ”

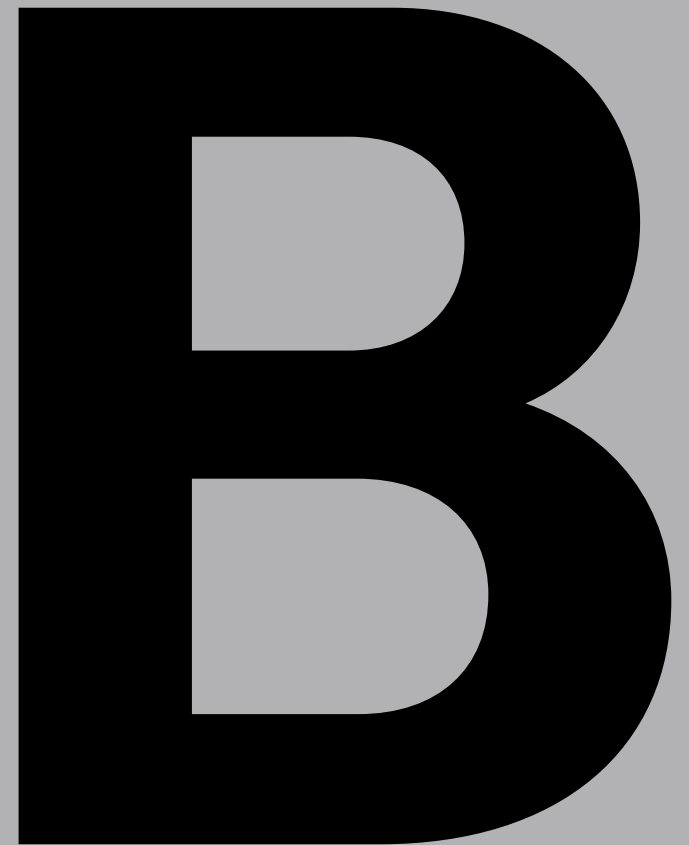
Tactile Guidance Paving

Discussing tactile guidance paving within stations to assist with navigation for blind and partially sighted users, Bryan states:

“ My preference would be for every station to consistently provide tactile guidance paving from the station entrance to the ticket barrier or assistance point, in order to create a usable and consistent station experience from the point of entry (and exit). Rather than a complex web of tactile guidance paths leading everywhere that would likely confuse, cost a lot to install and therefore probably have an inconsistent presence across stations, a more streamlined but reliable approach will be easier to learn and therefore more useful. ”

“ Any tactile system that is new to blind and partially sighted users would need to be learnt. If rolled out, it would need to be well communicated and explained to individuals, sight loss organisations, mobility trainers and community user groups. ”

Tactile Paving & Wayfinding
Appendix B: Application Examples



Appendix B: Application Examples

Poor Installation and Watch Points



This section sets out some installation and application watch points that have been identified. The examples here typically fall into the following categories:

- Inconsistent application across an area of station
- Additional markings obscure legibility of tactiles
- The incorrect tactiles have been installed
- Tactile application does not take into account the surroundings and obstacles
- Product choice is not suitable for the purpose



Image B.1

Tactile paving staggered at the platform edge

Platform edge warning tactiles should be installed in a continuous line, avoiding staggers. In some scenarios where a platform is extended, the existing tactiles may have a non-compliant platform edge offset, with new tactiles installed correctly, resulting in a stagger. Please refer to section 3.2.2 for more information on the arrangement and setting out of staggered tactile platform edge warning paving.



Image B.2

Guidance paths applied to the length of a platform

Tactile guidance paths should not be applied running along the entire length of a platform. The close proximity to the tactile platform edge warning surface may lead to confusion for blind and partially sighted passengers. Tactile guidance paths should only be applied on platforms where primary/secondary destinations can only be accessed using a wider section of the platform. Please refer to section 2.5 for more information on when to use tactile guidance paths on platforms.

Appendix B: Application Examples

Poor Installation and Watch Points



Image B.3

Platform edge warning tactiles

Tactile paving to warn of the platform edge should be applied to all platforms, and consistently across the station. Scenarios where these are not consistently applied across all platforms can increase the risk of danger to life.



Image B.4

Additional markings applied over warning tactiles

'Waiting Zone', 'Keep Clear' and other platform markings should not be applied over warning or guidance tactiles. Tactile paving should be visible, with sufficient tonal contrast; the layering of additional hatched markings can reduce visibility, legibility and cause confusion for all passengers. Additional markings are advised against in RIS 7016.



Image B.5

Tactile installation that does not consider obstacles

Wherever possible, tactile paving should be installed to avoid obstacles in the built environment in order not to cause disorientation or danger to users. Where it is not possible to avoid obstacles, tapping rails should be installed (please refer to section 2.5.5 for further information).

Appendix B: Application Examples

Poor Installation and Watch Points



Image B.6

Applied tactile is lifting or curling

The applied tactile has been installed incorrectly, which has resulted in it lifting and allowing moisture and dirt to get between the tile and the substrate. As the tile lifts further it might become loose or constitute a trip hazard. Several factors may have caused this, including the tile not being securely adhered to a flat surface.



Image B.7

Mixing the use of different products

Materials and products should be used consistently, and should not be combined. Different materials might age and weather in different ways, and have varying slip resistance and performance. A difference in LRV of materials that are supposed to perform consistently can also cause confusion for some passengers.



Image B.8

Installation of the incorrect tactile surface

In this example, the incorrect tactile surface has been installed. An inconsistent combination of blister tiles (lower landing) and offset blister tiles (upper landing) are present in the image. The correct application would be to install corduroy warning tactiles at the top and bottom of the stairs.

Appendix B: Application Examples

Poor Installation and Watch Points



Image B.9

Multiple guidance paths to paired lift doors

Avoid providing separate guidance paths to each lift door when more than one lift services the same destination(s). This document advises that a single guidance path should be provided, aligned to the lift call button. The intent is to minimise the extent of tactile paving in the manoeuvring space immediately outside the lift doors for wheelchair users or passengers with pushchairs or luggage.

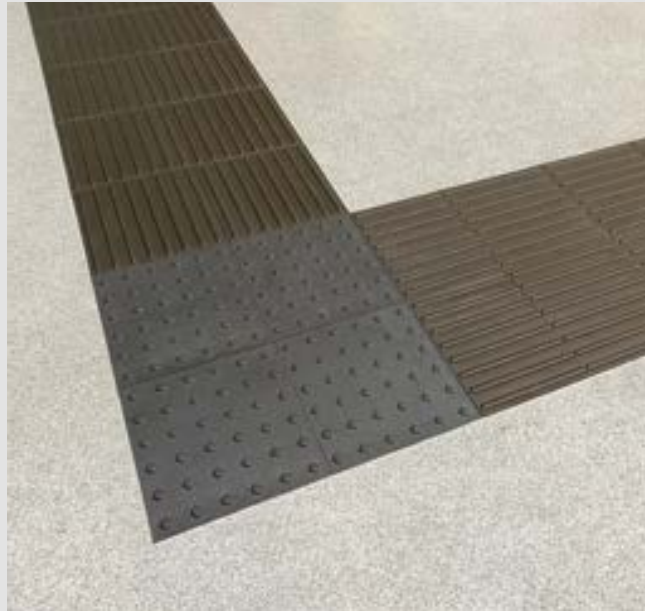


Image B.10

Using a blister tactile at a 90 degree turn

In this image, an inline blister tile has been installed at every 90-degree turn, which does not align with this guideline. A 90-degree turn is a continuation of a route, not a decision point where a choice between destinations is required. Therefore, at a 90-degree turn, the guidance path should continue without utilising an inline blister tile.



Image B.11

Applying the incorrect tactile for guidance paths

A domed corduroy tactile paving tile has been installed as a guidance path. The tactile guidance path should be a flat-topped bar. Installing the incorrect tactile type may lead to confusion, and could be less comfortable to walk along and follow as a guidance path.

Appendix B: Application Examples

Suppliers

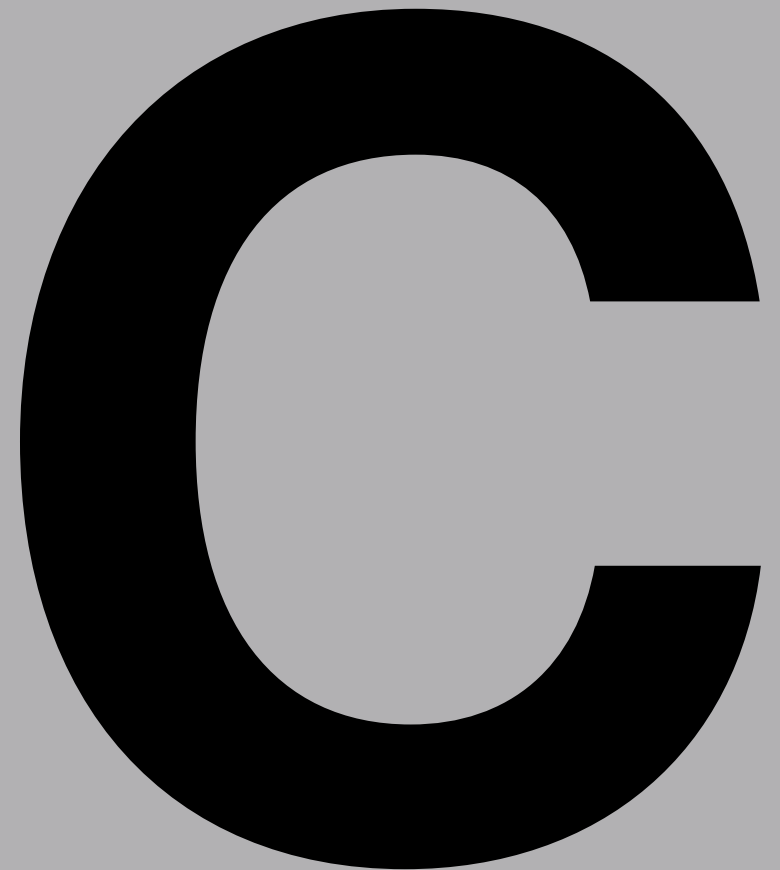


The table on the right hand side provides a list of common manufacturers or suppliers, and the type of product they provide.

This table is not exhaustive, and other manufacturers can be considered. Network Rail do not advocate the use of any manufacturer or supplier over others.

Supplier	Paving Slabs	Surface Mounted	Studs	Ceramic	Cast Metal
AATi					X
SureGrip		X			
Viztek		X	X		
Aggregate Industries	X				
Visul Systems		X			
FP McCann	X				
Marshalls	X				
Tobermore	X				
FibreGrid		X			
SDG		X			
AG Professional	X				
Killeshal Precast	X		X		
Kent Stainless			X		
PodoTactil			X		
Pomery Natural Stone	X				
CED Stone	X				
UrbaStyle	X				
Environmental Street Furniture			X		
Brett Landscaping	X				
Dorset Woolliscroft				X	
Shackerley				X	
CTA Group (Austact)			X		
Guardian Tactile Systems	X	X	X	X	

Tactile Paving & Wayfinding
Appendix C: Document References



Definitions

**BEAP**

Built Environment Accessibility Panel

BREEAM

Building Research Establishment
Environmental Assessment Methodology

BS

British Standards

COP

Code of Practice

CRI

Colour Render Index

DfT

Department for Transport

DIA

Diversity Impact Assessment

EPDs

Environmental Product Declarations

GBR-TT

Great British Railways Transition Team

ISO

International Organisation
for Standardization

LRV

Light Reflectance Value

NR

Network Rail

NTSN

National Technical Specification Notice

PRM NTSN

Persons of Reduced Mobility
National Technical Specification Notice

RIS

Rail Industry Standard

RNIB

Royal National Institute of Blind People

RSSB

Rail Safety and Standards Board

TOCs

Train Operating Companies

UKAS

United Kingdom Accreditation Service

Obstacle-free Route

An obstacle-free route is a link between two or more public areas dedicated to the transport of passengers. It can be navigated by all persons, including those with disabilities and reduced mobility. In order to achieve this, the route may be divided, for example, by lifts in addition to stairs. To achieve an obstacle-free route, the combination if all its part must offer accessible means of navigation.



Below is a list of the relevant standards and guidance documents referenced within this guideline. These documents were drawn from various sources to develop this guideline. The following list is provided for reference only and is not exhaustive.

Relevant Network Rail Standards and Guidance documents:

- NR/GN/CIV/100/02, Station Design Guidance
- NR/GN/CIV/100/03, Station Capacity Planning
- NR/GN/CIV/200/01, Materials and Components
- NR/GN/CIV/200/02, Design Manual for Medium to Small Stations
- NR/GN/CIV/200/05, Vertical Circulation
- NR/GN/CIV/200/10, Public Realm Design Guidance for Stations
- NR/GN/CIV/300/04, Inclusive Design Manual
- NR/L2/XNG/30020, Level Crossing Design Handbook
- NR/L3/CIV/030, Platform Components and Prefabricated Construction Systems
- Planning and Designing for Safer Escalator Use at Stations

Other useful documents:

- BS 8300 Part 1 (External Environment) 2018, Design of an Accessible and Inclusive Built Environment
- BS 8300 Part 2 (Buildings) 2018, Design of an Accessible and Inclusive Built Environment
- BS 7533-101:2021, Pavements Constructed with Clay, Concrete or Natural Stone Paving Units (Code of Practice for the Structural Design of Pavements Using Modular Paving Units)
- BS EN 1339:2003, Concrete Paving Flags (Requirements and Test Methods)
- BS EN 1341:2012, Slabs of Natural Stone for External Paving (Requirements and Test Methods)
- PD CEN/TS 15209:2021, Tactile Paving Surface Indicators Produced from Concrete, Clay and Stone
- BS EN 1344:2013, Clay Pavers (Requirements and Test Methods)
- BS 5385-3:2014, Design and Installation of Internal and External Ceramic and Mosaic Floor Tiling in Normal Conditions
- Department for Transport, Guidance on the Use of Tactile Paving Surfaces, 2021
- Department for Transport, Inclusive Mobility - A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure, 2021
- Department for Transport, Design Standards for Accessible Railway Stations, 2015
- ISO 23599:2019, Assistive Products for Blind and Vision-Impaired Persons (Tactile Walking Surface Indicators)
- National Technical Specification Notice, Persons with Reduced Mobility (PRM), 2021
- RIS 7701 Issue 1, Automatic Ticket Gates at Station
- RIS 7016-INS, Interface between Station Platforms, Track, Trains and Buffer Stops
- Singapore Metro Support Design Guidelines, Guide to the Layout of the Tactile Guidance System in MRT and LRT Stations
- British Journal of Visual Impairment, Indoor Navigation by Blind People: Behaviors and Challenges in Unfamiliar Spaces and Buildings



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Appendix C: Document References

Acknowledgements



Document Credits

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 Image 5.1
Barking Riverside Station
Tactile guidance path leading
to step-free access via lifts

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