

Cambridge Science Park Station

Interoperability Review

Cambridgeshire County Council

4 June 2013

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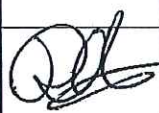


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Executive summary

This report sets out the interoperability authorisation strategy for the Cambridge Science Park Station Interchange project (the project). It provides an assessment of the overall safety level, the applicability of the TSIs and any potential derogations that may be required. This will lead to agreement on the elements of the programme requiring an authorisation for placing into service or a derogation which will then be subject to a formal application.

The key output of the project is to provide a new passenger station in the north east of Cambridge with three platforms, one of which is a south facing bay, on the current Bethnal Green to Kings Lynn line just north of Chesterton Junction. The route is currently electrified on the 25kV overhead line system.

The project does not drive a requirement for new rolling stock to operate the station. The current programme assumption is that this will be provided by rolling stock currently permitted to use the route.

When considering the infrastructure works the following points are relevant:

1. For the application of the regulations and specifications, the works to construct a new station are considered as new works. The extension of OLE equipment and track for the bay platform and all other works are classified as infill to existing routes and minor adjustments.
2. The level of novelty involved in the project is low. The works consists of infrastructure changes undertaken within the safety parameters and technical limits of well established railway technologies.
3. An independent assessment of the application of the CSM on Risk Evaluation and Assessment will be carried out which will also meet the ROGS requirement for safety verification on the elements of the programme not subject to authorisation under the interoperability regulations.

It is proposed that considering the works as a mixture of new works and minor adjustments could achieve a pragmatic and cost efficient application of, and demonstrate compliance with, relevant parts of the TSIs through the application of the interoperability regulations in parallel with application of the CSM to achieve safety verification under ROGS.

1. Introduction

The Cambridge Science Park Station Interchange project has identified some elements of the project as requiring an authorisation for placing into service under the Railways (Interoperability) Regulations 2011.

Within the regulations, the rail system is broken down into structural and functional subsystems. Structural subsystems are defined as: infrastructure, energy, control-command and signalling (trackside and train borne), and rolling stock. Functional subsystems are defined as: traffic operation and management, and telematic applications for passengers and freight services. Additionally there are transverse TSIs that cover more than one system such as Persons with Reduced Mobility and Safety in Railway Tunnels

This document sets out proposals to the Safety Authority on the requirements for and scope of authorisation. It is supported by the following information;

- a file setting out details of the project;
- an assessment of whether and how the overall safety level of the subsystem concerned may be adversely affected by the works envisaged;
- identification of any TSI, or parts thereof, for which derogations may or will be sought pursuant to regulation 14;
- an indication of any TSI, or parts thereof, which it is proposed should not apply if the Competent Authority determines that the subsystem requires authorisation.

Sections 3, 4 and 5 of this paper cover the areas described above in (b), (c) and (d) respectively. This will lead to agreement on the elements of the programme requiring an authorisation for placing into service or a derogation which will then be subject to a formal application.

This paper has been written in conjunction with the TSIs available and Recommendation 2011/217/EU “The authorisation for placing into service of structural subsystems and vehicles under directive 2008/57/EC”.

The functional TSIs are included for completeness but are accompanied by a statement indicating that functional subsystems do not require authorisation.

2. Details of the Project

A new station to be called Cambridge Science Park is to be built to the north east of Cambridge on part of the former Chesterton sidings site. It will have platforms on the current Bethnal Green to Kings Lynn line (ELR: BGK) (line speed on both lines is 75mph) and a third new bay platform facing south.

Crossing from the station building to all platforms will be achieved by footbridge which will be sufficiently elevated to clear overhead line equipment (OLE). It will also cross operational freight sidings.

The new station will allow services that currently terminate at Cambridge Station to be extended to the Science Park Station and will assist in alleviating the overcrowding experienced at Cambridge Station.

New construction will comprise the station itself with a new bay platform. Associated works will involve infill of OLE and track into the bay, minor track work to accommodate points, minimal track levelling and minor alterations to the existing signalling system and OLE.

Signal control will be provided from Cambridge SB which already controls the main line at Chesterton and the entrance to the sidings and former rail branch line which now forms the alignment for the guided busway. GSM-R/CSR are installed at this location and some trains are worked under Driver Only Operation.

The new station will have a station information and security system (SISS) and car and cycle parking. Train reversing and splitting will be facilitated in the bay platform only. The ability to join trains will not be provided in any platform.

The ability to operate freight traffic into Chesterton sidings will not be affected by the project.

Few interfaces with highways and utilities exist at the station site.

2.1. Application of the CSM on Risk Evaluation and Assessment

The proposed change to the rail system relates to a complete new station that will be built and operated in accordance with established and recognised standards. As with any station failures can occur as a result of asset failure, rolling stock failure, operational failures, human error or other outside influences (extreme weather conditions for example). The worst case scenario therefore (albeit very unlikely) is a significant accident with the potential to cause serious injury or loss of life.

There are no particularly novel or complex elements or systems proposed as part of the project and no new product approvals are anticipated. Therefore the likelihood that the station, once implemented, will not behave as predicted is low.

The 'novel' aspect to this project is that a new station will exist where none existed previously and this will increase overall risk to the rail system by the introduction of additional passengers and platform train interface risks. This will represent a significant change in risk compared to the current usage of the site (freight and wildlife). It may however reduce risk in other parts of the rail system.

In applying the criteria in the CSM to the proposed change at Chesterton, there are no other recent changes in the area that would need to be taken into account. (additionality). Given the lack of novelty and/or relatively low complexity of the scheme, the uncertainty of outcome is not significant. The consequence of failure of the new station once complete could be catastrophic for the rail system.

Considering the balance ('uncertainty of outcome' x 'consequence of failure' - the significance test) for this project produces a borderline 'significant' change outcome. This would suggest additional criteria should be applied. Considering the criterion with respect to an ability to monitor the implemented change throughout the system life-cycle and take appropriate interventions, and since, in practice, numerous, standard systems and processes will be implemented to monitor and operate the station throughout its lifecycle, this criterion does not push the outcome towards the significant side of the scale.

However, reversibility would be impractical to consider with respect to a project of this nature. (ie closure and demolition of the station would not be an option)

It is therefore considered that the project is significant with regard to the CSM and the CSM will be applied. Furthermore, the application of the CSM and its associated independent assessment will satisfy the safety verification requirements of ROGS.

3. Effect on the overall safety level

This section describes the impact of the project on the overall safety level of the railway system affected by the works.

3.1. Infrastructure subsystem

Although previously used as a freight yard, the new station will be built on a partially disused siding and at either side of the current Bethnal Green to Kings Lynn route.

Introduction of a three platform station and additional OLE would be a significant change in risk compared with previous railway operations on site. The project will utilise established and product approved technology, at this stage no new product approvals are anticipated.

The changed risks will be mitigated by the extension of current railway processes and procedures to the new station. This will be complemented by a publicity campaign.

3.2. Energy subsystem

An electrified bay platform is to be constructed on the west side of the new station. The project will utilise established and approved technology. No new product approvals will be required.

3.3. Co Co Sig subsystem

Construction of the bay platform will require one main class route to be provided. The project signalling works will be designed in accordance with existing signalling principles and established technologies.

GSM-R/CSR communications between signaller and driver will be implemented in the bay platform by an extension of the current network and operating rules.

3.4. Rolling Stock subsystem

No new trains will be provided and those used in the new station will be the EMUs and DMUs currently serving the route.

3.5. Conclusion

The project does constitute a change in safety risk over the current situation for the site but may well herald reductions in safety risk elsewhere by amelioration of overcrowding risk at Cambridge Station and fewer local passenger road miles in travelling to other stations. The proposed works consist of infrastructure changes undertaken within the safety parameters and technical limits of well established railway technologies. It will extend the use of established railway processes and procedures to a new area. Any risks will be mitigated by training and awareness programmes for railway staff and the public alike.

4. Application of TSIs

The regulations (5)(a) and (b) describe factors to be taken into account when a decision regarding authorisation is made. These include

- (a) the implementation strategy provided in any relevant TSI; and
- (b) the size of the proposed works.

This section includes an opinion on these areas to aid the decision making process.

A summary of the status and applicability of the TSIs at the time of writing is included in Appendix A of this document. The sections below explain the reasons behind the decision.

4.1. High Speed TSIs

The project has no works taking place on High Speed TEN-T routes so the requirements of the High Speed TSIs would not be applicable.

4.2. Transverse TSIs

4.2.1. Persons with Reduced Mobility (PRM)

This TSI is split into two main sections concerning infrastructure (4.1) and rolling stock (4.2). The rolling stock elements of the TSI would not be applicable to this project which is using existing rolling stock. Within Clause 7.3.1.1 of the TSI the infrastructure elements are split further into 2 blocks, station buildings (including parking areas, toilets, sales offices etc) and platforms.

Clause 7.1.1 of the TSI states:

“Infrastructure aspects of Chapters 2 to 6 of the TSI and any specific provisions below apply in full to new infrastructure being placed into service.”

Clause 7.3.1.1 of the TSI states:

“Systems and Components that are not included in the scope of a particular upgrade or renewal programme do not have to be made compliant at the time of such a programme.”

Clause 7.3.2 of the TSI states:

“The TSI does not apply to existing Rolling Stock as long as it is not being renewed or upgraded.”

The Cambridge Science Park Station is new and the infrastructure elements of the TSI would apply.

4.2.1.1. Conclusion

It is proposed that the relevant sections of this TSI would be applicable to the new station as a complete new ‘block’ of facilities is being constructed. No derogations will be sought for the application of the appropriate parts of the PRM TSI on this subsystem.

The following parts of the TSI are proposed not to apply and shall be excluded from any assessment process.

Sections:

- 1, Introduction;
- 2, Definition of Subsystem/Scope of the subsystem;
- 3, Essential requirements, and
- 4.1.3 Functional and technical specifications of the interfaces

are considered to be informative and containing no requirements.

Section 4.1.2.21, Boarding aids for passengers using wheelchairs (Platform Lifts) is not applicable to this station project.

Section 4.1.2.22, Level track crossing at stations is not applicable to this project.

Section 4.2, Subsystem Rolling Stock is not applicable to this project.

The following GB specific cases will be applied:

The platform height will be in accordance with the GB specific case detailed in section 7.4.1.1 of the PRM TSI.

The platform offset will be in accordance with the GB specific case as detailed in section 7.4.1.2 of the PRM TSI.

The stepping distances for all existing rolling stock will be in accordance with the GB specific case detailed in 7.4.1.3.2 of the PRM TSI.

The assessment of this subsystem will be done in accordance with Module SG.

4.2.2. Safety in Railway Tunnels (SRT)

There are no tunnels in the station project and this TSI is not applicable.

4.3. Combined High Speed and Conventional Rail TSIs

4.3.1. Control, Command and Signalling (CoCoSig)

The station project has no requirement to install ERTMS to meet the required project objectives and the project will not change the functions or the performance of the radio part of the CoCoSig track-side subsystem already in service (CSR). As described in the TSI Clause 2.2 – Overview, the requirements of the TSI are split in two, trackside systems and train borne systems. These will be considered separately.

4.3.1.1. CSR/GSM-R

Works are being progressed on the basis that the existing system for driver/signaller communication, Cab Secure Radio (CSR), will cover the bay platform at the new station with any necessary minor infill works. This will not give rise to a requirement for authorisation as its functions and performance are not being changed for these works.

GSM-R is not mandated (7.2.7.1.2) for the proposed station works and will not be provided by the project for driver/signaller communication or for GSM-R data communication between the infrastructure and the train.

Any requirements for the extension of the GSM-R system and operational rules would be completed under the existing RIR process agreed for GSM-R. Any need for a reauthorisation of modified GSM-R equipment will be assessed by the GSM-R project team and progressed as appropriate.

4.3.1.2. Train Borne

The project is reliant on existing electric multiple units to provide the rolling stock for the proposed service. This rolling stock is not currently fitted with ETCS technology.

The project will not make any changes to the existing trains, therefore the project will neither facilitate nor preclude any future fitment of ETCS/ERTMS to these trains.

4.3.1.3. Trackside

The Cambridge Science Park Station project is not shown on any current ERTMS implementation plan so does not need to be considered as requiring an authorisation. The future conversion of the signalling system at Cambridge SB, which will control the new station will drive the fitment of rolling stock to operate in the area. The current project requirements mandate that any signalling infrastructure is supplied ERTMS ready so as not to frustrate any future migration that would be of benefit.

No new interlocking will be used.

The project will make alterations to existing command systems (e.g. Cambridge signallers' workstations) which will increase the control area of the current command system but will not change the system employed or the method of operation.

4.3.1.4. Conclusion

No authorisation of the CoCoSig subsystem is required.

It is proposed that any requirement for the extension of the GSM-R system and operational rules would be completed under the existing RIR process agreed for GSM-R. The conversion of the station to ERTMS operation will be completed in the future in line with the implementation plan for the BGK route and ERTMS ready infrastructure will be fitted.

4.3.2. Operation and Traffic Management (OPE)

This is a functional subsystem and in accordance with the regulations does not require authorisation for placing into service.

4.3.3. Telematic Applications for Passenger Services (TAP)

This is a functional subsystem and in accordance with the regulations does not require authorisation for placing into service.

4.4. Conventional Rail TSIs

4.4.1. Rolling Stock (Freight Wagons) (WAG)

There are no requirements for the provision of new rolling stock wagons therefore this TSI is not applicable.

4.4.2. Rolling Stock (Noise) (NOI)

The requirements of the TSI are currently only applicable to rolling stock. There is a potential application to infrastructure in the future at the latest by 2018.

4.4.2.1. Infrastructure Works

There are no applicable requirements relating to infrastructure.

4.4.2.2. Conclusions

There are currently no applicable noise requirements relating to infrastructure works though requirements are placed upon the station project by the CCC.

4.4.3. Rolling Stock (Locomotives and Passenger Carriages) (LOC&PAS)

The project is reliant on existing rolling stock and the Rolling Stock TSI is not applicable.

4.4.4. Telematic Applications for Freight (TAF)

This is a functional subsystem and in accordance with the regulations does not require authorisation for placing into service.

4.4.5. Energy (ENE)

The project proposes the OLE works should be considered as infill and adjustment. The works will replace existing OLE with portal structures to cover the station platforms and to provide the new bay platform OLE. It will require no new products and will be undertaken in accordance with well established methods and be in compliance with current standards. Contact wire heights, permissible lateral deviation, pantograph gauge and protective provisions will all be designed to current standards and as far as possible will not be affected by the new station.

The rolling stock that currently operates in the proposed new station area will be unchanged and will continue to use the OLE equipment when the station is constructed.

4.4.5.1. Conclusion

No authorisation of the Energy subsystem is required.

4.4.6. Infrastructure (INF) – Station Works

It has been assumed that the rail route through the new station is classified as mixed traffic Other TEN route so TSI categories VI-M and VII-M could apply.

The project is adding a bay platform to a current route which is intended for passenger trains only. A new route is not being created.

It is proposed that the station infrastructure works should be considered as a new construction on an upgraded line where the UK special cases (TSI Clause 7.6.12) could apply. The project route should therefore be considered a category VII-P line.

An assessment of the requirements of the Infrastructure TSI for the station design has been undertaken in more detail and is included in Appendix B.

4.4.6.1. Station Structure Gauge

The station platforms will achieve clearance for all the rolling stock currently used on the route. All rolling stock within the sectional appendix as well as freight gauges W10 & W12 will be checked for stepping,

passing and structural clearances within the limits of the proposed track alterations. This is the proposed project specific structure gauge as provided for by the specific case in the TSI (clause 7.6.12.2).

The new footbridge at the station will be designed to accommodate W12 freight gauge and electrification clearance.

4.4.6.2. Platform Length

Within the Infrastructure TSI Table 3 a Category VII-P line has the performance parameter requirement for 250m train lengths. Platform length will be 270m at the new station. This is therefore compliant with the requirements of the TSI.

4.4.6.3. Structures Capability

No new relevant structures will be provided.

4.4.6.4. Conclusion

When classified as an upgraded line a pragmatic application of elements of the TSI is possible and the project should proceed on this basis. No derogations are being sought for the application of the appropriate parts of the CR INF TSI on this subsystem.

Should this subsystem require authorisation, the following parts of the TSI are proposed not to apply and shall be excluded from any assessment process.

Sections 1, Introduction; 2, Definition of Subsystem/Scope of the subsystem; 3, Essential requirements, 4.1, Introduction and 4.3, Functional and Technical Specification of the Interfaces are considered to be informative and containing no requirements.

Where open points are identified in the TSI the relevant national standards shall be used to demonstrate compliance. Where NTRs or relevant standards are not available the open point shall be considered as not applicable.

Section 4.2.13 is not applicable as facilities for the servicing of HS and CR rolling stock TSI compliant trains are not being provided.

Section 4.4.1 and 4.4.2, Operating Rules are only applicable in respect of including the new station, where appropriate, in the existing operating rules.

Section 4.4.3, Protection of Workers against aerodynamic effects is not applicable to this project owing to the speed of trains (max 75mph) in the station.

Section 4.7, Health and Safety Conditions where the sections are excluded from the assessment.

Should this subsystem require authorisation, the following UK specific cases will be applied:

The published information relating to axle load shall use the Route Availability number in combination with the permitted speed in accordance with the UK specific case detailed in section 7.6.12.1 of the CR INF TSI.

A project specific gauge shall be applied in accordance with the UK specific case as detailed in section 7.6.12.2 of the CR INF TSI.

The stepping distances for all TSI compliant rolling stock will be in accordance with the UK specific case detailed in 7.4.1.3.2 of the PRM TSI.

Because of the use of an existing railway formation, the distance between track centres will remain as is in the station area, and the UK specific case as detailed in section 7.6.12.3 shall be applied as topographical constraints require.

The assessment of this subsystem will be done in accordance with Module SG.

4.4.7. Infrastructure (INF) – Track works

The project proposes the track works should be considered as infill and adjustment. The works will include minor track work to accommodate points, minimal track levelling and extension of track into the new bay platform. The works will require no new products and will be undertaken in accordance with well established methods and be in compliance with current standards.

4.4.7.1. Conclusion

No authorisation of the track element of the infrastructure subsystem is required.

5. Potential derogations to TSIs

The requirements for derogations detailed below is the assessment of the programme at its current status, within outline design (GRIP 3). If, at a later stage, derogations are found to be required then an application will be made in accordance with the current procedures.

5.1. High Speed TSIs

Not Applicable.

5.2. Transverse TSIs

5.2.1. Persons with Reduced Mobility

The current assessment is that no derogations are anticipated.

5.2.2. Safety in Railway Tunnels

Not Applicable.

5.3. Combined High Speed and Conventional Rail TSIs

5.3.1. Command Control and Signalling

Not Applicable.

5.3.2. Operation and Traffic Management

Not Applicable.

5.3.3. Telematic Applications for Passenger Services

Not Applicable.

5.4. Conventional Rail TSIs

5.4.1. Rolling Stock (Freight Wagons)

Not Applicable.

5.4.2. Rolling Stock (Noise)

Not Applicable.

5.4.3. Rolling Stock (Locomotives and Passenger Carriages)

Not Applicable.

5.4.4. Operation and Traffic Management

Not Applicable.

5.4.5. Telematics for Freight Wagons

Not Applicable.

5.4.6. Energy

Not Applicable.

5.4.7. Infrastructure

It is our proposal that the station infrastructure works are classified as new construction on an upgraded line, rather than a new line, and therefore no derogations are anticipated.

6. Proposed method of Authorisation

For a project involving elements requiring authorisation under the Interoperability Regulations two methods of authorisation exist for different parts of the project.

6.1. RIR (Authorisation for placing into service)

To make an authorisation for placing into service the Safety Authority requires a technical file to be submitted. This would include details of the programme and an assessment of TSI compliance by a Notified Body (NoBo). Under the regulations this will also include assessments by a Designated Body (DeBo) for notified NTRs.

6.2. ROGS (Application of the CSM)

For those elements of the project not subject to authorisation under the interoperability regulations, an assessment body will review the project for compliance with the CSM on risk evaluation and assessment and, if satisfied, issue a safety assessment report showing compliance with the CSM and the decision to implement the change remains the responsibility of the proposer. Where an authorisation is also required for the same system, the safety assessment report should be submitted to the Safety Authority with the technical file. When appointed, a remit will be agreed with the CSM assessment body (AsBo).

6.3. Conclusion

Although not large the works are to be executed within the safety and technical parameters of the well established railway technologies, standards, processes and procedures.

For the elements of the project subject to approval under the interoperability regulations the technical conformance assessment will be carried out by a NoBo/DeBo. In parallel a CSM assessment body will check compliance with the application of the CSM for elements of the project being authorised under ROGS and where required for elements authorised under RIR. The remits for the two assessments will be carefully controlled to eliminate any duplication.

Appendices

Appendix A. TSI Applicability Overview

| Scope | Station | OLE | Signalling | Non-station Infrastructure | Rolling Stock |
|---|---|---|--|---|---|
| TSI | | | | | |
| All High Speed | No works, no authorisation proposed | | | | |
| Conventional INF | Three new station platforms Authorisation proposed | No applicable requirements | No applicable requirements | Works not considered major No proposed authorisation | Existing rolling stock No authorisation proposed |
| Transverse PRM | One new station including three new station platforms Authorisation proposed for infrastructure elements. | No applicable requirements | No applicable requirements | No applicable requirements | Existing rolling stock No authorisation proposed |
| Transverse SRT | No applicable requirements | No applicable requirements | No applicable requirements | No applicable requirements | Existing rolling stock No authorisation proposed |
| Combined and Conventional CoCoSig | No applicable requirements | No applicable requirements | No authorisation proposed. Any future reauthorisation of GSM-R deemed to be required will be progressed by the GSM-R project. | No applicable requirements | Existing rolling stock No authorisation proposed |
| Conventional ENE | No applicable requirements | Works not considered major. No authorisation proposed. | No applicable requirements | No applicable requirements | Existing rolling stock No authorisation proposed |
| Other: CR LOC&PAS, Noise, Operation and Traffic Management, Telematic Applications for passengers, Freight Wagons, Telematic Applications for Freight. There are no applicable requirements or requirements for authorisation for any of these TSIs, other than the provision of passenger information at the new station. | | | | | |

Appendix B. INF and PRM TSI Applicability Assessment

CR INF TSI

| | Cambridge Science Park Station | |
|---|--------------------------------|----------|
| S – station works. T – track works. | | |
| ■ - project compliant. ■ - not applied | | |
| INFRASTRUCTURE SUBSYSTEM | S | T |
| Line Layout | | |
| 4.2.4.1 Structure Gauge | ■ | |
| 4.2.4.2 Distance between Track Centres | | |
| 4.2.4.3 Maximum Gradients | | |
| 4.2.4.4 Minimum Radius of horizontal curve | | |
| 4.2.4.5 Minimum radius of vertical curve (600m crest/ 900m hollow) | | |
| Track parameters | | |
| 4.2.5.1 Nominal track gauge | | |
| 4.2.5.2 Cant | | |
| 4.2.5.3 Rate of Change of Cant | | |
| 4.2.5.4 Cant Deficiency | | |
| 4.2.5.5 Equivalent Conicity | | |
| 4.2.5.6 Railhead Profile | | |
| 4.2.5.7 Rail Inclination | | |
| 4.2.5.8 Track Stiffness | | |
| Switches and Crossings | | |
| 4.2.6.1 Means of locking | | |
| 4.2.6.2 In service geometry of switches and crossings | | |
| 4.2.6.3 Maximum unguided length of fixed obtuse crossings | | |
| Track Resistance to Applied Loads | | |
| 4.2.7.1 Track resistance to vertical loads | | |
| 4.2.7.2 Longitudinal Track Resistance | | |
| 4.2.7.3 Lateral Track Resistance | | |
| Structures Resistance to traffic loads | | |
| 4.2.8.1 Resistance of new bridges to traffic loads | | |
| 4.2.8.2 Equivalent vertical loading for new earthworks and earth pressure effects | | |
| 4.2.8.3 Resistance of new structures over or adjacent to tracks | | |
| 4.2.8.4 Resistance of existing bridges and earthworks to traffic loads | | |
| Track Geometry quality and limits on isolated defects | | |
| 4.2.9 Limit for action to be based on NR Standards | | |
| Platforms | | |
| 4.2.10.1 Usable Length | ■ | |
| 4.2.10.2 Width and Edge of Platforms | ■ | |
| 4.2.10.3 End of Platforms | ■ | |
| 4.2.10.4 Height of Platforms | ■ | |
| 4.2.10.5 Offset of Platforms | ■ | |
| Health, Safety & Environment | | |
| 4.2.11.1 Maximum pressure variations in tunnels | | |
| 4.2.11.2 Noise and vibration limits and mitigation measures | | |
| 4.2.11.3 Protection against electrical shock | | |

| | | |
|--|--|--|
| 4.2.11.4 Safety in railway tunnels | | |
| 4.2.11.5 Effect of crosswinds | | |
| Provision For Operation | | |
| Fixed Installations for Servicing Trains | | |

PRM TSI

| | |
|--|----------|
| Subsystem Infrastructure | S |
| Car Parking | |
| Obstacle-free route | |
| 4.1.2.3.1 General | |
| 4.1.2.3.2 Route identification | |
| Doors and entrances | |
| Floor surfaces | |
| Transparent obstacles | |
| Toilets and baby-changing facilities | |
| 4.1.2.7.1 Subsystem requirements | |
| 4.1.2.7.2 Interoperability constituent requirements | |
| Furniture and freestanding devices | |
| Ticketing, Information desks and Customer Assistance points | |
| 4.1.2.9.1 Subsystem requirements | |
| 4.1.2.9.2 Interoperability constituent requirements | |
| Lighting | |
| Visual information: signposting, pictograms, dynamic information | |
| 4.1.2.11.1 Subsystem requirements | |
| 4.1.2.11.2 Interoperability constituent requirements | |
| Spoken information | |
| Emergency exits, alarms | |
| Geometry of footbridges and subways | |
| Stairs | |
| Handrails | |
| Ramps, escalators, lifts, travelators | |
| Platform height and offset | |
| 4.1.2.18.1 Platform height | |
| 4.1.2.18.2 Platform offset | |
| 4.1.2.18.3 Track layout along the platform | |
| Platform width and edge of platform | |
| End of platform | |
| Boarding aids for passengers using wheelchairs | |
| 4.1.2.21.1 Subsystem requirements | |
| 4.1.2.21.2 Interoperability constituent requirements | |
| Level track crossing at stations | |
| | |
| Subsystem Rolling stock | NA |

Appendix C. Abbreviations

| Abbreviation | Means |
|--------------|--|
| AsBo | Assessment Body |
| CoCoSig | Control Command and Signalling |
| CSM | Common Safety Method on Risk Evaluation and Assessment |
| CSR | Cab Secure Radio |
| DeBo | Designated Body |
| DMU | Diesel Multiple Unit |
| EC | European Community |
| EMU | Electric Multiple Unit |
| ENE | Energy |
| ERTMS | European Rail Traffic Management System |
| ETCS | European Train Control System |
| GB | Great Britain |
| GSM-R | Global System for Mobile Communications - Railway |
| INF | Infrastructure |
| LOC&PAS | Locomotives and Passenger Carriages |
| NoBo | Notified Body |
| NOI | Noise |
| OLE | Overhead Line Equipment |
| OPE | Operation and Traffic Management |
| PRM | Persons with Reduced Mobility |
| RIR | The Railways (Interoperability) Regulations 2011 |
| ROGS | The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended) |
| SB | Signal Box |
| (Module) SG | EC verification based on unit verification |
| SISS | Station Information and Security System |
| SRT | Safety in Railway Tunnels |
| TAF | Telematic Applications for Freight |
| TAP | Telematic Applications for Passenger Services |
| TEN-T | Trans-European Network – Transport (or Trans-European Transport Network) |
| TSI | Technical Specification for Interoperability |
| WAG | Freight Wagons |

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