

OFFICIAL



**UK BRIDGES BOARD**

# PARAPET HEIGHT PROTOCOL FOR ASSET OWNERS & MANAGERS

## DESIGN GUIDANCE



**COMMENTS & FEEDBACK**

The UK Bridges Board would welcome any comments and feedback on this document, so that it may be reviewed, improved, and refined to give the sector the best support possible. If you wish to make a comment, please send an email to [ukrlg@ciht.org.uk](mailto:ukrlg@ciht.org.uk) with the header, 'Feedback on the Parapet Height Protocol'.

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# 1 INTRODUCTION

## PURPOSE

- 1.1 To give guidance and advice to highway managers and bridge owners regarding roles and responsibilities relating to the revised requirements for bridges over the railway detailed in Network Rail Letter of Instruction NR/BS/LI/331<sup>1</sup> Issue 3.

## SCOPE

- 1.2 The guidance is intended for all highway authorities (where the term highway authority appears in this document it shall be deemed to include reference to road authorities in Scotland and Northern Ireland) and for all local authorities, transport authorities, and other public authorities who own bridges and similar structures over or adjacent to the national rail network.
- 1.3 The guidance relates only to the revised and clarified requirements for bridges over the railway detailed in Network Rail Letter of Instruction NR/BS/LI/331 Issue 3.
- 1.4 The document is advisory and sets out an initial position from which negotiations between parties can begin for each project (with regards to the apportioning of responsibility and costs of enhancements).

## INTRODUCTION

- 1.5 This document has been prepared by a working group including representatives from ADEPT, National Highways, Transport Scotland, Welsh Government, Network Rail, and Mott MacDonald.
- 1.6 This document has been produced to provide guidance to infrastructure owners and managers in relation to the revised and clarified bridge and bridge parapet requirements detailed in Network Rail Letter of Instruction NR/BS/LI/331 Issue 3 that amends Network Rail Bridge Design Standard NR/L3/CIV/020<sup>2</sup> Issue 1.
- 1.7 This document specifically sets out the roles and responsibilities. The document also includes and an initial position for cost sharing framework associated with the revised requirements for bridges carrying a public highway over the railway.
- 1.8 This document also intends to raise awareness of the extent of edge protection risk and the role that good parapet design can have in mitigating this risk.
- 1.9 The information contained in this document is believed to be correct at the time of publication, but regulations, standards and specifications are subject to change. The reader should refer to their organisations' latest instructions which this document does not supersede.
- 1.10 The contributors to this document have used their best endeavours to make sure that the content, layout, and text of this document are accurate. No responsibility for any loss occasioned to any person acting or refraining from action as a result of any statement in this document, can be accepted by the contributors to the document, or their associated organisations. The publication is not intended to be a fully exhaustive review of the subject and it is incumbent upon any person to undertake their own research and formulate their own conclusions.
- 1.11 The contributors make no warranty, expressed or implied, that compliance with the contents of this document is sufficient on its own to guarantee safe systems of work or operation. Each

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<sup>1</sup> Letter of Instruction NR/BS/LI/331 'Bridge parapet requirements': Issue 3: December 2020 (withdrawn December 2021): Network Rail

<sup>2</sup> NR/L3/CIV/020 'Design of Bridges': Issue 1: March 2011, updated August 2015: Network Rail

user is reminded of their own responsibilities for health and safety at work and their individual duties under health and safety, road traffic and highway related legislation.

## 2 BACKGROUND

### LEGAL RESPONSIBILITIES

- 2.1 This protocol is necessary because bridge parapets mitigate certain risks that result from the presence of the railway (e.g. unauthorised access to the railway), and some that result from the presence of the highway above (e.g. edge restraint to persons and vehicles). The result is that responsibilities for the assessment and mitigation of some of these risks rests with the highway authority, some with the railway infrastructure authority, and some with both authorities.
- 2.2 The following text is extracted from the DfT document “Managing the accidental obstruction of the railway by road vehicles”<sup>3</sup> (2003); the text is considered equally valid for this protocol document.
- 2.3 “The Health and Safety at Work etc. Act 1974 (HSWA), with its related regulations, imposes a general duty on employers to protect the health and safety not only of their employees but also of others affected by their operations (i.e. including the general public not using railways). Implicit in the HSWA<sup>4</sup>, and explicit in the Management of Health and Safety at Work Regulations 1999<sup>5</sup>, is a requirement for every employer to make a suitable and sufficient assessment of risk. This assessment must cover risks to employees and anyone else potentially affected by the conduct of the employer’s activities. The purpose is to manage health and safety risks down to the lowest reasonably practicable levels. Railway companies have a duty to assess risks and to take any reasonably practicable steps to reduce them. “Reasonably practicable” is assessed by agreeing the value used of preventing a fatality. This value is published annually in the Railway Group Safety Plan. Once necessary actions have been identified through the risk assessment process, railway companies have a legal obligation to carry them out.”
- 2.4 “There are differing views on whether highway authorities have a similar legal duty. Highway law has its roots in common law and authorities generally have powers rather than duties. The Highways Act 1980<sup>6</sup> puts on highway authorities a duty to maintain the highway (Section 41), which is usually understood to mean that they should ensure the safe passage of road users. They also have a duty under Section 39(3) of the Road Traffic Act 1988<sup>7</sup> to study road traffic accidents and to take such measures as they consider appropriate to prevent them. Similar duties are required of authorities in Scotland under the Roads (Scotland) Act 1984.”
- 2.5 “It may be difficult for a railway infrastructure authority to fulfil its duties under the Health and Safety at Work Act<sup>4</sup> if the reasonably practicable steps it identifies need to be taken on land outside the railway boundaries, where it has no authority to take action. The action may be on land where the highway authority has the power to take action but may not have a precise legal duty. Furthermore, the railway infrastructure authority may not be in a position to consider the overall effect on road safety of any measures proposed.”
- 2.6 This protocol sets out what has been agreed about the responsibilities of the highway authorities and the railway infrastructure authorities in this matter, and who should pay for what.

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<sup>3</sup> ‘Managing the accidental obstruction of the railway by road vehicles’: September 2020: Department for Transport

<sup>4</sup> The Health and Safety at Work etc. Act 1974: The Stationary Office Ltd

<sup>5</sup> The Management of Health and Safety at Work Regulations 1999: (S.I. 1999 No. 3242): The Stationary Office Ltd

<sup>6</sup> Highways Act 1980: The Stationary Office Ltd

<sup>7</sup> Road Traffic Act 1988: The Stationary Office Ltd

## AN ASSESSMENT OF EDGE PROTECTION RISK

- 2.7 In 2014 Network Rail commissioned a study to review the bridge parapet geometrical requirements specified in Network Rail standard NR/L3/CIV/0202 'Design of Bridges'. The study primarily involved:
- Risk assessment, analysis of railway accident and safety risk data, and cost benefit analysis, to estimate the risk profile for different bridge environments and indicate where an increased height of parapet (to 1.8m) may be appropriate in terms of risk reduction (to fulfil ALARP requirements), for both new and existing structures.
  - A review of UK railway, national and European requirements relating to the protection of persons (on a bridge) from direct or indirect contact with live parts of overhead electrification equipment. This included an anthropometric (reach) study.
- 2.8 Key study findings
- The safety risk associated with suicide, trespass, and accidental falls onto national rail infrastructure via bridge parapets is markedly high, and typically under-appreciated. The risk has been estimated to be of the order of **13 Fatalities and Weighted Injuries (FWI)** per year (with suicide accounting for approximately 75% of this figure, and falls from structure accounting for a further 20%). To put this figure into perspective, it is greater than the reported<sup>8</sup> annual risk of train accidents (7.8 FWI per year), train derailments (2.4 FWI per year), level crossing risk (11.4 FWI per year) and road vehicle incursion risk (0.5 FWI per year).
  - Increasing the height of parapets (to 1.8m) is expected to significantly reduce the risk of falls from bridges and lead to a small reduction in risk of suicide from bridges (50% and 10% reductions respectively were assumed for the 'baseline scenario').
  - Quantitative Risk Assessment indicated that raising the standard height of bridge parapets on new or renewed bridges to 1.8m is justified (on risk ALARP grounds), except where the risk of trespass, vandalism and suicide is very low (e.g. in remote rural locations where the bridge deck is less than 10m above the tracks).
  - For existing parapets, raising the standard height to 1.8m is unlikely to be justified (on ALARP grounds), except for structures where the risk/occurrence of trespass, vandalism or suicide is high.
- 2.9 Bridges above overhead electrified railways
- A number of the requirements within the mandated European Standard BS EN 50122-1<sup>9</sup> were considered to be either open to interpretation, or overly prescriptive or onerous, and are considered to warrant revision.
  - Providing 'protection by obstacle' by installing lateral obstacles/panels at the top or base of existing parapets (as BS EN 50122-1<sup>9</sup> options), is not typically recommended for use on the UK rail network (for safety and maintainability reasons). As such, where 'protection by clearance' cannot be provided on existing structures, a 1.8m (min) high obstacle or parapet (with/without extension) should typically be preferred.
  - The anthropometric study indicated that the BS EN 50122-1<sup>9</sup> minimum clearance dimensions should be increased for some scenarios to provide a more consistent (and higher) level of safety.

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<sup>8</sup> RSSB Annual Safety Performance Report 2013/14: Rail Safety and Standards Board

<sup>9</sup> BS EN 50119-1:2011+A2:2016 'Railway applications – Fixed installations – Electrical safety, earthing and the return circuit - Part 1 - Protective provisions against electric shock: 2011, updated February 2017: British Standards Institution

**REVISED BRIDGE PARAPET REQUIREMENTS**

## 2.10 Network Rail requirements

The conclusions from the aforementioned study have led to several changes to Network Rail Bridge Design Standard NR/L3/CIV/020. These were implemented through Letter of Instruction NR/BS/LI/3311 Issue 3). The changes within the Letter of Instruction are summarised below.

## 2.11 Reference documentation (clarification of existing regulatory requirements)

The list of reference documentation has been updated and expanded [s9.1 and 'Reference documentation']. Principle additions include:

- The Railway Safety (Miscellaneous Provision) Regulations<sup>10</sup>
- The Electricity at Work Regulations<sup>11</sup>
- The Health and Safety (Safety Signs and Signals) Regulations<sup>12</sup>
- Technical Specifications for Interoperability (INF TSI<sup>13</sup>, PRM TSI<sup>14</sup>, ENE TSI<sup>15</sup> and SRT TSI<sup>16</sup>)
- Railway Group Standards GL/RT1210<sup>17</sup>, GL/GN1610<sup>18</sup> and GM/RT1041<sup>19</sup> (NB GM/RT1041 was subsequently withdrawn in December 2015<sup>20</sup>).

## 2.12 Risk mitigation (clarification of existing regulatory requirements)

Requirement added for structures and parapets to be designed such that the risk of electric shock and unauthorised access to the railway are prevented so far as is reasonably practicable. [s9.9.4 and s10.8]

## 2.13 New/renewed structures or parapets [s10.9 and s10.17] (revised requirements)

The standard minimum parapet height (including any parapet extension) of new/renewed overline bridges and footbridges over the railway has been increased from 1.5m to 1.8m.

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<sup>10</sup> The Railway Safety (Miscellaneous Provision) Regulations 2001 (S.I. 2001 No. 3291): The Stationary Office Ltd

<sup>11</sup> The Electricity at Work Regulations 1989 (S.I. 1989 No. 635): The Stationary Office Ltd

<sup>12</sup> The Health and Safety (Safety Signs and Signals) Regulations 1996 (S.I. 1996 No. 341): The Stationary Office Ltd

<sup>13</sup> Commission Regulation (EU) 1299/2014/EU of 18 November 2014 on the technical specifications for interoperability relating to the 'infrastructure' subsystem of the rail system in the European Union: EU OJ L356, 12.12.2014, p.1

<sup>14</sup> Commission Regulation (EU) 1300/2014/EU of 18 November 2014 on the technical specifications for interoperability relating to accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility: EU OJ L356, 12.12.2014, p.110

<sup>15</sup> Commission Regulation (EU) 1301/2014/EU of 18 November 2014 on the technical specifications for interoperability relating to the 'energy' subsystem of the rail system in the Union: EU OJ L356, 12.12.2014, p.179

<sup>16</sup> Commission Regulation (EU) 1303/2014/EU of 18 November 2014 on the technical specifications for interoperability relating to 'safety in railway tunnels' of the rail system in the European Union: EU OJ L356, 12.12.2014, p394

<sup>17</sup> GL/RT1210 AC Energy Subsystem and Interfaces to Rolling Stock Subsystem: Issue 2: December 2019: RSSB

<sup>18</sup> GL/GN 1610 Guidance on AC Energy Subsystem and Interfaces to Rolling Stock Subsystem: Issue 2: December 2019: RSSB

<sup>19</sup> GM/RT1041 'Warning Signs and Notices for Electrified Lines': Issue 1: August 1997 (withdrawn December 2015): RSSB

<sup>20</sup> 15 IA14 'RSSB impact assessment for GE/RT8025, GL/RT1254, GM/RT2304, GM/RC2514 and GM/RT1041': July 2015: RSSB



Parapet heights less than 1.8m (but not less than 1.5m) can be permitted on new bridges over the railway in the following instances:

- Motorway (or similar limited access) bridges (unless the bridges span over OLE and ‘protection by safety clearance’ would not be provided)
- Footbridges with parapet mesh/screen extensions to provide 1.8m overall height
- (by agreement) Any overline bridge or footbridge in areas where trespass, vandalism, suicide, and electrocution risk is very low
- (by agreement) Where provision of a 1.8m high parapet is impractical yet (for spans over OLE) ‘protection by safety clearance’ can still be provided.

#### 2.14 Electrification (clarified and revised requirements)

Changes to the electrical protection related requirements include:

- New Railway Group Standard GL/RT121017 requirements incorporated. [10.10]
- Electrical protection by use of a horizontal/inclined obstacle (as shown in NR/BS/LI/3311 Figure 10.10(c) and BS EN 50122-1<sup>9</sup> figures A.2(a) and A.2(b)) no longer permitted (without a Departure from Standard). [s10.10.1]
- Minimum ‘protection by clearance’ distance from standing surface to HV OLE when below an imperforate deck, reduced from 3.0m to 2.25m (2.50 to 1.45m for LV OLE). [Figures 10.10.1, 10.10.2 and 10.10.3]
- Additional clearances (to those specified in BS EN 50122-1<sup>9</sup>) required where live parts of the OLE are above the standing surface and adjacent to the bridge parapet. [Figures 10.10.1 and 10.10.2]
- Parapet extensions (in mesh) permitted for existing 1.25m (min) high parapets (previously limited to 1.50m (min) high parapets). [Figure 10.10.3(c)]
- Electrocution warning signs (Type W012) to be installed on the inside face of parapets over or adjacent to exposed live OLE when a risk of electric shock from OLE from the bridge has been introduced or increased and the residual risk is not insignificant. [10.10.3]

New requirement added that passive provision for potential future overhead electrification of the railway shall be provided at new or renewed structures that are currently due to span over non-electrified or DC electrified lines (unless future electrification of the line is not reasonably foreseeable). [s9.9.4]

#### 2.15 DMRB requirements

The publication of CD 377<sup>21</sup> “Requirements for road restraint systems” has generally aligned the requirements for motorway and all-purpose trunk roads with speed limits of 50 mph or more, and two-way traffic flows with Network Rail’s Letter of Instruction 331.

As per NR/BS/LI/331 there is a requirement in CD 377 that “For all bridges and structures over railways, the minimum height of the parapet shall be 1800mm.” (CI 4.2.4). The scope for CD 377 (CI.1.3) sets out when the standard applies which aligns with both NR/BS/LI/331 and this document.

<sup>21</sup> CD 377 “Requirements for road restraint systems” (formerly TD 19/06) Revision 4: January 2021

## 3 PROTOCOL FOR APPORTIONING RESPONSIBILITY AND COSTS

### GENERAL

- 3.1 This section sets out a protocol for apportioning responsibility and costs associated with the changed requirements set out in Network Rail Letter of Instruction NR/BS/LI/331 Issue 3.
- 3.2 Responsibilities between the parties vary depending upon factors such as:
- The reason for, and type of work being undertaken
  - Who the bridge owner is
  - Who the 'Instigating Authority' is
  - The stage in the risk mitigation process
  - Relative benefits realised by rail and highway authorities
  - Existing agreements
- 3.3 The 'Instigating Authority' is defined as the rail authority or highway authority which instigates, or requires, all or the majority of the mitigation works. Examples where the rail infrastructure authority would typically be the Instigating Authority include: overhead electrification related works to bridges and bridge parapets; bridge renewal due to revised track alignment or structure gauge requirements; and strengthening of rail infrastructure authority owned bridges that fail to meet rail infrastructure authority strength obligations. Examples where the highway authority would typically be the Instigating Authority include: highway improvement related bridge modifications; increased highway loading requirements, and; repair/strengthening of highway authority owned bridges.
- 3.4 The protocol is presented through describing the responsibilities for the following scenarios:
- Installation and maintenance of electrification hazard signage on existing bridge parapets
  - Installation and maintenance of earthing and bonding measures
  - Parapet height upgrades (related to new or modified OLE)
  - Parapet height upgrades (unrelated to OLE)
  - Parapet strength (and height) upgrade
  - Bridge deck renewal
  - New bridge

#### Note

The protocol covers only those roads maintainable at public expense. Railway infrastructure providers may wish to use it as the basis for negotiations with those responsible for roads and bridges that are not maintainable at public expense, particularly those over which the public has a right of way.

It is a framework agreement, which sets out the general principles. There may need to be changes to deal with the circumstances at individual sites.

The term "lead" means responsibility for initiating and managing work and ensuring that progress is recorded.

The term "proportionate" (vis-à-vis cost share) is in relation to the relative benefits of the work to each organisation.

Not all stages will be appropriate in every instance.

## INSTALLATION AND MAINTENANCE OF ELECTRIFICATION HAZARD SIGNAGE ON EXISTING BRIDGE PARAPETS

3.5 This scenario relates to the need to install electrocution warning signs on the inside face of existing parapets over or adjacent to exposed live OLE when the risk of electric shock from OLE from the bridge has been introduced or increased and the residual risk is not insignificant. [ref NR/BS/LI/331 s9.8 and s10.10.3]

3.6 This scenario applies to both railway authority and highway authority owned bridges that cross over OLE.

Note: the responsibility for installing electrocution warning signs on new bridge parapets rests with the rail or highway authority responsible for the new bridge parapets.

**Table 3.1: Responsibilities - Installation and maintenance of electrification hazard signage on existing bridge parapets**

Stage	Lead	Costs
1. Risk Assessments	Rail authority <sup>1</sup>	Each party (highway authority and railway infrastructure authority) meets own costs
2. Feasibility study and Design Approval in Principle	Rail authority (if needed)	Each party meets own costs (if any)
3. Preparation of scheme specification for mitigation measures	Rail uthority <sup>2</sup>	Each party meets own costs
4. Land (if needed)	Rail authority (if needed)	If permission to access or use third party land to install the signage is required, associated costs shall be met in by the rail infrastructure authority. If permission to use the land is acquired, the arrangements for maintaining any measures installed, and who will pay for this, will need to be agreed at the same time.
5. Planning consent (if needed)	Rail authority <sup>3</sup> (if needed)	Rail infrastructure authority
6. Procurement of works	Rail authority	Rail infrastructure authority
7. Physical works	Rail authority	Rail infrastructure authority
8. Traffic/footway management	Rail authority	Rail infrastructure authority
9. Track possessions	Rail authority (if needed)	Rail infrastructure authority
10. Supervision of work	Rail authority	Rail infrastructure authority
11. Future inspection and evaluation	Rail authority <sup>4</sup>	Each party meets own costs (associated with its own asset management process)
12. Future maintenance and replacement	Rail authority	Rail infrastructure authority

### Notes:

1. Rail infrastructure authority responsible for determining whether risk warrants installation of electrocution warning signs.
2. The specification, sizing, and location of signage within the public realm shall be agreed between the rail infrastructure authority and local highway authority.
3. Rail infrastructure authority to liaise with and obtain agreement from local highway and planning authorities for works to listed structures.
4. Missing or otherwise defective signage to be recorded by both rail authority and highway authority examination / inspection teams, and reported to bridge owner asset engineers.
5. The Rail Authority is responsible for maintenance of any OLE attached to the highway bridge (e.g. earthing strips). The rail authority will require agreement to install or make any alterations from the highway authority. Typically, OLE equipment hazard signage attached to a highway bridge should be treated as highway signage (or other highway equipment). The highway authority or rail authority may wish to enter into an asset protection agreement

for more clarity regarding the ongoing responsibility relating to the OLE and/or the subsequent hazard signage but this is not essential.

## INSTALLATION AND MAINTENANCE OF EARTHING AND BONDING MEASURES

- 3.7 This scenario relates to the potential need to implement earthing and bonding measures to existing structures when rail electrification is introduced beneath a bridge. [ref NR/BS/LI/331 s9.8, s9.9.4, s9.9.5 and s10.10.2]
- 3.8 This scenario applies to both railway authority and highway authority owned bridges over electrified railway.

Note: the responsibility for earthing and bonding protection (including passive provision for potential future OLE) on new bridges or renewed elements rests with the rail or highway authority responsible for the design and construction of the new structures or elements.

**Table 3.2: Responsibilities - Installation and maintenance of earthing and bonding measures**

Stage	Lead	Costs
1. Risk Assessments	Rail authority <sup>1</sup>	Each party (highway authority and railway infrastructure authority) meets own costs
2. Feasibility study and Design Approval in Principle	Rail authority	Each party meets own costs
3. Preparation of scheme specification for mitigation measures	Rail authority	Each party meets own costs
4. Land (if needed)	Rail authority (if needed)	Provide free of charge if land owned by highway authority or railway infrastructure authority. If land has to be purchased, costs (including legal and administration charges) should be met 100% by the railway infrastructure authority and a sensible decision made about ownership based on whose land it adjoins. It is probably preferable to acquire the land, but if this cannot be done, permission to use it will need to be acquired, and costs involved in that should be met by the railway infrastructure authority. If permission to use the land is acquired, the arrangements for maintaining any measures installed, and who will pay for this, will need to be agreed at the same time.
5. Planning consent (if needed)	Rail authority (if needed)	Rail infrastructure authority
6. Procurement of works	Rail authority	Rail infrastructure authority
7. Physical works	Rail authority	Rail infrastructure authority
8. Traffic/footway management	Rail authority	Rail infrastructure authority
9. Track possessions	Rail authority	Rail infrastructure authority
10. Supervision of work	Rail authority	Rail infrastructure authority
11. Future inspection and evaluation	Rail authority <sup>2</sup>	Each party meets own costs
12. Future maintenance and replacement	Rail authority <sup>2,3</sup>	Rail infrastructure authority

**Notes:**

1. Rail infrastructure authority responsible for determining whether earthing and bonding of the structure and/or its components and attachments is required when introducing or modifying OLE (to ensure risk of electric shock is minimised so far as is reasonably practicable).
2. Inspection, evaluation, and maintenance responsibility for installed earthing and bonding systems that are present for reducing the risk of electric shock from the OLE shall rest with the Rail Authority.

3. When subsequent changes to the railway electrification system are proposed, the railway infrastructure authority remains responsible for evaluating the need for, and implementing (where required), additional or modified protection measures.

## PARAPET HEIGHT UPGRADES (RELATED TO NEW OR MODIFIED OLE)

3.9 This scenario relates to the need to extend the height of existing bridge parapets (or install parapet extension panels or meshes) when OLE is introduced (or modified) and clearances between the bridge and nearest live part of the OLE are less than desirable (i.e. 'protection by clearance' is not provided). [ref NR/BS/LI/331 s9.8 and s10.10]

3.10 This scenario applies to both railway and highway authority owned bridges over OLE.

Note: the responsibility for providing and financing 1.8m high parapets on new or renewed bridges rests with the rail or highway authority responsible for the design and construction of the new structures (see sections 3.14 and 3.19).

**Table 3.3: Responsibilities – Parapet height upgrades (related to new or modified OLE)**

Stage	Lead	Costs
1. Risk Assessments	Rail authority <sup>1</sup>	Each party (highway authority and railway infrastructure authority) meets own costs
2. Feasibility study and Design Approval in Principle	Rail authority	Each party meets own costs
3. Preparation of scheme specification for mitigation measures	Rail authority	Each party meets own costs
4. Land (if needed)	Rail authority (if needed)	Provide free of charge if land owned by highway authority or railway infrastructure authority. If land has to be purchased, costs (including legal and administration charges) should be met 100% by the railway infrastructure authority and a sensible decision made about ownership based on whose land it adjoins. It is probably preferable to acquire the land, but if this cannot be done, permission to use it will need to be acquired, and costs involved in that should be met by the railway infrastructure authority. If permission to use the land is acquired, the arrangements for maintaining any measures installed, and who will pay for this, will need to be agreed at the same time.
5. Planning consent (if needed)	Rail authority	Rail infrastructure authority
6. Procurement of works	Rail authority	Rail infrastructure authority
7. Physical works	Rail authority	Including costs of contractors and utilities and associated costs such as accommodation works. Rail infrastructure authority to pay 100% of what would be a 'minimum electrification compliant scheme' (i.e. raised parapets over electrified lines only). For increased scope (e.g. raised parapets extended across full width of bridge at the request of the highway authority), the extra-over costs to be shared between the highway authority and rail infrastructure authority on a proportionate basis. See 3.18.
8. Traffic/footway management	Rail authority	<i>Cost attribution as 'Physical works' above</i>
9. Track possessions	Rail authority	<i>Cost attribution as 'Physical works' above</i>
10. Supervision of work	Rail authority	<i>Cost attribution as 'Physical works' above</i>
11. Future inspection and evaluation	Bridge owner	Each party meets own costs (associated with its own asset management process)
a General	Rail Authority	
b Rail electrification requirements		
12. Future maintenance and replacement	Bridge owner	Costs covered by the bridge owner. Commuted sum to Bridge owner when not the instigating authority if likely increased costs.

## Notes:

1. Rail infrastructure authority responsible for determining whether parapet modifications or other protective measures are required when introducing or modifying overhead electrification systems (to ensure risk of electric shock is minimised so far as is reasonably practicable).
2. When subsequent changes to the railway electrification system are proposed, the railway infrastructure authority remains responsible for evaluating the need for, and implementing (where required), additional or modified protection measures. Rail authority to agree parapet / parapet modification design with the bridge owner (where the bridge owner is not the rail authority).
3. Where deck edge strengthening or deck replacement is required in order to accommodate higher parapets, costs will be met by the rail infrastructure authority.

## PARAPET HEIGHT UPGRADES (UNRELATED TO OLE)

3.11 This scenario relates to the need to extend the height of existing bridge parapets (or install parapet extension panels or meshes) to reduce the risk of trespass, vandalism, and/or suicide. Such measures may be appropriate at locations of high trespass and/or vandalism occurrence or repeat suicides. [ref NR/BS/LI/331 s10.8]

3.12 This scenario applies to both railway and highway authority owned bridges over railways.

Note: the responsibility for providing and financing 1.8m high parapets on new or renewed bridges rests with the rail or highway authority responsible for the design and construction of the new structures.

**Table 3.4: Responsibilities – Parapet height upgrades (unrelated to OLE)**

Stage	Lead	Costs
1. Risk Assessments	Bridge owner <sup>1</sup>	Each party (highway authority and railway infrastructure authority) meets own costs
2. Feasibility study and Design Approval in Principle	Bridge owner	Each party meets own costs
3. Preparation of scheme specification for mitigation measures	Bridge owner	Each party meets own costs
4. Land (if needed)	Bridge owner (if needed)	Provide free of charge if land owned by highway authority or railway infrastructure authority. If land has to be purchased, costs (including legal and administration charges) should be shared between the highway authority and railway infrastructure authority on a proportionate basis, and a sensible decision made about ownership based on whose land it adjoins. It is probably preferable to acquire the land, but if this cannot be done, permission to use it will need to be acquired, and costs involved in that should be shared between the highway and railway infrastructure authorities. If permission to use the land is acquired, the arrangements for maintaining any measures installed, and who will pay for this, will need to be agreed at the same time.
5. Planning consent (if needed)	Bridge owner	Costs (including legal and administration charges) should be shared between the highway authority and railway infrastructure authority on a proportionate basis.
6. Procurement of works	Bridge owner	Costs should be shared between the highway authority and railway infrastructure authority on a proportionate basis.
7. Physical works	Bridge owner	Including costs of contractors and utilities and associated costs such as accommodation works. Costs should be shared between the highway authority and railway infrastructure authority on a proportionate basis.
8. Traffic/footway management	Bridge owner	<i>Cost attribution as 'Physical works' above</i>
9. Track possessions	Bridge owner	<i>Cost attribution as 'Physical works' above</i>

Stage	Lead	Costs
10. Supervision of work	Bridge owner	Cost attribution as 'Physical works' above
11. Future inspection and evaluation	Bridge owner	Each party meets own costs (associated with its own asset management processes) <sup>2</sup>
12. Future maintenance and replacement	Bridge owner	Costs covered by the bridge owner. Commuted sum to Bridge owner when not the instigating authority if likely increased costs.

Notes:

- Both rail infrastructure and highway authorities have a duty to assess the risks (in relation to their own operations) at the rail/highway interface. Although either authority could therefore be the Instigating Authority, the Lead Authority shall be the railway infrastructure or highway authority that owns or manages the bridge.
- For a highway authority owned bridge over the railway for example, the highway authority would meet the costs associated with bridge inspections by or on behalf of the highway authority (including any associated track possession and traffic management costs), and the rail authority would meet the costs associated with routine bridge examinations by or on behalf of the rail authority (including any associated track possession and traffic management costs).

## PARAPET STRENGTH (AND ASSOCIATED HEIGHT) UPGRADES

3.13 This scenario relates to the replacement or strengthening of existing bridge parapets to provide enhanced vehicular containment capacity. Full height (1.8m min) parapets should be provided when strengthening or replacing existing parapets where this can be achieved without unreasonable cost [ref NR/BS/LI/331 s7.2, s9.8, s10.8, s10.9 and s10.11]

3.14 This scenario applies to both railway and highway authority owned bridges over railways.

Note: the responsibility for providing and financing 1.8m high parapets on new or renewed bridges rests with the rail or highway authority responsible for the design and construction of the new structures.

**Table 3.5: Responsibilities – Parapet strength (and associated height) upgrade**

Stage	Lead	Costs
1. Risk Assessments	Bridge owner <sup>1</sup>	Each party (highway authority and railway infrastructure authority) meets own costs
2. Feasibility study and Design Approval in Principle	Bridge owner	Each party meets own costs
3. Preparation of scheme specification for mitigation measures	Bridge owner	Each party meets own costs
4. Land (if needed)	Bridge owner (if needed)	Provide free of charge if land owned by highway authority or railway infrastructure authority. If land has to be purchased, costs (including legal and administration charges) should be shared between the highway authority and railway infrastructure authority on a proportionate basis, and a sensible decision made about ownership based on whose land it adjoins. It is probably preferable to acquire the land, but if this cannot be done, permission to use it will need to be acquired, and costs involved in that should be shared between the highway and railway infrastructure authorities. If permission to use the land is acquired, the arrangements for maintaining any measures installed, and who will pay for this, will need to be agreed at the same time.
5. Planning consent (if needed)	Bridge owner	Costs (including legal and administration charges) should be shared between the highway authority and railway infrastructure authority on a proportionate basis.
6. Procurement of works	Bridge owner	Costs should be shared between the highway authority and railway infrastructure authority on a proportionate basis.

Stage	Lead	Costs
7. Physical works	Bridge owner	Including costs of contractors and utilities and associated costs such as accommodation works. Costs should be shared between the highway authority and railway infrastructure authority on a proportionate basis.
8. Traffic/footway management	Bridge owner	<i>Cost attribution as 'Physical works' above</i>
9. Track possessions	Bridge owner	<i>Cost attribution as 'Physical works' above</i>
10. Supervision of work	Bridge owner	<i>Cost attribution as 'Physical works' above</i>
11. Future inspection and evaluation	Bridge owner	Each party meets own costs (associated with its own asset management processes) <sup>2</sup>
12. Future maintenance and replacement	Bridge owner	Costs covered by the bridge owner. Commuted sum to Bridge owner when not the instigating authority if likely increased costs.

**Notes:**

- Both rail infrastructure and highway authorities have a duty to assess the risks (in relation to their own operations) at the rail/highway interface. Although either authority could therefore be the Instigating Authority, the Lead Authority shall be the railway infrastructure or highway authority that owns or manages the bridge.
- For a highway authority owned bridge over the railway for example, the highway authority would meet the costs associated with bridge inspections by or on behalf of the highway authority (including any associated track possession and traffic management costs), and the rail authority would meet the costs associated with routine bridge examinations by or on behalf of the rail authority (including any associated track possession and traffic management costs).

## BRIDGE AND BRIDGE DECK RENEWALS

3.15 This scenario relates to the replacement / renewal of existing bridges or bridge decks over the railway. The revised bridge design requirements require replacement bridges or bridge decks to provide: 1.8m min high parapets/obstacles (typically), sufficient clearance for existing, proposed or potential future overhead electrified railway (as appropriate), and active or passive electrical protection provisions (as appropriate). [ref NR/BS/LI/331 s9.8, s9.9.4, s10.8, s10.9, s10.10 and s10.17]

3.16 This scenario applies to both railway and highway authority owned bridges over railways.

**Table 3.6: Responsibilities – Bridge and bridge deck renewals**

Stage	Lead	Costs
1. Risk Assessments	Instigating authority	Each party (highway authority and railway infrastructure authority) meets own costs
2. Feasibility study and Design Approval in Principle	Instigating authority	Each party meets own costs
3. Preparation of scheme specification for mitigation measures	Instigating authority	Each party meets own costs
4. Land (if needed)	Instigating authority (if needed)	Provide free of charge if land owned by highway authority or railway infrastructure authority. If land has to be purchased, costs (including legal and administration charges) should be met 100% by the instigating authority or shared (as agreed) when there is a shared benefit <sup>1</sup> between instigating authority and rail/highway authority. If permission to use the land is acquired, the arrangements for maintaining any measures installed, and who will pay for this, will need to be agreed at the same time.
5. Planning consent (if needed)	Instigating authority	Costs (including legal and administration charges) should be met 100% by the instigating authority or shared (as agreed) when there



Stage	Lead	Costs
		is a shared benefit <sup>1</sup> between instigating authority and rail/highway authority.
6. Procurement of works	Instigating authority	<i>Cost attribution as 'Planning consent' above</i>
7. Physical works	Instigating authority	Costs should be met 100% by the instigating authority or shared (as agreed) when there is a shared benefit <sup>1</sup> between instigating authority and rail/highway authority.
8. Traffic/footway management	Instigating authority	<i>Cost attribution as 'Physical works' above</i>
9. Track possessions	Instigating authority	<i>Cost attribution as 'Physical works' above</i>
10. Supervision of work	Instigating authority	<i>Cost attribution as 'Physical works' above</i>
11. Future inspection and evaluation		
a General	Bridge owner	Each party meets own costs (associated with its own asset management processes) <sup>2</sup>
b Rail electrification requirements	Rail authority	
12. Future maintenance and replacement	Bridge owner	Costs covered by the bridge owner. Commuted sum to Bridge owner when not the instigating authority if likely increased costs.

**Notes:**

1. The sharing of costs between highway and rail infrastructure authorities will depend upon the nature and extent of shared benefits. Factors to consider in determining appropriate cost share include:
  - Extent to which the existing structure meets rail infrastructure authority obligations (e.g. BE11 assessment loading for older structures)
  - Residual asset life
  - Asset ownership and future maintenance liabilities
  - Costs associated with providing any enhanced railway clearance (e.g. passive provision for future overhead electrification)
2. For a highway authority owned bridge over the railway for example, highway authority would meet the costs associated with bridge inspections by or on behalf of the highway authority (including any associated track possession and traffic management costs), and the rail authority would meet the costs associated with routine bridge examinations by or on behalf of the rail authority (including any associated track possession and traffic management costs).

## PROPORTIONATE COSTS

3.17 For several of the stages and scenarios above the cost attribution is described as “on a proportionate basis”. For the purposes of this guidance, proportionate basis shall typically refer to:

- each party meets own costs;
- costs being assigned based on benefit to each party.

Note: that a proportionate share of the costs based on benefits may mean that one party effectively pays for all costs if they receive all the benefits.

3.18 Example: Using scenario “Parapet height upgrades (related to new or modified overhead rail electrification)” Table 3.3. The rail authority propose 'minimum electrification compliant scheme' that raises parapet height over electrified lines then 100% of cost would sit with the rail authority. This includes any edge strengthening or deck replacement that may be required in order to accommodate higher parapets.

However, if upon reviewing the scheme the highway authority wish to alter the scheme to provide additional benefit to the road users, eg. providing higher parapets along the whole length for equestrian users then the additional cost would fall upon the highway authority.

## **NEW BRIDGES**

- 3.19 The roles and financing responsibilities between highway and rail infrastructure authorities in relation to new bridges are unaffected by the revised Standard.

## **DISPUTE RESOLUTION**

- 3.20 If the highway authority and railway infrastructure authority cannot within three months agree on any issue, they should first refer the matter to their head office if they have one (e.g. Network Rail and National Highways) or to their representative organisations (e.g. ADEPT, SCOTS Bridges Group, or London Technical Advisors Group (LoTAG)) to try to reach an amicable agreement. If a resolution cannot be reached within a further three months (i.e. six months after start of dispute), they may refer the matter to the Department for Transport, Department for Economy and Infrastructure (Wales), Transport Scotland, or the Department for Infrastructure (NI) (as appropriate) who, with independent advisors such as Railway Safety, HSE and the Institution of Civil Engineers, who should help to find a solution.

## APPENDIX A – WORKING GROUP

The following individuals contributed to the development of this protocol document.

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## APPENDIX B – ABBREVIATIONS

(see Bibliography for full title of documents)

<b>ADEPT</b>	Association of Directors of Environment, Economy, Planning and Transport
<b>ALARP</b>	As Low As Reasonably Practicable
<b>DfT</b>	Department for Transport
<b>DMRB</b>	Design Manual for Roads and Bridges
<b>DC</b>	Direct Current
<b>FWI</b>	Fatalities and Weighted Injuries
<b>HSE</b>	Health and Safety Executive
<b>HSWA</b>	Health and Safety at Work etc. Act
<b>HV</b>	High Voltage
<b>LV</b>	Low Voltage
<b>LoTAG</b>	London Technical Advisers Group
<b>NI</b>	Northern Ireland
<b>NR</b>	Network Rail
<b>OLE</b>	Overhead Line Equipment
<b>ORR</b>	Office of Rail and Road
<b>ROGS</b>	Railways and Other Guided Transport Systems (Safety) Regulations
<b>RSMPR</b>	Railway Safety (Miscellaneous Provisions) Regulations
<b>SCOTS</b>	Society of Chief Officers of Transportation in Scotland
<b>TfL</b>	Transport for London
<b>TSI</b>	Technical Specifications for Interoperability

## APPENDIX C – BIBLIOGRAPHY

The numbers below refer to the footnotes.

1. Letter of Instruction NR/BS/LI/331 'Bridge parapet requirements': Issue 3: December 2020 (withdrawn December 2021): Network Rail
2. NR/L3/CIV/020 'Design of Bridges': Issue 1: March 2011, updated August 2015: Network Rail
3. 'Managing the accidental obstruction of the railway by road vehicles': September 2020: Department for Transport
4. The Health and Safety at Work etc. Act 1974: The Stationary Office Ltd
5. The Management of Health and Safety at Work Regulations 1999: (S.I. 1999 No. 3242): The Stationary Office Ltd  
The Management of Health and Safety at Work (Amendment) Regulations (Northern Ireland) 2006: (S.I. 2006 No. 255): The Stationary Office Ltd
6. Highways Act 1980: The Stationary Office Ltd
7. Road Traffic Act 1988: The Stationary Office Ltd
8. RSSB Annual Safety Performance Report 2013/14: Rail Safety and Standards Board
9. BS EN 50122-1:2011+A2:2016 'Railway applications – Fixed installations – Electrical safety, earthing and the return circuit - Part 1 - Protective provisions against electric shock: 2011, updated February 2017: British Standards Institution
10. The Railway Safety (Miscellaneous Amendments) Regulations 2001 (S.I. 2001 No. 3291): The Stationary Office Ltd  
The Railway Safety (Miscellaneous Provision) Regulations (Northern Ireland) 2007 (S.I. 2007 No. 48): The Stationary Office Ltd
11. The Electricity at Work Regulations 1989 (S.I. 1989 No. 635): The Stationary Office Ltd  
The Electricity at Work Regulations (Northern Ireland) 1991 (S.I. 1991 No. 13): The Stationary Office Ltd
12. The Health and Safety (Safety Signs and Signals) Regulations 1996 (S.I. 1996 No. 341): The Stationary Office Ltd  
The Health and Safety (Safety Signs and Signals) Regulations (Northern Ireland) 1996 (S.I. 1996 No. 119): The Stationary Office Ltd
13. Commission Regulation (EU) 1299/2014/EU of 18 November 2014 on the technical specifications for interoperability relating to the 'infrastructure' subsystem of the rail system in the European Union: EU OJ L356, 12.12.2014, p.1
14. Commission Regulation (EU) 1300/2014/EU of 18 November 2014 on the technical specifications for interoperability relating to accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility: EU OJ L356, 12.12.2014, p.110
15. Commission Regulation (EU) 1301/2014/EU of 18 November 2014 on the technical specifications for interoperability relating to the 'energy' subsystem of the rail system in the Union: EU OJ L356, 12.12.2014, p.179
16. Commission Regulation (EU) 1303/2014/EU of 18 November 2014 on the technical specifications for interoperability relating to 'safety in railway tunnels' of the rail system in the European Union: EU OJ L356, 12.12.2014, p394
17. GL/RT1210 AC Energy Subsystem and Interfaces to Rolling Stock Subsystem: Issue 2: December 2019: RSSB
18. GL/GN 1610 Guidance on AC Energy Subsystem and Interfaces to Rolling Stock Subsystem: Issue 2: December 2019: RSSB
19. GM/RT1041 'Warning Signs and Notices for Electrified Lines': Issue 1: August 1997 (withdrawn December 2015): RSSB
20. 15 IA14 'RSSB impact assessment for GE/RT8025, GL/RT1254, GM/RT2304, GM/RC2514 and GM/RT1041': July 2015: RSSB
21. CD 377 "Requirements for road restraint systems" (formerly TD 19/06) Revision 4: January 2021



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