Oliver Stewart
RAIB Recommendation Handling Manager

14 May 2025

Mr Andy Lewis
Deputy Chief Inspector of Rail Accidents

Dear Andy,

RAIB Report: Derailment of a passenger train at Carmont, Aberdeenshire on 12 August 2020

I write to provide an update[1] on the action taken in respect of recommendations 2, 3, 7, 8, 10, 12, 13, 16, 18 & 19 addressed to ORR in the above report, published on 10 March 2022.

The annex to this letter provides details of actions taken in response to the recommendation and the status decided by ORR. The status of recommendations 2, 3, 7, 8, 10, 12, 18 & 19 is **'Open'**. The status of recommendations 13 & 16 is **'Closed'.**

ORR will advise RAIB when further information is available regarding actions being taken to address these recommendations.

We will publish this response on the ORR website.

Yours sincerely,

Oliver Stewart

[1] In accordance with Regulation 12(2)(b) of the Railways (Accident Investigation and Reporting) Regulations 2005

Recommendation 2

The intent of this recommendation is to identify and correct instances where new works have not been incorporated into appropriate maintenance processes (at present these include Ellipse and Maintenance Scheduled Tasks).

Network Rail should:

a) take steps necessary to ensure that all elements of infrastructure constructed in Scotland since 2012 that require routine inspections and maintenance are included in the appropriate asset management processes

b) dependent on findings from the above activity, extend the timeframe, to an extent determined on the basis of safety risk, to include work constructed before 2012

c) determine, based on safety risk, the extent to which similar steps are required on Network Rail infrastructure outside Scotland and, if necessary, implement these steps

d) conduct an audit review covering the implementation of existing arrangements to identify, report and correct asset database management and data quality issues

ORR decision

1. We were satisfied with the plans first described to us as Network Rail's means to identify and rectify any deficiencies of the type envisaged by the RAIB recommendation. At the end of April 2023, we received a closure statement from Network Rail. We discussed this with Network Rail and indicated that we needed to see substantial progress by each region before we would consider the recommendation to be closed. We have had a further update since then, showing good progress by most regions, but others requiring an extension to the originally agreed timeframe. Closure for the two remaining routes is 31 March 2025 for Scotland and 1 August 2025 for Eastern.

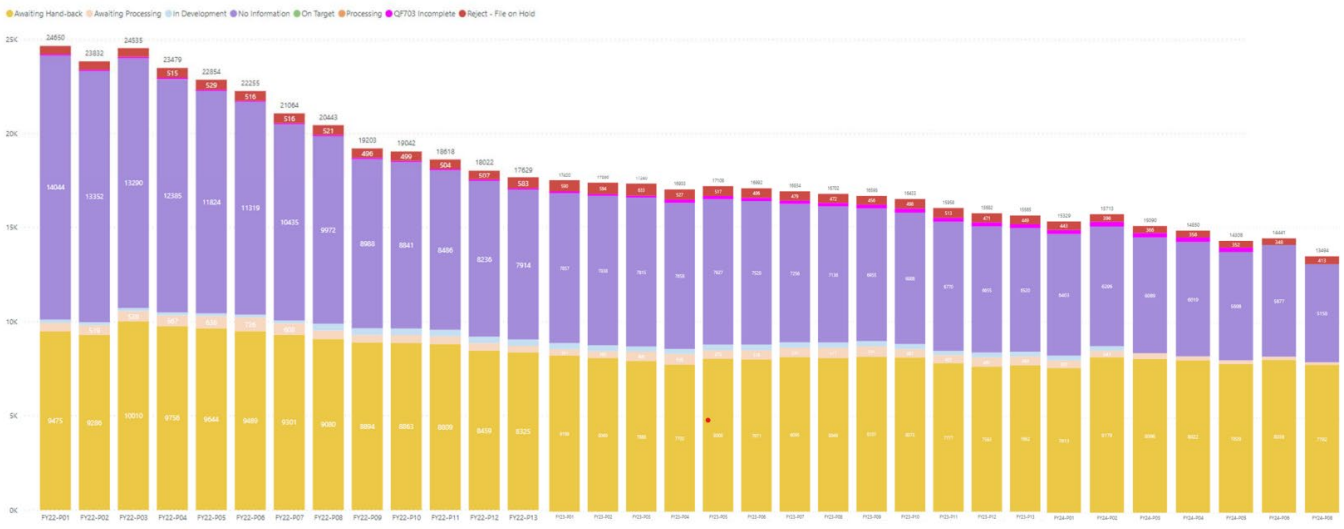
2. Network Rail has:

- Undertaken a national review (not confining it to Scotland initially, as suggested by the recommendation).
- Ensured national coordination of regional efforts through each region's Director of Engineering and Asset Management (DEAM).
- Initiated the review using a risk-based approach. A working group involving all regions and the Technical Authority (and overseen by Network Rail's National Records Group, for governance) drew up a plan identifying all relevant asset management systems and mapping all the processes relevant to ensure

completeness and accuracy of asset information and planning of associated inspection and maintenance tasks.

- Questionnaires and interviews of front-line staff informed further development of action plan criteria. Each region adopted structured questions to draw up prioritised plans to:
  - Undertake identification of historic enhancement/renewal and refurbishment projects affecting assets
  - For each project, produce and provide a H&S file and AMP forms
  - Where H&S file could not be found, make strenuous further searches to track down the information (from alternative sources where possible)
  - Ensure all H&S files appropriately stored to allow future consultation/reference
  - Check, so far as possible, for all projects, that asset data is provided, is complete, is accurate and has been input/transferred appropriately. Where this hasn't happened, use best endeavours to fill gaps and/or correct data.
  - Update asset registers in asset management systems as required.
  - Update inspection and maintenance tasks in asset management systems (generally MSTs – maintenance scheduled tasks – in Ellipse
  - Undertake inspection and maintenance activities

3. The following chart is from Network Rail and shows the status of H&S files for projects, and identifies that those with missing or incomplete data is steadily reducing. The regions have nearly reached the point that is 'steady state' for H&S file and AMP form provision, as there will always be a lag between project completion and the provision of revised asset data. We have accepted that are some details from missing H&S files that will never be recovered. There is more work for regions to do to demonstrate consistently that they have made equivalent progress on the programming and achievement of MSTs, that is why a compliance extension has been requested.



4. With regard to item d) of the RAIB recommendation (audit of arrangements), a special topic audit has been carried out by the Technical Authority in four regions.

5. In addition to the work described to identify and correct instances where new works have not been incorporated into appropriate maintenance processes, Network Rail has made the following improvements to process to make it less likely that there will be repeats of the shortcomings found at Carmont (some linked to recommendation 1):

- The standard for CDM H&S files (NR/INF/02202) was updated in June 2023 to make requirements explicit
- The requirements of NR/INF/02202 are now incorporated into Contract Requirements documentation
- A new 16-week limit has been introduced for provision of entry into operational service
- Guidance for a range of Project staff including engineers and project managers now include objectives relating to H&S file provision
- The AMP (Asset Management Process) standard (NR/MTC/089) was updated in December 2023 to strengthen links to H&S File production

6. There is regular monitoring of the dashboard that has been established for missing H&S files and MSTs. This involves Route Services, Technical Authority and Network Rail regions. Network Rail's National Records Group has oversight of progress against the action plans.

7. Several regions have recently shared draft closure statements with us. Not all regions are so advanced in what they have completed. The latest date to finish all the planned work is August 2025. We therefore expect to be able to report all actions complete by the end of 2025.

8. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to close it by December 2025.

Status: Open.

Previously reported to RAIB

9. See Annex B para 1 – 6 for previous ORR response to RAIB.

Update

10. On 28 January 2025 Network Rail provided the following update

Work completed to date

- *Working group formed (Technical Authority, Regions, National Records Group).*
- *Adopted a risk-based approach.*
- *Relevant asset management systems identified.*
- *Relevant processes mapped.*
- *Questionnaire issued to understand priority areas for focus.*
- *Interviews with data managers and subject matter experts.*
- *Health & Safety File status dashboard available.*
- *Update to H&S File standard (INF/02202) published in June 2023.*
- *PACE now requires progressive build-up of H&S File.*
- *Objectives set for DPE/PE/DEM/PMs relating to H&S File provision.*
- *Missing MST reporting and dashboard being used to focus on priority areas.*
- *Questions developed to provide structure for Regional Action Plans.*
- *Closure statement produced for National Action Plan.*
- *5 x Regional Action Plans produced.*
- *Update to Asset Management Process standard (MTC/089) published in December 2023.*
- *Special Topic Audit Carmont Rec A9.20 published in April 2024.*
- *Closure statements submitted fand reviewed by National Recommendations Review Panel (NRRP) for NW&C, Southern and W&W Regions in November 2024*

Work to do

- *Working Group continues to meet to monitor progress with the remaining Regional Action Plans and to share good practice. Last meeting was on 9 January 2025.*
- *Closure dates within Regional Action Plans:*
    - *Scotland – 31 March 2025*
    - *Eastern – 1 August 2025*
- *Closure statements will be reviewed by NRRP.*

Recommendation 3

The intent of this recommendation is for Network Rail to use learning from events at Carmont and the subsequent investigation of this to improve the design of drainage systems.

Network Rail should review and update its drainage-related procedures so that the output from the design process takes full account of likely impacts on railway safety due to flooding and/or debris washed from drains and/or surrounding ground. The review should take account of:

- **water flow return periods and climate change allowances appropriate for both normal operation of the drain and for assessment of drain performance during more extreme events**
- **the extent to which site-specific information about topography and ground conditions should be obtained, taking into account the extent to which modern technology (such as LiDAR) can assist this**
- **the full range of drain types available, including those recently developed**
- **the circumstances in which each type of drain should be used and the detailed specification necessary to suit particular locations**
- **potential failure modes such as blocked pipes and catchpits**
- **preventing flooding and/or material displaced from a drain endangering the safety of train movements, allowing for potential exacerbating factors such as the use of gravel-filled drains on steep slopes.**

This recommendation may also apply to other infrastructure managers in the UK.

ORR decision

11. In the immediate aftermath of the fatal derailment at Carmont in August 2022 Network Rail commissioned Lord Robert Mair to undertake a review of its management of earthworks, including the role of drainage. He made many observations relevant to the points raised by this RAIB recommendation. Network Rail Earthworks Review Final Report

12. Work was already underway, as a result of the Mair recommendations, to review and revise drainage-related procedures. This work has continued and is close to closure. Taking account of the factors listed in the RAIB recommendation, and the findings of the Mair review, Network Rail has completely overhauled its approach to the whole lifecycle of its water management processes: design, installation,

inspection, maintenance, rapid response and renewal. Its activities to address the RAIB recommendation include:

- Carrying out improved modelling of water catchment and concentration features and the link to surface water threats to drainage asset integrity
- Producing enhanced guidance to staff to enable them to identify and deal with potential failure modes
- Increasing dedicated drainage resource in each region of Network Rail to ensure there are sufficient staff to carry out necessary tasks
- Introducing an improved competence management scheme for drainage staff to promote better skills and understanding of the impact of interventions on the infrastructure (at our most recent update in early September, Network Rail reported that more than 630 staff had completed e-learning modules on inspection and maintenance since it had gone live)
- Comprehensively revised guidance to staff about the range of drainage types available and criteria to indicate what works best in certain locations with specific topographical and ground conditions
- Completely revised drainage design manual and handbook. These will now include catchment analysis and water hazard maps, and 3D definitive design drawings. All of the revised material has been prepared but must go through the revised company standard procedures before going live.The standards concerned are NR/L3/CIV/15101 (for the drawings and technical user manual) and NR/L2/CIV/005/09 for the drainage design standard.
- CIV/005/09 was published in March 2025 and CIV/15101 will be published in June 2025. There is a three month implementation period for COV/005 for briefings and minor changes, so Network Rail has extended its anticipated closure date to June 2025. CIV/15101 will take effect as soon as it is published.
- To support update of training regions have developed timebound plans to train their staff aligned to available training budgets. training material has already been developed for drainage inspection, maintenance, design, construction, survey and assessment, evaluation and rapid response... This will be followed by a two-day training course to gain deeper understanding – but timescales for that are in the gift of the regions who will be delivering the training and freeing staff to attend. Closure of this recommendation is not strictly dependent on delivery of the training, as the recommendation required Network Rail to ‘review and update’ its drainage-related procedures, which it has done – but ensuring effective delivery is dependent on Network Rail demonstrating that relevant staff have the capability to interpret and comply with revised guidance.

13. We have reviewed the draft drainage manual and consider it to largely address the issues raised in the Carmont RAIB report. Since receiving the draft modules, we have met with Network Rail to discuss the document in greater detail. We await details of what post-implementation review activity Network Rail is planning

to monitor compliance with its revised water management processes. We want to see credible evidence of embedment and assurances about sustaining improvements before we can report that the recommendation has been fully addressed.

14. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to close it.

Status: Open

Previously reported to RAIB

15. See Annex B para 11 – 15 for previous ORR response to RAIB.

Update

16. On 28 January 2025 Network Rail provided the following update

Carmont rec 3 milestones update

- *Agree methodology and approach – Completed*
- *Issue preliminary guidance for L3 A9.16 – Completed*
- *National roll-out of Catchment Analysis and Water Hazard Map – Completed*
- *Drainage Standard Design and Detail Drawings – June 2025. Delays from consultant have led to publication in June. 48 drawings will be checked for Form A or B engineering assurance and align to updated CIV/005 standards.*
- *NR/L2/CIV/005/09, Drainage Design Standard – Completed publication on 8 March on standards hub site.*
- *Training – eLearning is now live for inspection, maintenance, design, construction and evaluation (Awareness proficiency). Practical training modules (Understanding proficiency) are ready for April engagement aligned to Routes' training programme. Drainage Survey and Drainage assessment included in scope for delivery by end March 2025.*

Recommendation 7

This recommendation is intended to enhance the ability of route control staff to contribute to the safe operation of a modern railway by making good safety decisions in difficult circumstances based on a holistic assessment of the most relevant information. It is intended to build on the work already undertaken as part of Network Rail's 21st Century Operations programme.

Network Rail, in conjunction with train operating companies, should review the capability of route control rooms to effectively manage complex, widespread and unusual situations such as abnormal weather conditions and multiple infrastructure failures. This review should consider the steps needed to ensure that route controls have sufficient staff with appropriate skills (technical and non-technical), experience and knowledge, all with clearly defined responsibilities and accountabilities. The review should therefore examine how Network Rail ensures that route control staff are provided with appropriate training, learning and professional development for their roles, supported by means of a comprehensive competence management system, that enables them to feel confident and empowered to make difficult decisions.

As part of this review, Network Rail should also compare its railway control safety-related decision-making frameworks with those in other organisations (such as offshore exploration and air traffic management) to determine if good practices can be imported into the railway environment.

The review should be used to inform the development of a timebound programme for the implementation of the measures that are needed to develop the incident management capability of route controls

ORR decision

17. This is a wide-ranging recommendation aimed at fundamentally revising and improving the skills and professionalism of Network Rail control room staff. There has been some good progress and Network Rail submitted a closure statement (July 2024), believing it has completed its plans to address the recommendation. Whilst this may be the case, it is in the nature of these sorts of fundamental culture change programmes that effective, lasting change takes years (sometimes decades) to become firmly embedded. Network Rail has made required enhancements to its competency framework for control room staff. It remains for Network Rail to demonstrate that it has secured measurable improvements in outputs.

18. At the time of publication of the RAIB Carmont investigation, Network Rail had already begun to develop a training and competence framework for various route control roles as part of the 21st Century Rail Operations Programme. Upon receipt of RAIB recommendation 7 it embarked on a review of those plans, in light of the investigation findings, and on augmenting those plans to satisfy the additional requirements of the recommendation. It identified four elements to its proposals to address the recommendation:

- Deliver competence framework for senior control room roles (Route Control Manager RCM; Network Delivery Manager NDM)
- Investigate good practice for decision making and draw up appropriate guidance and training
- Training staff to improve understanding of the impact of adverse weather conditions
- Review, revise and improve the existing competency framework for control room roles such as Incident Controller and Train Running Controller

19. Our initial response to RAIB of March 2023 showed Network Rail had made good progress in drafting a new competency framework for RCM/NDM roles and had delivered 'Taking the Chair' training and Tactical and Strategic Incident Commander training. It had made significant progress (working closely to address the guidelines in Dame Julia Slingo's review), to provide the weather-related training (Weather Academy). It had revised its wider control room staff competencies, taking account of work already done. It had found it more challenging to conclude the work on decision making. Its interactions with Newcastle University had revealed the complexity of factors to be taken into account and made it clear that more required to be done before a clear strategy for improvement could be evolved.

20. Since March 2023 Network Rail has continued to develop and embed these arrangements. It has reached the point where it has submitted a closure statement for recommendation 7. It is clear that really good progress has been made in relation to providing greater support in handling weather-related situations. It is also clear that a competency framework has been developed for route control staff, backed up with appropriate training. It is less clear that Network Rail has thoroughly explored and adopted existing good practice in complex decision making in time-pressured circumstances.

21. The closure statement makes it clear that 'closure' of the recommendation does not signal an end to Network Rail's efforts in this area. The statement outlines a range of continuing initiatives. It reflects that it is always difficult to judge when to draw a line under what is reported to RAIB when a recommendation prompts such fundamental and ongoing reforms to practice.

22. We have approached Network Rail to request supplementary information to allow us to judge how far its initiatives have become implemented, effective and sustainable. We are seeking evidence of the outcomes of Phase 1 of the Controller Competence and Development Programme – and a demonstration that it has influenced the development of Phase 2. We have asked for assurances over a range of issues that emerged during Network Rail workshops and for the outcomes of other related workstreams that had not concluded at the time of the July 2024 closure statement submission. Satisfactory responses to those enquiries will allow us to identify if more needs to be done, or whether we can agree that the recommendation has been addressed.

23. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to close it.

Status: Open.

Previously reported to RAIB

24. See Annex B para 16 – 24 for previous ORR response to RAIB.

Update

25. On 9 July 2024 Network Rail provided a closure statement and supporting information.

There were 5 key actions designed to deliver this recommendation:

1) *Implement and embed the **RCM/NDM (Route Control Manager/Network Delivery Manager) and controller competence framework and learning journey** that has been initiated as part of the 21st Century Operations Project.*

2) *Develop a training programme on operational decision making which is embedded into training for all operations roles.*

3) *Work in conjunction with the National Weather taskforce to create the weather academy (Recommendation 5) and embed that as part of the RCM/NDM learning journey.*

4) *Undertake research to explore decision-making frameworks in other industries particularly those that apply to decisions around managing weather related events and other unpredictable events. The aim of this research is to understand what good practice might be adopted into our approaches to decision making and the training we provide.*

5) *Review and update the controller competence framework (focussing on incident controller and train running controller roles) and create a supporting training programme.*

To date the following has been achieved:

- *Development of the RCM/NDM competence framework and learning journey. This has been published on our Operations Capability sharepoint site and shared with the Professional Development Managers for Control. The underpinning competence standard has also been reflected in the update Controller Competence Standard detailed within National Operating Procedure NR/L3/OPS/045/2.02 Controller Competence Assessment and Development.*

- *Three training programmes relevant to this recommendation have been developed and rolled out:*

    - *Taking the Chair which was designed to upskill RCMs/NDMs in the communications skills needed to facilitate joint decision making during operational conference calls such as the Extreme Weather Action Team (EWAT) calls.*

*(**Note:** This programme has recently been reviewed and will be re-titled and launched to a wider operations audience as part of the work on controller training going forwards. It will be known as Controlling the Conversation).*

    - *Tactical and Rail (Strategic) Incident Commander (TIC and RIC) training which includes decision making during significant events and covers subjects such as the importance of logging decisions. The programme to obtain both TIC and RIC is delivered as one 5-day block, the TIC training being a pre-requisite for RIC with learners requiring to pass the TIC element before moving on to the final 1.5 days for RIC. To note that TIC and RIC are separate competencies. RIC has a 2-year validity period and since this training has now been in existence for longer than this, we have also developed and will deliver a 2-day RIC Refresher training programme.*

*(**Note**: the competence framework for incident management competencies, NR/L3/045/2.10 Incident Management Competence Framework was published in April 2021)*

- *The development of Controller specific development days which include scenario-based refresher training and assessment using a platform called View 360 which enables the delivery of more interactive and engaging scenarios and the ability to encourage logging of the learner's rationale for their decisions. All Professional Development Managers that exist for Control have been upskilled on its use for ongoing training and assessment purposes.*

- *Initial discovery on decision making models has been undertaken and concluded that the RSSB research on this was comprehensive and that the most pragmatic approach was to promote two decision making models for Control:*

    - *The Joint Decision Model (JDM) as outlined in the Joint Emergency Services Interoperability Protocols (JESIP) which, as a Category 2 responder, the rail industry are required to use when dealing with the emergency services; and*
    - *G-FORCE, the tool designed by RSSB for the rail industry, and which can support all other operational decision making (see RSSB T1135 research and reports for further details of the G-FORCE model)*

Whilst it was recognised these are both generic decision-making tools, on-going work to develop and roll out other tools and processes which drive decision making specifically in relation to adverse weather events is also occurring, these are:

- *Convective Rainfall Alert Tool (CAT)*
- *Precipitation Analysis Tool (PAT)*
- *Proportionate Risk Response to Implementing Mitigating Speeds to Assets (PRIMA) being trialled by North West and Central Region*

- *GUSTO (**G**ales: **U**se of **S**peed-restrictions **T**argeted to **O**perational risk) currently being trialled by Wales and Western Region.*
- *NR/L3/OPS/045/3.17 Weather Arrangements which includes decision criteria for various weather events (e.g. when to impose speed restrictions in high wind situations)*

- *A training pilot held for operational decision making highlighted a requirement to change the National Operating Procedure on dynamic risk assessment before it could be rolled out in a meaningful way. The procedure was subsequently updated and republished in Dec 2023. The roll out of this procedure included:*

- *Briefings from the Operational Assurance team to the route operations teams and controls*
- *A briefing item in the signaller and controller's Operational Development day*
- *Development of e-learning as the means to explain the process to staff going forwards.*

A new operational decision-making programme has been developed building on the RSSB programme to support roll out of T1135, and includes specific content on:

- *National Operating Procedure NR/L3/OPS/045/3.06 Operational Decision Making*
- *The difference/similarities between JDM and G-FORCE*
- *The importance of decision logs*

The programme is being piloted in July 24.

- *The Controller Competence Framework has been reviewed and in National Operating Procedure NR/L3/OPS/045/2.02 and includes a specific unit of competence on managing adverse weather events and a requirement for non-technical skills assessment which includes decision making. The standard was published in Dec 23 and accompanied by an extensive briefing programme to Controls on its requirements.*

The re-issue of the standard was an opportunity to professionalise competence assessment in Controls and raise the profile of its importance. In support of these we have:

- *On-boarded Control into the operations competence assessment system RailSmart EDS which provides much better visibility of the progress with competence assessments and the quality of the competence evidence being provided*
- *Developed new assessor resources to improve the quality of the assessments*
- *Started a programme of ensuring all assessors within Control hold the full Level 3 Workplace Assessor qualification.*

- *The work of the National Weather Task Force in relation to their recommendation to create a Weather Academy has resulted in the development and delivery of the following (see also attached Weather Academy presentation):*

- *2-day weather workshop event designed to improve understanding of weather forecasting and the EWAT process. This has included a ½ day session on decision making including the psychology of decision making*
    - *Weather learning hub designed to help create a community of support for those involved in preparing for and responding to weather events www.railweatheracademy.co.uk*
    - *A series of weather 'lunch and learns'*
    - *An on-line weather learning journey consisting of:*

    - *Modules 1 – 5 Weather Fundamentals - published April 24*
    - *Modules 6 – 9 Decision making and best practice in managing weather – due for publication Sept 24*

The Weather Academy work going forward is focussed on making sure these materials are completed and embedded into business-as-usual arrangements.

Next Steps

Whilst there has been a significant amount of work to improve Controller capability around decision making its full benefits are still to be realised. Additionally, there are still projects on-going, such as:

- *the development of the Railway Operations Weather System (ROWS) which will improve the information on which control is making decisions.*
- *Western's Senior Network Delivery Manager training programme (COLA)*

Roll out of new systems, new tools/processes or Route specific initiatives usually involve training and support which means the controller training programme needs to be agile and respond to other changes. Therefore, this closure statement includes a proposal and action plan to ensure that the above initiatives are embedded, and it that it is delivered in phases so that it remains responsive to some of the other dependencies.

This is supported by:

- *Additional resources, specifically two Standards and Competence Managers and a competence coordinator being added to the Operations Capability team in System Operator in 2024 to give focus to developing more training materials, coordinate delivery and embedding training, competence and delivery arrangements*

- *Funding for a Controller Training and Development Programme from System Operator in CP7*

- *Continued funding through the National Weather Taskforce for the Weather Academy into 2025*

Details of the Controller Training and Development Programme and the rationale for the approach and the phases can be found in the presentation and action log that accompanies this close statement.

One of the key dependencies is the on-going research into decision making which involves consolidating work from across three separate workstreams:

- *Process maps for Controls (Southern Region projects)*
- *Task analysis in support of the design of ROWS (National Task Force)*
- *Outputs of the weather workshops which specifically sought feedback about the decision-making process around adverse weather events including the work of Newcastle University produced following the first workshop*
- *Review of control processes and systems work being started by the Control Transformation team in System Operator in the summer of 2024*

This is due for completion to inform Phase 2 of the Control Training and Development Programme for April 2024.

Supporting Documentation

- *National Operating Procedure NR/L3/OPS/045/2.02 Controller Competence and Development including the detail of the units of competence*
- *RCM/NDM Learning Journey*
- *Course overviews for:*
  - *Controlling the Conversation*
  - *Operational Decision-Making*
- *Weather Academy update presentation June 2024 (presentation)*
- *Newcastle University report on Weather Academy workshop outputs*
- *Controller Training and Development Programme proposal (presentation)*

Recommendation 8

The intent of this recommendation is to improve the effectiveness of Network Rail's management assurance processes related to safety critical functions of route control rooms, so that it provides a more realistic assessment of the extent to which mandated safety systems are being correctly applied, and the overall level of safety performance.

Network Rail, in consultation with staff representatives, should undertake a project to improve the way its management assurance system operates in areas directly affecting the safety critical functions of route control rooms. This project should include an in-depth management review to identify gaps or weaknesses in route control management arrangements and the underlying reasons for any areas of non-compliance that are identified.

The output of this project should include a structured and validated programme, endorsed by the Network Rail board, for implementing the necessary improved management assurance arrangements, and briefing the changes to those on the front line.

ORR decision

26. Network Rail set up a working group to decide how best to decide and introduce the improvements to its internal assurance of the application of its processes by route control staff. The work was intricately linked with the development of the response to recommendation 7. The outcomes of that work informed judgment of the most critical areas to be assured. The working group also considered how to move beyond basic 'tick box' compliance checks towards a framework that could evaluate the quality of decisions made.

27. The working group identified shortcomings in the existing company standard for self-assurance (NR/L3/OPS/045/1.02) and decided a radically different approach was needed. It also reflected on the number and complexity of procedures with which Route Control staff were supposed to be familiar (the entire suite of NR/L3/OPS/045 – some 95 modules with hundreds of risk control processes). The group identified irregularities and unsatisfactory incidents where self-assurance had been completed and deemed the management satisfactory.

28. The working group decided its new approach should be based on ORR's RM3 Risk Management Maturity Model. Network Rail has shared with us the extensive analysis that has been undertaken to select the appropriate RM3 criteria and provide appropriate descriptors for the different maturity levels so that assessors can reach consistent judgements. Further, the outcomes of the work of this group have been incorporated into the new company standard for controller competency.

29. ORR endorses the approach taken and believes that RM3 assessments are an effective way of identifying the systemic root causes for noncompliance with process and/or sub-optimal outcomes. However, we are not yet persuaded that this is the right time to consider the recommendation closed. We have sought further information from Network Rail with regard to several matters where we need greater

clarity in order to understand how well embedded the new approach to assurance has become.

30. One factor is that the initial trials of Route Control RM3 Assessment for ‘Manage Adverse/Extreme Weather’ and ‘Manage Disruptive Events’ have only recently concluded. We would like to understand the outcomes and perhaps see evidence of more widespread application before we have confidence in the mechanism adopted. Similarly, Network Rail has described to us the governance and oversight mechanisms to assure the new ways of working but there is not yet evidence of outcomes to demonstrate that assessment is working well and being reviewed appropriately. The revised standard for self-assurance (NR/L3/OPS/045/1.02) is in draft at the moment and still the subject of feedback from stakeholders.

31. In May 2024 Network Rail submitted a closure statement to ORR, describing progress made since 2023. ORR indicated that more information was required. We received more material in March 2025. This did not fully allay our concerns. We need to understand that the wider business is ready and capable of delivering the proposed new approach to assurance. We have asked some specific questions of Network Rail, including whether it is right to proceed with publishing the new standard at this time. ORR needs to understand the route to resolution of these outstanding issues.

32. In April 2025 ORR received further feedback from Network Rail indicating that, based on feedback so far, the roll out of NR/L3/OPS/045/1.02 has been temporarily paused. This is to allow renewed training and communications initiatives to those involved in assurance who are nervous of letting go of previous approaches. We believe this is the correct decision. We understand that control room operations is one of the areas where the RM3 methodology of the revised standard has been well received. Network Rail does not anticipate any problems in satisfying the requirements of recommendation. We continue to meet with Network Rail to ensure momentum is not lost in delivering improved management assurance.

33. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to close it.

Status: Open.

Previously reported to RAIB

34. See Annex B para 25 – 27 for previous ORR response to RAIB.

Update

35. On 18 June 2024 Network Rail provided a closure statement and supporting information:

Approach

- *Identified deficiencies in current Route Control practices through Carmont Rec 8 Working Group which included Route Control, representatives and assurance specialists. The review of arrangements was aligned to the high-risk activities completed by Route Control that were identified during the work on Carmont Recommendation 7.*
- *Established Working Group for NR/L3/OPS/045/1.02 Self-Assurance Standard to investigate levels of compliance for other operational functions and establish constraints, issues and reasons[1] for any non-compliance within the Routes. The review of high-risk activities and the current assurance framework identified that a change in approach was required to provide more value from the assurance activity.*
- *The working group considered the approach and agreed to use the RM[3] Risk Management Maturity Model methodology. This approach would more the focus away from compliance with a process and allow the Route Controls and System Operator to start to understand the reasons behind and deficiencies. This in turn allows targeted action plans to address the causal factors and not just rectification of the deficiencies found.*
- *The group reviewed the high-risk activities to identify the key process controls built these into a set of criteria[2] for use in RM[3] assessments. Each of these controls was linked to one or more elements of the RM[3] criteria which will allow better reporting on the levels of maturity.*
- *The new Route Controller Competence Standard built into criteria.*
- *Initial Route Control RM[3] Assessment Trial for "Manage Adverse/ Extreme Weather" and "Manage Disruptive Events" to take place early May in Scotland with remaining Routes assessed for the same activities immediately after.*
- *Each Quarter will progress a functional area of Operations (see timeline)*
- *A Quarterly Governance Group is to be established and held with Routes to review their previous quarter result and proposed improvement actions.*
- *Quarterly results will be compiled for all Routes by the Operational Safety & Assurance team and published to the Operations L2 Network Business Assurance Committee (BAC) for process owners and Operations L1 Network BAC attendees. The insights will also be shared with the Operations Capability Delivery Group and the Operations Standards and Controls Group. This will allow the insights relating to the competence and standards frameworks to be shared and built into the frameworks as part of continuous improvement.*
- *Operations Standard NR/L3/OPS/045/1.02 Self-Assurance is in draft review with Working Group however publication of this has been pushed back to allow the work on the other discipline areas before publication.*
- *Compliance Date for amended NR/L3/OPS/045/1.02 Self-Assurance Standard to be March 2025 to align with RM[3] implementation across all other functions of Operations.*
- *Communications and Briefing Programme has commenced in order to ensure feedback and engagement, this support will continue throughout implementation.*
- *Systemisation of the Assessments and Action Plans using the new 'Suresight App' is anticipated and discussions are taking place to get Operations agreed as a 'lighthouse' (trial) project. In the short-term, it is anticipated that the Excel RM[3] Template will be utilised and combined with sharepoint for tracking and recording purposes.*

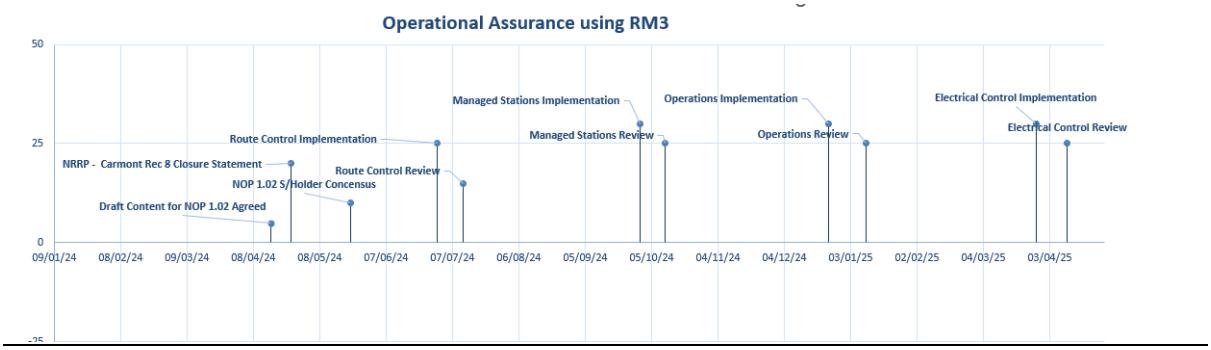
The approach to operations assurance has already been endorsed by the Regional representatives on the Working group. The approach and the programme of work to deliver the embed the process will be validated through the Operations L1 Network BAC with senior Regional attendees.

The approach taken and the programme of activity delivers a structured and validated programme for implementing improved management assurance arrangements. The work meets the intent of the recommendation and provides the business with improved assurance capability for the high-risk Route Control activities with a mechanism to deliver continuous improvement.

[1]The absence of any formal training on the iRIS system (used for assurance) is a significant issue for all Routes and this has also been repeatedly reported during the National Operations Quality Assurance Reviews completed to date. Users report the system as being "clunky", not easy to navigate and report from, and those completing assurance questionnaires have no guidance on the questions asked or the scoring system applied to question sets.

[2] The criteria developed specify the documents and/ or processes that shall be in place (with robust evidence supplied) in order for an assessor to claim a particular maturity level. The higher levels of maturity (Predictable/ Excellence) require the use of activity versus outcome indicators to measure risk control effectiveness and documented management controls to ensure repeatability of process activities.

High Level Timeline for Implementation



Recommendation 10

The intent of this recommendation is to identify and address any further areas of weakness in the mitigating controls that relate to weather-related failures of earthworks, drainage and structures (that is, the right-hand side of Network Rail's 'bowtie' analyses).

Network Rail, in conjunction with RSSB, should undertake a detailed and systematic risk assessment of the mitigating controls, including operational responses, that relate to weather-related failures of earthworks, drainage and structures. The purpose of the review shall be to rigorously assess the robustness of each control and to identify any further areas of weakness that warrant further examination.

The output of this risk assessment should then be used to devise a timebound programme to address the areas of weakness identified, so far as is reasonably practicable

ORR decision

36. We believe much of the work has been done but not yet described to us adequately. In our initial response to RAIB we outlined Network Rail's plans as described to us to procure input from RSSB and specialist support to review the adequacy of the mitigating controls in the relevant bow tie models – providing an independent report of conclusions. This would inform updating of the bow ties. It would then help frame internal scrutiny of the robustness of application of the necessary controls, leading to plans to implement any improvements identified. Plans would also include timescales, owners and funds for the introduction of any additional mitigations highlighted as being reasonably practicable.

37. On 30 August 2023 we received a closure statement from Network Rail for recommendation 10. It described how Network Rail's review of bow tie mitigations had emphasized the importance of Integrated Weather Management Plans IWMPs) to successful risk mitigation, and IWMPs were judged to be an effective control. Network Rail then stated that it had reviewed the application of IWMPs by the various regions and had found a mixed picture, though overall it was judged to be satisfactory. Some actions from the review had been closed out; those remaining were not subject to time-bound plans as they were considered to be part of routine business.

38. ORR judged that there was insufficient information to demonstrate that the recommendation had been addressed adequately. There was no report providing an independent assessment of the robustness of mitigations and no mention of the proposed engagement with RSSB and expert specialists, instead a purely internal review of the bow ties by a mix of operations and engineering and asset management staff. There was no description of the rationale for judging that existing controls were adequate – simply a factual statement that there was great reliance on operational processes by means of IWMPs. Network Rail reflected on our feedback leading to an exchange of views in March 2025 where ORR made it clear what was

lacking in submissions received so far. We have made suggestions about the route to resolution recognising the considerable work that has been done already. We have offered to support Network Rail's efforts to arrive at an acceptable response t this recommendation.

39. At the end of March 2025 Network Rail contacted ORR to explain that it intends to undertake a review of its Earthworks and Drainage assets bowties. This review will ensure that all of the improved control measures introduced since 2021 are reflected in the bowties and their adequacy is considered. RSSB will be invited to participate in these reviews to provide some independent verification and to contribute relevant outcomes of work in which it has participated that has contributed to new and improved mitigations of risk.

40. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to close it.

Status: Open.

Previously reported to RAIB

41. See Annex B para 28 – 31 for previous ORR response to RAIB.

Update

42. On 14 August 2024 Network Rail provided a closure statement and supporting information.


Adverse Weather Mitigation Controls -


RAIB Carmont Rec 10 IClosure Statement v1


IWMP Status Table.docx


Assurance Review of B C Bow-Tie Mitigatir

Background note for recommendations 12 and 14-20

43. The ORR convened a meeting on 6 April 2022 to discuss how to address recommendation 19 of the RAIB accident report. At this meeting, the recommendation duty holders and the ORR agreed to combine eight recommendations; 12, 14, 15, 16, 17, 19 and 20 related to Rolling Stock, with the existing Angel Trains led Carmont Seniors Meeting Group that had been set up to review the four recommendations where vehicle owners/operators were the duty holders. They agreed that the Railway Safety and Standards Board (RSSB), with industry support, would chair this revised approach to delivering the industry response. The group was called the Carmont recommendations Steering Group (CRSG).

44. The CRSG has one person (and one backup) from each affected organisation affected by the recommendations. It leads and coordinates the related workstreams,

updates the ORR on progress, and gives the industry's responses to the recommendations.

45. A working group (WG) has been formed to handle each of the eight recommendations, except for some items, such as research projects undertaken by the RSSB. These follow RSSB’s project management process and do not need a direct working group but may ask for representatives to join the project stakeholder group, and report straight to the CRSG. All working groups update the CRSG on their progress.

46. Each WG has a lead individual and includes relevant stakeholders who are involved in the operation, ownership and maintenance management of the rolling stock. The WG is responsible for collecting, examining, and providing a response. The WG and the CRSG manage any external support needed as necessary.

47. Each working group has developed a plan or route map to address each recommendation, agreed by CRSG, and progress via a scorecard supplied to each CRSG meeting.

Recommendation 12

The intent of this recommendation is to take account of learning from the Carmont accident in the development of a coherent long-term strategy for derailment mitigation. It is anticipated that implementation of this recommendation will be informed by work, including RSSB project T1143, already undertaken by the rail industry as a result of Recommendation 3 of RAIB's investigation of the Watford derailment.

RDG and Network Rail, in conjunction with RSSB, should consider and incorporate all relevant learning from the Carmont accident into the assessment of rolling stock and infrastructure design features that can provide guidance to trains when derailed. Particular features to be taken into account include:

a) the risk of derailment from relatively small landslips and washouts

b) position of track relative to adjacent ground on which derailed wheels may run (that is, features that can affect the deviation of a derailed train)

c) proximity to features with the potential to increase the consequence of an accident (bridge parapets, tunnel portals etc)

d) topography likely to increase the extent of vehicle scatter.

The above-mentioned assessment should then be used to develop a systemic, risk-based strategy for the provision of additional measures for the guidance of derailed trains that takes into account the appropriate balance between infrastructure-based mitigation and vehicle-based mitigation. The strategy should also include a plan for implementation of changes to the appropriate industry standards.

ORR decision

48. The industry response to this recommendation has been pursued via RSSB project T1316. This is a comprehensive research project whose aim is to evaluate every available derailment containment method in order to identify what might be effective and reasonably practicable for application to infrastructure and rolling stock on British mainline infrastructure. It builds on research project T1143, referred to in the recommendation. The work comes under the umbrella of related industry-wide responses to RAIB Carmont recommendations, overseen by RSSB. In the case of recommendation 12 there is an industry sponsor for the work in the already established group Vehicle/Track System Interface Committee (V/T SIC). There is a steering group for the project, on which an ORR representative sits.

49. There are two main phases to T1316:

- Phase 1 was completed in May 2023. This phase investigated available modelling tools and confirmed the understanding of applications used on other railways and industries to reach a sound understanding of how far risk

modelling and trajectory modelling can be used to support the assessment of effectiveness of derailment guidance solutions.

- Phase 2 was scoped by using the findings from Phase 1, and has the following three work packages:
    - Phase 2(a): Risk modelling - Development of a prototype tool completed in January 2024. This phase developed a basic tool that can be used to assess the derailment risk and trailed at two specific sites; the sites of the derailments at Carmont and Watford previously referenced. This enabled testing of the feasibility of modelling the sort of characteristics mentioned in the RAIB recommendation.
    - Phase 2(b): Risk modelling - Development of a functioning tool to be completed by May 2025. This phase is focused on expanding the prototype tool to develop a working version that can provide location and route specific risk assessment results. The functioning tool will incorporate the trajectory modelling developed as part of phase 2 (c).
    - Phase 2(c): Trajectory Modelling to be completed by March 2025. This phase is focused on the prediction of derailment consequences and the ability to simulate how those consequences are affected by the presence of derailment mitigation/guidance devices and features of the surrounding infrastructure and topography.

50. The output from phase 2 will be used towards developing a series of deliverables:

1. Policy statement on fitment of design features to provide guidance for derailed trains.

2. Identify potential design and interface requirements of derailment guidance equipment.

3. Develop a strategy for derailment mitigation.

51. This is expected to be completed during Quarter 4 2025.

52. In summary: T1316 has commissioned modelling by Huddersfield University in order to try to demonstrate actual effectiveness of a range of measures in a variety of locations with differing consequences. This will enable more soundly based decisions about what might be possible.

53. The current expected completion date is September 2025. This will also allow T1316 to take account of a parallel research project being undertaken by the International Rail Union UIC (Union Internationale des Chemins de fer) 2020/RSF/802 ‘Harmonized Methodology for design of Derailment Mitigation Measures.’

54. Although there is still much to be done to complete the modelling of various scenarios, several things are becoming clear:

- Many of the measures that appear to have some efficacy in the containment of derailed vehicles will never be able to be fitted retrospectively.
- Most of the rolling stock features being considered are not likely to be reasonably practicable to fit retrospectively (even where it might be physically

possible) but there could be a case for including in specifications for new builds (or in some cases, at half-life overhauls).

- There are some measures that work well for light rail (trams and metros) but are not suitable for heavy rail. Some measures can in certain circumstances worsen the outcome of derailment (derailed wheels may strike guard rails in such a way as to be more violently deflected rather than contained, for example).
- There is unlikely to be definitive guidance emerging from this project, because the research has shown the complexity of considerations depending on a range of variables. In one example, for instance, it was found that a difference in angle of one degree determined whether a potential mitigation contained derailed vehicles or actually exacerbated derailment.

55. It is expected that the project may result not in specific changes to industry standards, but in Technical Notes to describe the findings of research and modelling and introduce a range of design solutions to be considered depending on specific circumstances.

56. ORR received an update on recommendation 12 progress in March 2025. This informed us that the derailment model is able to run for Scotland's network. Once several minor errors have been independently assessed and corrected, it is expected that the entire mainline GB network can be run. A final stage of validating and calibrating the model will then be undertaken before the model is re-run to produce the final results.

57. Trajectory modelling: Task 4 - Application of the developed modelling capability. The work for task 4 is close to completion. The delay incurred by the supplier is due to the amount of calculation not being initially anticipated. Running the model has required purchasing additional computing capacity. The supplier is currently looking at the causes of the results obtained so that the team can draft the final report. The final report on phase 2b and 2c, incorporating both workstreams on trajectory and risk modelling is expected to be completed before end of May 2025.

58. The Steering Group meeting convened on 10th March has endorsed the primary focus for Phase 3. This will be on guard rails, with a small piece of work on duo block sleepers and potential axle-mounted post-derailment mitigation measures to close off those considerations. The forecast delivery on phase 3 is Q4 2025. In a verbal update it was explained to us that the focus on guard rails was due to the emerging intelligence about the effectiveness and applicability of the other options. Japanese railways have fitted strong L shaped anti-deviation devices to contain lateral movement of derailed trains (from earthquakes, primarily) but their efficacy is not fully demonstrated and fitment in this country would not be practicable due to the different characteristics of our infrastructure. The duo bloc sleepers, as used in some continental high-speed lines, can help contain derailments at up to 50mph but are less effective at high speeds. Further, its critical components are hard to inspect. For this reason, SNCF has ceased to use them.

59. We expect all work to have been completed before the end of 2025.

60. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to close it by December 2025.

Status: Open.

Previously reported to RAIB

61. See Annex B para 32 – 38 for previous ORR response to RAIB.

Update

62. On 12 March 2025 RSSB provided the following update:

Risk Modelling: The derailment model is able to run for Scotland network. Once several minor errors are being independently assessed and corrected, it is expected that the entire mainline GB network will be run. A final stage of validating and calibrating the model will then be undertaken before the model is re-run to produce the final results.
Trajectory modelling: Task 4 - Application of the developed modelling capability. The work for task 4 is close to completion. The delay incurred by the supplier is due to the amount of calculation not initially anticipated. The supplier is currently looking at the causes of the results obtained so that the team can draft the final report.

The final report on phase 2b and 2c, incorporating both workstreams on trajectory and risk modelling is expected to be completed before end of May 2025.

The Steering Group meeting convened on 10th March has endorsed the primary focus for Phase 3. This will be on guard rails, with a small piece of work on duo block sleepers and potential axle-mounted PDMs to close off those considerations. The forecast delivery on phase 3 is Q4 2025.

Recommendation 13

The intent of this recommendation is to enhance the processes for implementing infrastructure-mounted derailment containment devices (such as guard rails and kerbs) at high-risk locations, including bridges and tunnels (currently covered by standard NR/L2/TRK/2102).

Network Rail should review and improve its processes linked to the installation of guard rails and containment kerbs so that such derailment containment is available at high-risk locations until such time, if any, when rail vehicles carry onboard devices to perform a similar function. This review should include:

a) risk-based criteria for selecting sites for the fitting, or enhancement, of guard rails and containment kerbs, taking into consideration relevant learning from the accident at Carmont

b) the criteria used to determine the distance guard rails or kerbs should extend on the approach to a risk feature (for example, bridges and tunnels)

c) the criteria used to determine whether derailment containment should be retrofitted as soon as possible or installed during planned asset renewal.

ORR decision

63. The Network Rail response to recommendation 13 has been informed by the work for recommendation 12, particularly RSSB research project T1316. This has helped to evolve some criteria for fitment, depending on site-specific features and the severity of consequences of any derailment.

64. Containment kerbs will be a mandatory requirement in any design for new structures but are not susceptible to retrospective fitment. In respect of guard rail provision, Network Rail has now drafted more detailed new guidance with example cases to show how the principles should be applied to track design. The modified NR/TRK/2102 standard was published in March 2025. In drawing up the criteria, Network Rail has used its Common Consequence Tool as the benchmark for understanding the consequences of derailment at specific locations.

65. In most cases, retrospective fitment of guard rails is not practicable without a full track relay. It is therefore likely only to be reasonably practicable when there is a planned renewal of the track infrastructure. Network Rail has been looking at the planned work bank of track renewals for the current 5-year funding period, CP7, to see what candidate schemes there might be for fitment of guard rails. It has found, when looking at matters of reasonable practicability, that one feature of its analysis is that those sites with the severest consequences tend to be the most inaccessible parts of the rail network. This has the effect of increasing the costs of construction, inspection and maintenance of the fitted equipment.

66. ORR accept Network Rail's rationale for closure of the recommendation. The revised standard NR/L2/TRK/2102 includes improved risk-based criteria for

determining sites where infrastructure-mounted derailment containment should be fitted and the distance the provisions should extend on the approach to a risk feature. The standard applies to track renewal sites and new lines.

67. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- has taken action to close it.

Status: Closed.

Previously reported to RAIB

68. See Annex B para 39 – 45 for previous ORR response to RAIB.

The plan provided by Network Rail aims to outline the measures being considered to address the risk of derailment at high-risk locations in the short to medium term, with the longer-term consideration covered by recommendation 12. Network Rail have undertaken a significant amount of work in response to the recommendation, but clarity is needed in a number of areas to clearly explain how each part of the recommendation is being addressed.

We have challenged Network Rail to clearly demonstrate the risk assessment and associated process that determines the reasonable practicability of fitting guard rails or curbs at different locations across the network, and where they are to be fitted how they will be prioritised.

Update

69. On 18 February 2025 Network Rail provided the attached closure statement.

RAIB Carmont Rec 13
Closure Statement_v1

Recommendation 16

The intent of this recommendation is to minimise the risk of serious injury arising from secondary impact with the vehicle bodyside mounted folding tables fitted at some positions on the ScotRail HST mark 3 coaches.

Angel Trains, in conjunction with ScotRail, should:

a) review the design of the bodyside mounted folding tables fitted to train 1T08 with respect to minimising the risk of secondary impact injury in the folded position, and its compliance with the requirements of applicable standards.

b) develop a timebound plan for the modification or replacement of similar tables in trains leased by Angel Trains to a design which does not feature potentially injurious edges.

This recommendation may apply to owners of other types of rail vehicles on the UK main line network featuring similar table designs.

ORR decision

70. Work to address this recommendation has been led by a sub-group of the CRSG. During the post-accident examination of the Mk3 coaching stock it was identified that the “flip up” tables used in the wheelchair seating space were not compliant to current standards, being an additional feature introduced at vehicle refurbishment. This issue has also been identified on several other GB Fleets that use the same design of table.

71. An Angel Trains led workstream, working with Scotrail, has now amended the design to a compliant state.

72. A prototype table was manufactured and was fitted to a ScotRail Trains trailer vehicle at Wabtec’s Doncaster facility. Delay due to material issues and testing has been overcome and final testing has been completed. We have received a time bound plan for fitment, which will be completed by the end of September 2025.

73. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Angel Trains has:

- taken the recommendation into consideration; and
- taken action to close it

Status: Closed.

Previously reported to RAIB

74. See Annex B para 46 – 50 for previous ORR response to RAIB.

Update

75. On 10 March 2025 RSSB provided the following closure statement**:**

RSSB Response to Carmont Recommenc

Recommendation 16 of RAIB report 02/2022 is directed at reducing the risk of abdominal injuries through secondary impact with the table in the folded-up position. The RAIB report does not deem the folding tables was the cause of any injuries but does highlight their non-compliance to modern standards.

A working group led by Angel Trains contracted AEGIS Engineering and Baker Bellfield to complete an engineering review to develop a new design of folding tables that would comply with current standards. A new design of folding table was developed that utilised the mounting arrangements already in existence. This new table was then put through a series of simulated crash scenarios that demonstrated the new design would comply with the requirements of GM/RT2100 issue 6.

Following the engineering review, a modification procedure AT/MP2819 HSTT Folding Table Replacement was produced to define the process steps for installation. The modification procedure is supported by the following drawings:

Drawing Number	*Title*
ATC-C0-2219372	*Wheelchair Table Installation*
ATC-C0-2219468	*Seating, Table & Litter Bin Layout & Installation (TSD)*
ATC-C0-2219469	*Seating, Table & Litter Bin Layout & Installation First Class*
ATC-C0-2219936	*Seating, Table & Litter Bin Layout & Installation (Table Sections 1st)*
ATC-C0-2225395	*HST RH Standard Class Wheelchair Table ASM* *(Baker Bellfield drawing reference BBL-015458-02)*
ATC-C0-2225396	*HST LH First Class Airline Table ASM* *(Baker Bellfield drawing reference BBL-015456-02)*
ATC-C0-2225399	*HST RH First Class Airline Table ASM* *(Baker Bellfield drawing reference BBL-015457-02)*

The design is being subjected to independent review and certification is to be supplied by AEGIS Engineering Approvals Team. AEGIS Engineering will be issuing

an Attestation Statement in March 25 against RIS2700. The reference document will be supplied when received.

To prove the design, a prototype table was manufactured and were fitted to a ScotRail Trains trailer vehicle at Wabtec's Doncaster facility on 2nd September 2024.

Vehicle Maintenance Instructions (VMIs) for removal and refitting of folding tables will need to be updated by the operator.

Standards

The new folding table is now complaint with GM/RT2100 Issue 6.

Implementation Status

The implementation status as of 07/03/2025 is as follows: Fleet	*Status*
Angel Trains	*Order has been placed directly with Baker Bellfield by Angel Trains. Baker Bellfield will supply materials to Haymarket depot in 2 batches by 30/04/25.*
ScotRail Trains	*The equipment will be fitted by ScotRail Trains at Haymarket. The new tables will be fitted within 2 months of supply.*

Recommendation 18

The intent of this recommendation is for corrosion limits in maintenance and overhaul plans to be based on an adequate engineering analysis so that ageing rail vehicles retain their structural integrity to original design standards.

Owners of mark 3 coaches and other rail vehicle fleets susceptible to significant levels of corrosion and operating on the mainline network, should develop and implement a timebound plan to:

a) Review vehicle maintenance and overhaul plans to check there are clear criteria in place for the allowable extent of corrosion in safety critical areas. These criteria should be supported by an adequate engineering assessment that takes into account the intervals between corrosion inspections, so that vehicles maintain compliance with their original structural design load cases throughout their service life.

b) Amend vehicle maintenance and overhaul procedures as necessary to take account of findings from the review in a) and any practical issues with inspection of areas which are not normally readily accessible.

ORR decision

76. Actions to address this recommendation have been coordinated by CRSG. RSSB published a Technical Note TN102. This provides guidance to the industry regarding the effects of corrosion on vehicle structural integrity, and therefore the need to consider corrosion both during design and maintenance. Since then, owners, operators and maintainers of vehicles have begun a review and revision of maintenance and overhaul instructions, in the light of the guidance in TN102.

77. There have been examples of good co-operation between those affected. Porterbrook and Angel trains, for example, have shared their completed instructions with owners of smaller fleets and offered solutions to issues of inspection of areas which are not normally accessible, such as solebar scanning.

78. Further, owners have addressed the point in the RAIB recommendation about considering fleets other than HSTs which are susceptible to significant corrosion. This multiplies the volumes of maintenance and overhaul procedures that have to be modified. Network Rail, for example, has extended the principles of TN102 to its fleet of Class 150 and 153 diesel multiple units operating on the mainline.

79. CRSG has continued to provide support and oversight to those implementing this recommendation. In May 2024 it reported to us that: “A report drawing together the known areas of corrosion on the HST trailer cars and the acceptable corrosion limits is nearing completion. This considers 16 different areas on the vehicles where corrosion is known to occur (based on various inspections of the vehicles) and using the corrosion limit criteria identifies the improvements required to the maintenance instructions, to manage corrosion within the maintenance plan.”

80. We receive regular updates from end-implementers. There are a lot of them, and each has different challenges and therefore different compliance dates. We received an update from RSSB, as the coordinator of the working group, in March 2025. It confirmed that RSSB has produced TN2302 Iss 1 Corrosion of Rail vehicles, published Dec 2022. We were told that a joint ROSCO group, as part of CRSG, has identified susceptible fleets, as well as those of significant risk. Specific finite element models have been produced where this didn't exist previously. Maintenance documentation has been updated to provide heightened awareness during maintenance events. We anticipate receiving a full closure statement in April 2025.

81. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, RSSB has confirmed that end implementers have:

- taken the recommendation into consideration; and
- are taking action to close it

Status: Open.

Previously reported to RAIB

82. See Annex B para 51 – 56 for previous ORR response to RAIB.

Update

83. On 10 March 2025 RSSB provided the following update

The approach to addressing Carmont Recommendation 18 has been previously agreed and work is well under way using the same approach as that taken to address HST corrosion and crashworthiness Rec 19a.

RSSB has produced TN2302 Iss 1 Corrosion of Rail vehicles, published Dec 2022.

TN2302-Iss-1.pdf

A joint ROSCO group has identified susceptible fleets, as well as those of significant risk. Specific finite element models have been produced where this didn't exist previously. Maintenance documentation has been updated to provide heightened awareness during maintenance events.

Expected closure will be offered in April 2025.

Recommendation 19

***The intent of this recommendation is to evaluate the additional risk to train occupants associated with the continued operation of HSTs, which entered service before modern crashworthiness standards were introduced in July 1994. This will enable the future planning of HST deployment to be informed by a fuller understanding of any additional risk and the costs and safety benefits of any potential mitigation measures. This learning should also inform thinking about the mitigation of similar risks associated with the operation of other types of main line rolling stock*.**

Operators of HSTs, in consultation with train owners, ORR, DfT, devolved nations' transport agencies and RSSB should do the following:

a) Assess the additional risk to train occupants associated with the lack of certain modern crashworthiness features compared to trains compliant with Railway Group Standard GM/RT2100 issue 1 (July 1994), also taking account of age-related factors affecting condition (such as corrosion). This assessment should include a review of previous crashworthiness research (including driver safety), a review of previous accidents, consideration of future train accident risk, the findings presented in this report and any relevant engineering assessments.

b) Based on the outcome of a) and cost benefit analysis, identify reasonably practicable measures to control any identified areas of additional risk for HSTs, and develop a risk-based methodology for determining whether, and if so when, HSTs should be modified, redeployed or withdrawn from service.

c) In consultation with operators of other pre-1994 passenger rolling stock, develop and issue formalised industry guidance for assessing and mitigating the risk associated with the continued operation of HSTs and other types of main line passenger rolling stock designed before the introduction of modern crashworthiness standards in 1994.

ORR decision

84. This recommendation is in three parts and involves HST operators, RoSCo's, ORR, DfT and devolved nation agencies, and RSSB.

85. Part a. is to assess the crashworthiness of HSTs against the Railway Group Standard GM/RT2100, issue 1, July 1994.

86. Using the Finite Element model developed for HST as part of Rec 18a, and an extensive review of HST incidents, engineering assessments and the output of Rec 17, a report has been produced which includes a full cost benefit analysis of options for HST enhancements using the same principles as that used in rec 15 and rec 17.

87. This report is also the basis of the response to recommendation 3 contained in RAIB Report 13/2024: *Collision between a passenger train and a fallen tree at Broughty Ferry.*

88. Part b. is directed at Scotrail. It commissioned AtkinsRéalis to evaluate the implications of HST withdrawal from Scotland's network. The AtkinsRéalis report has been submitted to ORR as the response to recommendation 19b and is currently being assessed. .

89. Part c. is a cross RoSCo workstream, involving Angel Trains Ltd, Eversholt Rail Ltd and Porterbrook Leasing. This considered how the approach taken to 19a can be applied to the remaining pre 1994 built rolling stock still being operated in GB.

90. The outcomes of the work streams will be guidance on the process to follow when deciding on managing the risks for pre-1994 rolling stock. Once that guidance has been produced, we will consider the recommendation fully addressed.

91. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, RSSB have:

- taken the recommendation into consideration; and
- are taking action to close it.

Status: Open.

Previously reported to RAIB

92. See Annex B para 57 – 61 for previous ORR response to RAIB.

ORR hosted a meeting on 6 April 2022 (see para 108) with owners and operators of HSTs, together with government bodies and RSSB, to consider how recommendation 19 should be addressed. The initial consideration of the recommendation by relevant parties was done by the Carmont Seniors Group, coordinated by Angel Trains. SNC Lavalin have been commissioned to undertake an HST design review, which is expected to be completed by April 2023. The design review includes FE modelling in conjunction with recommendation 18. The coordination function of the Carmont Seniors group has now been subsumed into the RSSB Carmont Recommendations Steering Group.

Update

93. On 10 March 2025 RSSB provided the following closure statement and supporting documents**:**

Previously reported to RAIB

Recommendation 2

The intent of this recommendation is to identify and correct instances where new works have not been incorporated into appropriate maintenance processes (at present these include Ellipse and Maintenance Scheduled Tasks).

Network Rail should:

a) take steps necessary to ensure that all elements of infrastructure constructed in Scotland since 2012 that require routine inspections and maintenance are included in the appropriate asset management processes

b) dependent on findings from the above activity, extend the timeframe, to an extent determined on the basis of safety risk, to include work constructed before 2012

c) determine, based on safety risk, the extent to which similar steps are required on Network Rail infrastructure outside Scotland and, if necessary, implement these steps

d) conduct an audit review covering the implementation of existing arrangements to identify, report and correct asset database management and data quality issues

ORR decision

1. The recommendation was initially progressed as a regional recommendation, but after consideration a national approach was adopted by Network Rail. We consider the approach being taken by Network Rail to be appropriate and are encouraged by the time being taken to understand and scope the problem.

2. The information received from Network Rail Scotland in relation to the recommendation has reflected and confirmed that obtained through/from the TA in relation to regional planning. For example, in the January 2023 update, Recommendation 2 is captured under the ‘Fewer Infrastructure Failures’’ workstream, and the following regional update was provided:

- Supporting working groups for Management of H&S file standard and AMP standard rewrite
- 31/12/2022 – deliver initial action within Regional action plan
- 05/01/2023 – NRRP to confirm acceptance of Regional action plan
- 31/07/2023 – Continue to support AMP and H&S file standard working groups

3. The update provided by Network Rail on 24 January 2023 appears to confirm that accountability has moved to the regions/routes, though the regional panel has yet to accept the plans. ORR inspection contact in Scotland Region has found that the first submission regional action plans largely contain information necessary to address the recommendation, but Network Rail’s internal review found formatting and presentation was not consistent across the country. Regions have been directed to resubmit plans, having reviewed feedback from the panel and discussed between themselves, with the aim of achieving greater consistency. Resubmission was

expected to be completed by the end of February 2023, but Network Rail have not confirmed this.

4. Once the regional plans have been agreed, setting out actions and timescales, ORR will consider how to consistently monitor delivery across the regions. Network Rail will also monitor delivery and conduct post implementation reviews. The work done so far shows the majority of the central Initial Action Plan activity relating to parts a), b) and c) of the recommendation is complete, albeit slightly behind the intended timescale.

5. For part d) of the recommendation, Network Rail is reviewing existing relevant standards and processes (INF02202 and MTC/089) covering identification of asset information and transfer, however it is not clear if and how that the workstream has included audit of the implementation of existing arrangements. Some items suggest that it is included, for example the work has identified that the Ellipse Asset Information tool referenced in the process does not exist. Network Rail aims to introduce revised versions of IN02202 and MTC/089 in June and September 2023, so the degree of audit of existing arrangements may be a moot point, but further scrutiny by ORR is intended to clarify the position and potentially the arrangements for assuring the implementation of new arrangements.

6. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

7. On 17 May 2022 Network Rail provided the following action plan:

Action Plan
Please provide milestones with dates
Progress to date • Two working group meetings have been held (31 Mar and 6 Apr 2022) with representatives from TA and each of the Regions to discuss the approach to addressing this recommendation. The representatives were: Brian Tomlinson (TA), Nicholas Connelly (TA), Rupert Randhawa (Southern), Steve Pearson (W&W), Andy Free (NW&C), Adrian Murray (Scotland), Scott Waldrop (Scotland) and Hector Kidds (Eastern). • It was agreed that the work required to be undertaken to address this recommendation is potentially very significant, therefore a risk-based approach needs to be taken with later, more detailed, stages being informed by earlier work to scope and prioritise. • In taking a risk-based approach, the following factors need to be considered: o likelihood – the factors that could impact on whether an asset is recorded in our asset maintenance databases; and

  - consequence – the severity of outcome if an asset is not being maintained i.e. passenger, workforce and public safety.
- Whilst the scope of the RAIB Recommendation focuses on Scotland (part a) and then depending on the outcome to consider extending the timeframe (part b) and widening to other Regions (part c), the working group have agreed that all Regions would be involved from the outset.
- Further working group meetings have been planned for 27 April, 12 May and 26 May.

Initial Action Plan

The initial suite of actions agreed by the working group to date are as follows:

- Produce a more detailed definition and agree what is included within the scope of the term 'all elements of infrastructure constructed'. The scope should include both enhancements and renewals, and consideration shall be given to where one asset type may impact another. This may necessitate a more detailed definition for each asset type and the nature/extent of work undertaken. Parts of the system which could reasonably have been replaced by the maintenance organisation during repair activities, such as Line Replaceable Units e.g. relays, are not considered to be in scope.
- Identify the relevant asset management system/database for each of the key asset types.
- For each asset, map out the processes for registering assets and their maintenance requirements in the relevant database. Use the mapping exercise to identify potential weaknesses in the process and any areas for improvement, also to prioritise areas for focus in the scope of the review e.g. new assets that have not been previously subject to an inspection and maintenance regime as opposed to existing assets that are being renewed that will have featured in the asset register previously.
- Obtain list of projects recorded in Oracle as constructed/installed since 2012 and reconcile with the list of projects notified to National Records Group (NRG). Use the outputs of this exercise to identify the potential (initial) scope of projects/works to be considered. It is noted that work in this area is being undertaken in relation to provision of Health & Safety Files.
- Produce a list of questions for asset managers to lead a conversation with responsible teams to identify where omissions/errors could exist in our asset management data. This should include consideration of:
  - where new/novel types of asset have been installed;
  - experience gained where there has been a change in maintenance responsibilities e.g. change in geographic owner, change in discipline owner, change in company ownership;
  - any known or potential issues e.g. identified from historical events;
  - where one asset discipline acts as the client, and makes changes to the assets of other disciplines;
  - the effectiveness of different delivery mechanisms for registering asset information at project handback e.g. asset protection, enhancements, works delivery, minor works; and
  - assets that are installed (e.g. as part of a trial) where asset management responsibility requires clarification or agreement e.g. earthwork failure detection equipment.
- Conduct an initial discussion around the questions at the Asset Technical Review (ATR) meetings.
- Conduct follow up discussions within Regions and Routes, with responses being fed back into each ATR.
- Based on the outputs of the discussion determine whether further interviews/reviews/audits are required. Substantiate the points raised through asset management system queries.
- Detail the process required to address the recommendation to confirm the assets have been entered into the relevant database, that the data is of the required quality and that a sufficient maintenance regime has been established i.e. identify project, obtain H&S file, retrieve records, examine/check records, correct records, report complete. Identify relevant KPIs required to established and monitored to track progress.
- Consider to what extent we have achieved a cultural change around the importance of transfer of assets into maintenance, or whether there is further work to do.
- Regions to select a sample of assets identified through the early interview/discussion sessions, and follow the process required to address the recommendation (see above). A key candidate for this initial

exercise would be drainage assets constructed since 2012. Use feedback from this exercise to refine the approach taken within the detailed action plan.

- Following completion of this initial suite of actions, a more detailed plan will be produced by each Region to address the recommendation. At this point further actions to address part (d) of the recommendation will be identified. This will include key milestone stage gates and regular progress reporting.

Evidence required to support closure of recommendation

Items identified from the initial suite of actions:

- Definition and agreement on scope of the term 'all elements of infrastructure constructed'.
- List of the asset management system/database for each of the key asset types.
- Process maps for registering assets and their maintenance requirements in the relevant database.
- Details of potential weaknesses in the process(es) and any areas for improvement.
- Reconciled list of projects constructed (installed) since 2012 reconciled with the list of projects notified to NRG.
- List of questions to identify where omissions/errors could exist in our asset management data.
- Results of discussions with Regional/Route asset managers in response to the questions including any feedback on whether cultural change has been achieved.
- Details of the process required to address the recommendation to confirm the assets have been entered into the relevant database, that the data is of the required quality and that a sufficient maintenance regime has been established.
- Results of application of the process required to address the recommendation to the sample of assets identified from the early interview/discussion sessions.
- Details of KPIs to be established and monitored to track progress.
- More detailed action plan outlining the next steps to address the recommendation.

8. On 24 May Network Rail provided the following update:

2022 05 24 Carmont derailment - NR upda

9. On 22 September 2022 Network Rail provided the following update:

RAIB Carmont Action Plans Rec 2, 1

10. On 24 January 2023 Network Rail provided a further update on recommendations 2, 12 and 13:

RAIB Carmont Action Plans Rec 2, 1

Recommendation 3

The intent of this recommendation is for Network Rail to use learning from events at Carmont and the subsequent investigation of this to improve the design of drainage systems.

Network Rail should review and update its drainage-related procedures so that the output from the design process takes full account of likely impacts on railway safety due to flooding and/or debris washed from drains and/or surrounding ground. The review should take account of:

● water flow return periods and climate change allowances appropriate for both normal operation of the drain and for assessment of drain performance during more extreme events

● the extent to which site-specific information about topography and ground conditions should be obtained, taking into account the extent to which modern technology (such as LiDAR) can assist this

● the full range of drain types available, including those recently developed

● the circumstances in which each type of drain should be used and the detailed specification necessary to suit particular locations

● potential failure modes such as blocked pipes and catchpits

● preventing flooding and/or material displaced from a drain endangering the safety of train movements, allowing for potential exacerbating factors such as the use of gravel-filled drains on steep slopes.

This recommendation may also apply to other infrastructure managers in the UK.

ORR decision

11. Network Rail has carried out a review of drainage procedures to take account of the impact of flooding potentially caused by climate change or extreme weather. The review has identified a number of improvements, as set out in the update provided by Network Rail on 24 January 2023, although the expected completion date is now March 2024.

12. Network Rail have provided evidence of progress and a summary document covering the changes made, which was discussed at the February 2023 drainage quarterly liaison with ORR. Network Rail have established a working group to implement the actions described in the document. The working group will review drainage design standard (NR/L2/CIV/005/Mod09) to ensure it reflects that the risk from debris washout must be taken into account during the design process.

13. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

12. On 19 May 2022 Network Rail provided the following action plan:

Action Plan

Please provide milestones with dates

1. **Agree methodology and approach** – *1 May 2022 (at DOT ATR)*

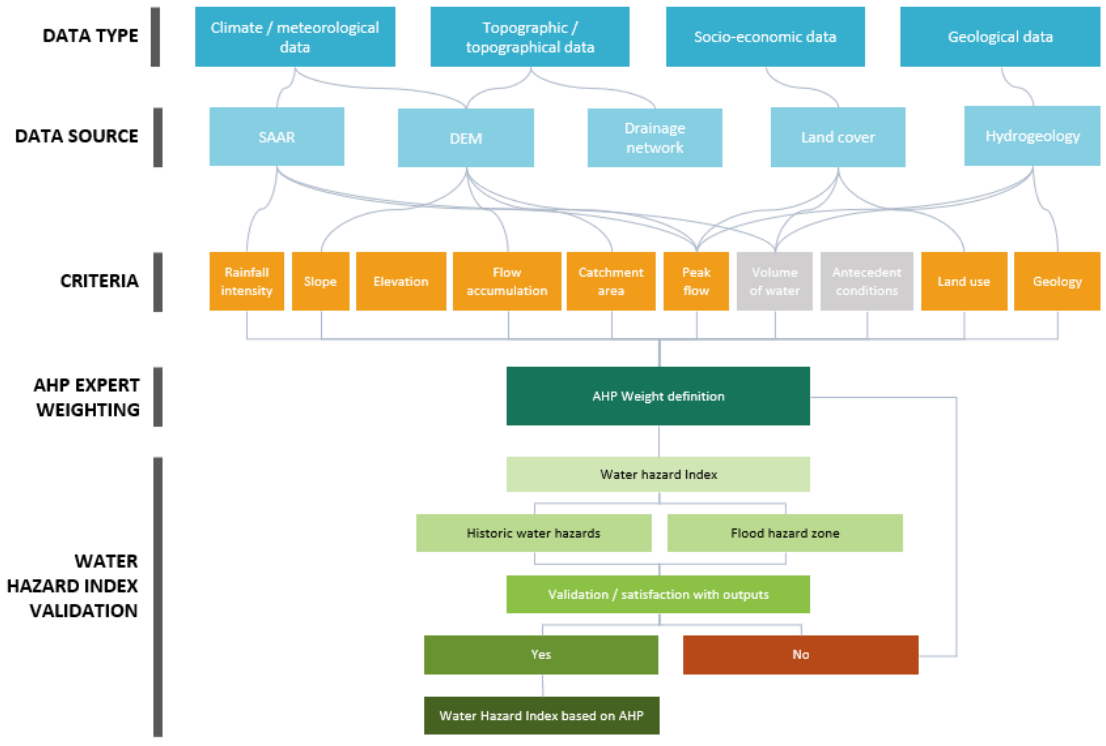
   The methodology and approach shall include definitions ('steep slope', 'vulnerable', 'catastrophic', 'rainfall exceedance', etc.) and process of identification of the vulnerable drainage systems, their typical failure modes, and types of mitigation. Scope to be limited to drainage components including infill material and geotextiles.

2. **Issue preliminary guidance for A9.16** – *18 May 2022*

   Upon agreement with the Route/Regional Drainage asset managers, finalise and issue a preliminary guidance for A9.16. The formal closure of A9.15 will be upon publications of updated Drainage Design Standard and drainage standard detail drawings. The associated standards' governance and process will require several months to complete.

3. **National roll-out of Catchment Analysis and Water Hazard Map** – *26 May 2023*

   Via II, deliver national roll-out of catchment delineation, peak flows under various return periods (to consider impact of climate change projections) and then map water hazard levels (very low to very high) against each catchment. The analysis shall use topography, climate, soil categories, geology, LiDAR, etc.



Results will be available on Geo-RINM Viewer and the specific data sets from Drainage data mart platform. Data sets can be used by individual asset groups to determine specific risk to their asset, operational threats, as parameters in designs and by ASPRO for engagement with outside parties. The analysis will be delivered agilely beginning in late summer 2022, with ongoing validation and/or verification across various Routes. Completion of entire network by end May 2023.

4. **Drainage Standard Detail Drawings** – *30 June 2023*

   Amend existing fifteen and create new as required drainage standard detail drawings to include full range of drainage types available, specifications and notes for each configuration/type, restrictions and limitations. Special attention to drainage components on steep slopes. Include industry best practice components which may be new or novel for NR. Consider carbon footprint impact and no/low maintenance solutions. Amend and issue update of NR/CIV/SD/SG/320 (*Selection Guide for Drainage Systems*). Publish under update to NR/L3/CIV/151/F010: *Index of Standard Designs and Details for Building and Civil Engineering Works*. Require engineering assurance with associated Forms 1, 2 and 3.

5. **NR/L2/CIV/005/09, *Drainage Design Standard*** – *29 September 2023*

   Incorporate guidance, definitions of vulnerable drainage systems, potential failure modes (including catastrophic failures) and mitigations. Strengthen section 7.2 with effects and impacts to railway infrastructure from over exceeding drainage design capacity. Include updates and findings from work completed above into the updated version of the *Drainage Design Standard*.

6. **Narrative of our Journey** – *30 June 2023*

   Publish document identifying the lessons learned, developments and improvements made since 2012 to present day. A document that can be shared with other infrastructure operations or transport industry to support sharing and benchmarking. Include the people, process and systems/tools elements of the journey

Evidence required to support closure of recommendation

Guidance document issued to DEAMs to enable progression of A9.16.

Catchment analysis including water hazard index mapped in GRV.

Published amended version of NR/L2/CIV/005/09 (*Drainage Design Standard)* with further clarity on effect of exceedance events and drainage system/component vulnerability identification.

Published amended version of NR/L3/CIV/151/F010 (*Index of Standard Designs and Details for Buildings and Civil Engineering Works*) including track drainage. Drainage Standard Detail Drawings with clear notes on restrictions, limitations, vulnerability (including failure mode mitigations) and engineering assurance (Forms 1, 2 and 3).

14. On 22 September 2022 Network Rail provided the following update:

Carmont Rec 3 Action Plan - ORR u

15. On 23 January 2023 Network Rail provided the following Review of Drainage Design Procedure and Process:

Carmont Rec 3 - Review for Actions.pd

Recommendation 7

This recommendation is intended to enhance the ability of route control staff to contribute to the safe operation of a modern railway by making good safety decisions in difficult circumstances based on a holistic assessment of the most relevant information. It is intended to build on the work already undertaken as part of Network Rail's 21st Century Operations programme.

Network Rail, in conjunction with train operating companies, should review the capability of route control rooms to effectively manage complex, widespread and unusual situations such as abnormal weather conditions and multiple infrastructure failures. This review should consider the steps needed to ensure that route controls have sufficient staff with appropriate skills (technical and non-technical), experience and knowledge, all with clearly defined responsibilities and accountabilities. The review should therefore examine how Network Rail ensures that route control staff are provided with appropriate training, learning and professional development for their roles, supported by means of a comprehensive competence management system, that enables them to feel confident and empowered to make difficult decisions.

As part of this review, Network Rail should also compare its railway control safety-related decision-making frameworks with those in other organisations (such as offshore exploration and air traffic management) to determine if good practices can be imported into the railway environment.

The review should be used to inform the development of a timebound programme for the implementation of the measures that are needed to develop the incident management capability of route controls

ORR decision

16. Network Rail has provided a plan setting out the four workstreams that make up the plan to address the recommendation: (1) RCM/NDM competence framework and learning journey; (2) decision making training for control room staff; (3) training to improve understanding of the impact of abnormal weather conditions (Weather Academy); and (4) a review and update of the controller competence framework focusing on Incident Controller and Train Running Controller roles.

17. Network Rail has completed a draft NOP for RCM/NDM competence and learning journey with publication expected in June 2023. 'Taking the chair' training and Tactical and Strategic Incident Commander Training has been provided for 50% of RCM/NDMs and is expected to be complete by the end of the year.

18. The Railway Operations Weather System will be the decision-making support tool. However, the decision-making work is delayed due to findings from workshop with Nottingham University in October 2022. These findings were around the complexity of such decision-making, not only requiring greater understanding of weather forecast information but the operational context, likely impact on assets and resultant risks. Further research is proposed. Work also delayed until Training and Competence Manager appointed, which is expected later in 2023.

19. A weather learning hub has been created, and the trial went live at end of Jan 2023. This is an interim step to the final Weather Academy.

20. The controller competence framework has been re-drafted and is under review. The decision on when to go live was expected in February 2023 but has not yet been confirmed. It is understood that weather will be strengthened as a theme in the competence framework for Incident Controllers and Train Running Controllers in summer 2023.

21. To close the recommendation, we would expect Network Rail to provide evidence that new or refreshed competence frameworks are in place for RCMs/NDMs and controllers to provide the skills (technical and non-technical), knowledge and experience needed to respond effectively in the event of adverse weather conditions. In addition, we expect demonstrable evidence that NR has the means to assure themselves that their competence management system, including the training provided in decision-making and understanding the impact of abnormal weather conditions, enables those with responsibility and accountability to feel confident and empowered to make difficult decisions in adverse weather conditions. It is anticipated that any bespoke training provided, e.g. via the Weather Academy, will become routine, rather a one-off training exercise.

22. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

23. On 19 May 2022 Network Rail provided the following action plan:

Action Plan
Please provide milestones with dates
1) Implement and embed the RCM/NDM competence framework and learning journey that has been initiated as part of the 21st Century Operations Project. Date: Framework and Learning Journey to be published by Sept 22 2) Develop a training programme on operational decision making which is embedded into training for all operations roles. Note: This action will continue whilst the work to further investigate decision making processes and benchmark ourselves against other industries (see action 4 below) continues. The results of this work will feed into the training as part of a continuous improvement process.

Date: Training to be piloted in May with national roll out to start in September 22. Roll out strategy may depend on outcomes of the Weather Academy work which is also considering an approach to enhancing decision making skills.

3) Work in conjunction with the National Weather taskforce to create the weather academy (Recommendation 5) and embed that as part of the RCM/NDM learning journey.

Date: The first part of the weather academy is due to complete in Sept 22. It is anticipated that roll out will take a further 12 months and there may be further developments/stages of the Academy. A more detailed action plan will be available in August 22 once some of the discovery and development work for the Academy has taken place.

4) Undertake research to explore decision-making frameworks in other industries particularly as they apply to decisions around managing weather related events and other unpredictable events. The aim of this research is to understand what good practice might be adopted into our approaches to decision making and the training we provide

Date: Research to start in May 22 and conclude by Oct 22 with a view to feeding into phase 2 of the weather academy work.

5) Review and update the controller competence framework (focussing on incident controller and train running controller roles) and create a supporting training programme by Dec 2022 for the start of their next 3-year cycle.

Date: Framework to be published by Sept 22 in line with the start of the next competence cycle. Learning Journey to be completed by June 23.

Evidence required to support closure of recommendation

RCM/NDM Learning Journey and competence standard
Operational decision-making training material
Learning Needs Analysis to support delivery of Weather Academy
Outline of the Weather Academy
Training delivery plan to demonstrate training within Control

24. On 13 September 2022 Network Rail provided the following update:

Rec 7 Carmont Aug 22 update.pptx

Recommendation 8

The intent of this recommendation is to improve the effectiveness of Network Rail's management assurance processes related to safety critical functions of route control rooms, so that it provides a more realistic assessment of the extent to which mandated safety systems are being correctly applied, and the overall level of safety performance.

Network Rail, in consultation with staff representatives, should undertake a project to improve the way its management assurance system operates in areas directly affecting the safety critical functions of route control rooms. This project should

include an in-depth management review to identify gaps or weaknesses in route control management arrangements and the underlying reasons for any areas of non-compliance that are identified.

The output of this project should include a structured and validated programme, endorsed by the Network Rail board, for implementing the necessary improved management assurance arrangements, and briefing the changes to those on the front line.

ORR decision

25. Network Rail has established a working group to review the critical activities in Route Control and National Operations Control, with the aim of producing a better process for managing assurance. The working group is trying to identify critical points that need assurance and determine how to do it, within the overall aim of moving to quality assurance rather than compliance assurance. The new process will take account of the ORR guidance document, RSP01 – Developing and Maintaining Staff Competence. The work is closely linked to the development of a competence framework to identify key decision-making activities for recommendation 7.

26. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

27. On 13 July 2022 Network Rail provided the following action plan:

Action Plan
Please provide milestones with dates
The action plan will be delivered using the principles behind process management and the guidance contained within RSP01, this will allow the move towards quality assurance for key processes and risks. Convene a working group to review the critical activities in Route Control and the National Operations Control. This will include Control reps, staff reps and process owners for elements of the operations core process. August 2022 Through the working group, identify the leading and lagging indicators that will prove assurance that the controls are being implemented and that they are delivering the correct outcome. November 2022 From the working group output put in place a plan to deliver more targeted assurance activity for Route Controls. December 2022 Provide an overview of the approach to Route Control assurance activity to the Network Rail Board. June 2023 Systemise the assurance activity on a system similar to IRIS which will provide a live position on the assurance activity. June 2023 Implement the assurance activity within the Route Control environment. November 2023 Develop a report to the Head of Control and process owners which will provide the feedback loop to allow improvement. December 2023

Evidence required to support closure of recommendation

Clear strategy for assurance in Route Control & the National Operations Control.
Process Definition Documents updated to reflect the required assurance.
Evidence of the systemized assurance activity.
Paper to Network Rail Board.

Recommendation 10

The intent of this recommendation is to identify and address any further areas of weakness in the mitigating controls that relate to weather-related failures of earthworks, drainage and structures (that is, the right-hand side of Network Rail's 'bow tie' analyses).

Network Rail, in conjunction with RSSB, should undertake a detailed and systematic risk assessment of the mitigating controls, including operational responses, that relate to weather-related failures of earthworks, drainage and structures. The purpose of the review shall be to rigorously assess the robustness of each control and to identify any further areas of weakness that warrant further examination.

The output of this risk assessment should then be used to devise a timebound programme to address the areas of weakness identified, so far as is reasonably practicable

ORR decision

28. Network Rail are working with RSSB to risk assess mitigating controls relating to weather-related failures of earthworks, drainage and structures. Once the risk assessment has been completed, Network Rail will put together a timebound plan for any changes. Once available, ORR will assess the plan, and if it is suitable and sufficient will consider closing the recommendation.

29. In addition to the synergy with Laurencekirk recommendation 1 and 2, we note that the Network Rail response to Carmont recommendations 3, 6 and 10 will become increasingly interlinked.

30. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

31. On 19 May 2022 Network Rail provided the following action plan:

Action Plan

1. Please provide milestones with dates

Progress to date

- Structures, Earthworks & Drainage bowties issued to RSSB on 15th March 2022
- Initial meeting between Network Operations & TA (B&C) leads held on 7th April 2022
- Initial alignment mapping of high consequence mitigation controls started for structures, earthworks & drainage bowties

Initial Action Plan

1. Review and align, where appropriate, mitigating controls on structures, earthworks and drainage bowties that relate to weather related failures.
2. Procure support from RSSB and Specialist Consultants to support objective and independent risk assessment of mitigating controls utilising industry best practice methodologies
3. Peer Review with Regions, Routes, TA & Operations to establish current breadth of application of each mitigating control and identify other potential controls.
4. In determining the nature of the interventions required to address the recommendation following the initial activities outlined above consideration shall be given to:

    - To inform the detailed and systematic risk assessment undertake information gathering such as but not limited to; assurance & audit activity to gather input on current control application in Regions and Routes, KPI's or PI's currently in use, qualitative information from Ops Directors, Control Managers, Asset Management & Engineering Directors and Asset Engineers on opportunities, concerns and gaps.

    - In conjunction with NR bow-tie specialists, RSSB and additional specialist consultants where necessary risk assess the current performance of the mitigating controls to assess their robustness.

    - Identify existing overlapping in-flight work in WRTF that will improve robustness of mitigating controls.

5. Identify scope and programme of improvement works and confirm action plan with leaders, time scales and budget.

Evidence required to support closure of recommendation

Typical Evidence, Items to be confirmed from Initial Action Plan:

- Formal report detailing the review, actions, intervention plan, timescales and deliverables.
- Independent assessment of robustness of controls.
- Bow-Ties, Processes, Standards and Controls updated to deliver the implementation plan and intent of recommendation.
- Technical briefing and tabletop exercises completed to support changes to standards and controls.

Recommendation 12

The intent of this recommendation is to take account of learning from the Carmont accident in the development of a coherent long-term strategy for derailment mitigation. It is anticipated that implementation of this recommendation will be informed by work, including RSSB project T1143, already undertaken by the rail industry as a result of Recommendation 3 of RAIB's investigation of the Watford derailment.

RDG and Network Rail, in conjunction with RSSB, should consider and incorporate all relevant learning from the Carmont accident into the assessment of rolling stock and infrastructure design features that can provide guidance to trains when derailed. Particular features to be taken into account include:

a) the risk of derailment from relatively small landslips and washouts

b) position of track relative to adjacent ground on which derailed wheels may run (that is, features that can affect the deviation of a derailed train)

c) proximity to features with the potential to increase the consequence of an accident (bridge parapets, tunnel portals etc)

d) topography likely to increase the extent of vehicle scatter.

The above-mentioned assessment should then be used to develop a systemic, risk-based strategy for the provision of additional measures for the guidance of derailed trains that takes into account the appropriate balance between infrastructure-based mitigation and vehicle-based mitigation. The strategy should also include a plan for implementation of changes to the appropriate industry standards.

ORR decision

32. RDG and Network Rail have jointly sponsored a study to take forward the findings from T1143 as research project T1316, with the first steering group meeting held in December 2022. Network Rail has completed the scoping work to address the recommendation.

33. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, RDG and Network Rail have:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

34. On 20 April 2022 Network Rail provided the following action plan:

Action Plan
Please provide milestones with dates
Progress to date • Reports from RSSB Research & Development study T1143 titled ‘Devices to Guide Derailed Trains’ produced in response to the Watford derailment have been reviewed. • Meeting held between Brian Tomlinson (NR) and Mark Oakley (RSSB) on 31 March 2022 to discuss potential for further work in this area. • Contacted Marcus Dacre (RSSB) who has advised that the lead for the risk model would be Chris Harrison (RSSB).

- Meeting held between Brian Tomlinson, Gareth Evans (NTH Track), Simon Abbott (NTH Geotechnical), Mark Burstow (Principal Vehicle Track Dynamics Engineer), Mark Bradbury (Principal Engineer, Track), David Shipp (Head of Risk Management) and Michael Edwards (Principal Engineer, Geotechnical) on 1 April 2022 to discuss previous involvement with T1143 and proposed approach to addressing Carmont Recommendations 12 and 13.
- Meeting held between Brian Tomlinson and Phil Barrett (RDG) on 6 April 2022 to discuss joint sponsorship of further work in this area. Agreement reached to progress a joint proposal.
- Further desktop information obtained regarding the derailment devices in use on Japan Railways East and Japan Railway West.
- A second meeting between the Network Rail technical and risk specialists was held on 13 April 2022 to review the Initial Action Plan.

Initial Action Plan

To address this recommendation, it is proposed that RDG and Network Rail jointly sponsor a further study that will request RSSB to develop the work undertaken as part of T1143, building in the learning from the Carmont accident and other relevant information sources.

- An initial scoping meeting for the further study proposed involving representatives from RDG, Network Rail and RSSB is arranged for 4 May 2022. When fully developed the output will be a completed 'Request for Help' form that will be submitted to RSSB. Considerations for the remit will include:
  a) addressing the recommendations from T1143 which include: (i) producing a mature costed 'stopper' design; (ii) evaluating the risk at S&C; (iii) design considerations for new vehicles; (iv) further development and trial of the risk tool; and (v) simulation of effectiveness;
  b) evaluation of any further information available regarding vehicle and/or infrastructure fitment in other countries, including effectiveness in actual derailment events;
  c) understanding details of any related patents that have been granted or are pending;
  d) the potential for modelling and simulation to better understand: (i) vehicle performance in the event of impacting debris on the track (such as from small landslips and washouts) and the potential effectiveness of lifeguards and obstacle deflectors; and (ii) subsequent vehicle interaction and trajectory/scatter following derailment. This would include a variety of typical infrastructure configurations/features with a range of derailment guidance options fitted, and not fitted, to evaluate their relative effectiveness. This could include simulation of historical accidents involving train derailment. Consideration shall also be given to existing vehicle design features (or subsequent modification/design thereof) that could provide vehicle guidance in the event of a derailment such as axle-mounted disc brakes and/or gearboxes;
  e) impact of vehicle and/or infrastructure fitment including technical performance, potential failure modes, maintenance costs, lower sector vehicle gauge, etc.;
  f) potential impact on other railway system risks such as a person falling from a platform (survival space), equipment located in the 'four foot', conductor rail, trackside monitoring equipment, etc.;
  g) factors that may exacerbate the consequences of derailment through vehicle and/or infrastructure derailment device fitment;
  h) understanding of development and testing requirements and timescales;
  i) use of the established Common Consequence Tool (CCT) outputs in conjunction with the Safety Risk Model (SRM) derived model in determining potential routes or locations for vehicle and/or infrastructure fitment;
  j) cost benefit analysis for fitment of potential derailment guidance options (new vehicles/infrastructure, overhaul/renewal or for retrospective fitment) including sensitivity analysis;
  k) comparative case for investment in preventative measures that reduce the likelihood of derailment as an alternative to consequence mitigation.

Subsequent Action Plan

- RSSB's processes for evaluating the study proposal (i.e. Request for Help) will then follow.
- The outputs of the study will be considered to determine the industry approach to be taken to address the recommendation. This may involve the production of an industry strategy, and subsequent capture of requirements in standards and train/infrastructure requirements. A timebound action plan would be produced at this stage relating to items to be taken forward.

Evidence required to support closure of recommendation

- Remit for the further study proposed i.e. a completed ‘Request for Help’ form.

35. On 24 May 2022 Network Rail provided the following update:

2022 05 24 Carmont derailment - NR upda

36. On 22 September 2022 Network Rail provided the following update:

RAIB Carmont Action Plans Rec 2, 1

37. On 14 December 2022 RSSB provided the following update:

Good progress continues, knowledge search building on T1143 workstreams. Risk modelling approach in development, Huddersfield University engaged to support. External sponsor established and stakeholder steering group meets 16/12/22

38. On 15 February 2023 RSSB provided the following update:

RSSB has now started a new project, T1316. A kick-off meeting with the project steering group was held on 16 December 2022 and the project is expected to be completed in mid-2024.

The results of T1316 will be reported to the industry in the usual manner when the project is complete.

Recommendation 13

The intent of this recommendation is to enhance the processes for implementing infrastructure-mounted derailment containment devices (such as guard rails and kerbs) at high-risk locations, including bridges and tunnels (currently covered by standard NR/L2/TRK/2102).

Network Rail should review and improve its processes linked to the installation of guard rails and containment kerbs so that such derailment containment is available at high-risk locations until such time, if any, when rail vehicles carry onboard devices to perform a similar function. This review should include:

a) risk-based criteria for selecting sites for the fitting, or enhancement, of guard rails and containment kerbs, taking into consideration relevant learning from the accident at Carmont

b) the criteria used to determine the distance guard rails or kerbs should extend on the approach to a risk feature (for example, bridges and tunnels)

c) the criteria used to determine whether derailment containment should be retrofitted as soon as possible or installed during planned asset renewal.

ORR decision

39. The plan provided by Network Rail aims to outline the measures being considered to address the risk of derailment at high-risk locations in the short to medium term, with the longer-term consideration covered by recommendation 12. Network Rail have undertaken a significant amount of work in response to the recommendation, but clarity is needed in a number of areas to clearly explain how each part of the recommendation is being addressed.

40. We have challenged Network Rail to clearly demonstrate the risk assessment and associated process that determines the reasonable practicability of fitting guard rails or curbs at different locations across the network, and where they are to be fitted how they will be prioritised.

41. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, Network Rail has:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

42. On 20 April 2022 Network Rail provided the following action plan:

Action Plan
Please provide milestones with dates
Progress to date • Reports from RSSB Research & Development study T1143 titled 'Devices to Guide Derailed Trains' produced in response to the Watford derailment have been reviewed. • Meetings held with RSSB and RDG in connection with RAIB Carmont Recommendation 12, acknowledging there is a degree of overlap with Recommendation 13. The former being a longer-term study, and the latter being an 'interim' measure. • Details of the requirements detailed in standards relating to guard rails provided by Gareth Evans. • Analysis provided by Mark Bradbury of the number and length locations currently fitted with guard rails including a summary by infrastructure feature and age. • Meeting held between Brian Tomlinson, Gareth Evans (NTH Track), Simon Abbott (NTH Geotechnical), Mark Burstow (Principal Vehicle Track Dynamics Engineer), Mark Bradbury (Principal Engineer, Track), David Shipp (Head of Risk Management) and Michael Edwards (Principal Engineer, Geotechnical) on 1 April 2022 to discuss previous involvement with T1143 and proposed approach to addressing Carmont Recommendations 12 and 13. • Review of an Australian RISSB code of practice on derailment protection and mitigation for rail underbridges, and other studies undertaken in Europe in relation to freight train derailments. • A second meeting between the Network Rail technical and risk specialists was held on 13 April 2022 to review the Initial Action Plan. Initial Action Plan To address this recommendation, the following actions are initially proposed:

- A remit will be produced for a study to address the key points in Carmont Recommendation 13. Considerations for the remit will include:
  - l) identification of the potential infrastructure mitigation options currently available and evaluation of their potential effectiveness using evidence obtained. These will include guard rails and containment kerbs;
  - m) reviewing the current suitability of the risk model developed under T1143 for trial use, or application to a wider geography. This will take into account the recommendations made within the T1143 research report;
  - n) the degree to which the outputs of the established Common Consequence Tool (CCT) could be used within the risk model to determine potential locations for, and extent of, infrastructure fitment;
  - o) the factors described in parts (a) and (b) of the recommendation;
  - p) the degree to which infrastructure fitment may require removal or modification when the outcomes from Recommendation 12 are available;
  - q) impact of infrastructure fitment including technical performance, potential failure modes, maintenance costs, gauging, use in 3rd/4th rail areas, trackside monitoring equipment, equipment located in the 'four foot', track renewal, rail awaiting installation/removal, re-railing activities, and impact on inspection and maintenance activities such as visual/automated inspection, tamping, ballast cleaning and stone blowing;
  - r) factors that may exacerbate the consequences of a derailment following infrastructure fitment;
  - s) cost benefit analysis for fitment of potential derailment guidance options (new infrastructure, renewal or for retrospective fitment) including sensitivity analysis – addressing part (c) of the recommendation;
  - t) comparative case for investment in preventative measures that reduce the likelihood of derailment as an alternative to consequence mitigation.

Following review at Network Rail's National Recommendations Review Panel (NRRP) on 19 April 2022, it was noted that the scope of the response to this recommendation will exclude risk assessment of new and existing trap points, as this is covered by the response to Recommendation 4 from RAIB's investigation into the runaway and derailment of wagons at Toton on 17 January 2021.

Subsequent Action Plan

- Depending on the content of the remit this may require specialist technical/risk input to assist in undertaking the study. A view on next steps will be taken at this point before proceeding.
- The outputs of the study will be considered to determine whether any new, or changes to existing standards, are required. In addition, whether the safety analysis would conclude if installation of infrastructure mitigation would be reasonably practicable: (a) at new project sites; (b) for renewal schemes; or (c) retrospectively at locations determined as higher risk. A timebound action plan would be produced at this stage relating to items to be taken forward.

Evidence required to support closure of recommendation

- Remit for the study proposed.

43. On 24 May 2022 Network Rail provided the following update:

2022 05 24 Carmont derailment - NR upda

44. On 22 September 2022 Network Rail provided the following update:

RAIB Carmont Action Plans Rec 2, 1

45. On 24 March 2025 Network Rail provided the following closure statement:

RAIB Carmont Rec 13 Closure Statement_v1

Recommendation 16

The intent of this recommendation is to minimise the risk of serious injury arising from secondary impact with the vehicle bodyside mounted folding tables fitted at some positions on the ScotRail HST mark 3 coaches.

Angel Trains, in conjunction with ScotRail, should:

a) review the design of the bodyside mounted folding tables fitted to train 1T08 with respect to minimising the risk of secondary impact injury in the folded position, and its compliance with the requirements of applicable standards.

b) develop a timebound plan for the modification or replacement of similar tables in trains leased by Angel Trains to a design which does not feature potentially injurious edges.

This recommendation may apply to owners of other types of rail vehicles on the UK main line network featuring similar table designs.

ORR decision

46. Work to address this recommendation is being carried out by a subgroup of the RSSB Carmont Recommendations Steering Group.

47. Design and supply proposals for a new bodyside-mounted folding tables were submitted by 3 suppliers. Following review by the subgroup, technical queries were raised, and proposal resubmitted. A design has been finalised and new tables will be shipped for fitting to the ScotRail HST fleet by September 2023.

48. Fitment of a redesigned bodyside mounted folding tables to other Angel Trains fleets is being considered on a case-by-case basis. We have asked RSSB to clarify the timescales for this work.

49. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, RSSB has:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

50. On 15 February 2023 RSSB provided the following response:

Angel Trains, working together with other ROSCOs and TOCs, has commissioned a new design of tabletop which is suitable for retrofit to Mark 3s; the design principles are also transferrable to other affected stock. It is anticipated that fleet fit of Angel Trains' ScotRail Mark 3s will be complete by the end of September 2023; other affected fleets are being assessed on a case-by-case basis and, where appropriate, will be scheduled for fitting thereafter.

Recommendation 18

The intent of this recommendation is for corrosion limits in maintenance and overhaul plans to be based on an adequate engineering analysis so that ageing rail vehicles retain their structural integrity to original design standards.

Owners of mark 3 coaches and other rail vehicle fleets susceptible to significant levels of corrosion and operating on the mainline network, should develop and implement a timebound plan to:

a) Review vehicle maintenance and overhaul plans to check there are clear criteria in place for the allowable extent of corrosion in safety critical areas. These criteria should be supported by an adequate engineering assessment that takes into account the intervals between corrosion inspections, so that vehicles maintain compliance with their original structural design load cases throughout their service life.

b) Amend vehicle maintenance and overhaul procedures as necessary to take account of findings from the review in a) and any practical issues with inspection of areas which are not normally readily accessible.

ORR decision

51. RSSB has issued Technical Note TN102 to provide additional guidance to RIS-2780-RST Issue 1.1 Rail Vehicle Structures and RIS-2004-RST issue one Rail Vehicle Maintenance about the management of corrosion.

52. Vehicle owners have started a thorough review and will amend maintenance procedures when complete. This is a significant undertaking, and we are satisfied with the progress being made. Work is also in progress to identify maintenance tasks for targeted areas of vehicles. This task has been completed for the HST.

53. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, RSSB has:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

54. On 20 April 2022 Network Rail provided the following action plan:

Action Plan
Please provide milestones with dates
The Route Services Supply Chain Operations (SCO) fleet team are a member of the Carmont Seniors Group – this group is formed of HST owners and operators and has the remit of developing coordinated and collaborative plans for the rolling stock recommendations in the Carmont RAIB report. Recommendation 18 will be addressed by Route Services SCO using outputs from the Carmont Seniors Group. These are as follows: a) Work with the group to identify safety critical areas of the coaching stock using previous industry reports and structural analysis. **August 2022** b) Publish a corrosion repair policy which sets out the approach to be taken when corrosion is discovered in safety critical areas. **August 2022** c) Update Network Rail Infrastructure Monitoring fleet maintenance and overhaul documents to reference the repair policy **December 2022**
Evidence required to support closure of recommendation
• Report detailing the safety critical areas of IM fleet rolling stock • Corrosion repair policy document • Updated IM fleet maintenance and overhaul documentation

55. On 2 January 2023 Network Rail provided the following timescale extension:

Recommendation Extension Form - A Pc

56. On 15 February 2023 RSSB provided the following response:

RSSB has published a Technical Note TN102 which provides guidance to the industry regarding the effects of corrosion on vehicle structural integrity, and therefore the need to consider corrosion both during design and maintenance.

The vehicle owners have started a thorough review of maintenance and overhaul documentation, which has prioritised the Scotrail fleets. It should be noted that many of the activities associated with ensuring vehicle structural integrity through corrosion repairs was already underway as part of vehicle owners' asset management strategies.

Recommendation 19

The intent of this recommendation is to evaluate the additional risk to train occupants associated with the continued operation of HSTs, which entered service before modern crashworthiness standards were introduced in July 1994. This will enable the future planning of HST deployment to be informed by a fuller understanding of any additional risk and the costs and safety benefits of any potential mitigation

measures. This learning should also inform thinking about the mitigation of similar risks associated with the operation of other types of main line rolling stock.

Operators of HSTs, in consultation with train owners, ORR, DfT, devolved nations' transport agencies and RSSB should do the following:

a) Assess the additional risk to train occupants associated with the lack of certain modern crashworthiness features compared to trains compliant with Railway Group Standard GM/RT2100 issue 1 (July 1994), also taking account of age-related factors affecting condition (such as corrosion). This assessment should include a review of previous crashworthiness research (including driver safety), a review of previous accidents, consideration of future train accident risk, the findings presented in this report and any relevant engineering assessments.

b) Based on the outcome of a) and cost benefit analysis, identify reasonably practicable measures to control any identified areas of additional risk for HSTs, and develop a risk-based methodology for determining whether, and if so when, HSTs should be modified, redeployed or withdrawn from service.

c) In consultation with operators of other pre-1994 passenger rolling stock, develop and issue formalised industry guidance for assessing and mitigating the risk associated with the continued operation of HSTs and other types of main line passenger rolling stock designed before the introduction of modern crashworthiness standards in 1994.

ORR decision

57. ORR hosted a meeting on 6 April 2022 (see para 108) with owners and operators of HSTs, together with government bodies and RSSB, to consider how recommendation 19 should be addressed. The initial consideration of the recommendation by relevant parties was done by the Carmont Seniors Group, coordinated by Angel Trains. SNC Lavalin have been commissioned to undertake an HST design review, which is expected to be completed by April 2023. The design review includes FE modelling in conjunction with recommendation 18. The coordination function of the Carmont Seniors group has now been subsumed into the RSSB Carmont Recommendations Steering Group.

58. After reviewing the information provided ORR has concluded that, in accordance with the Railways (Accident Investigation and Reporting) Regulations 2005, RSSB has:

- taken the recommendation into consideration; and
- is taking action to implement it

Status: Open

Information in support of ORR decision

59. Notes of ORR Carmont rec 19 industry meeting:

2022 04 06 Carmont rec 19 meeting - not

60. On 20 April 2022 Network Rail provided the following action plan:

Action Plan

Please provide milestones with dates

The Route Services Supply Chain Operations (SCO) fleet team are a member of the Carmont Seniors Group – this group is formed of HST owners and operators and has the remit of developing coordinated and collaborative plans for the rolling stock recommendations in the Carmont RAIB report.
Recommendation 19 will be addressed by Route Services SCO using outputs from the Carmont Seniors Group. These are as follows:

a) Review of research and evidence related to crashworthiness of IM fleet rolling stock and a comparison with modern rolling stock crashworthiness features **September 2022**
b) Risk assessment of the future train accident risk profile considering the current plans for renewal of the Infrastructure Monitoring fleet (in CP7) **December 2022**
c) Undertake a Cost Benefit Analysis of whether the IM fleet should be modified, or operations amended considering the output of the risk assessment in stage b. **February 2023**

Evidence required to support closure of recommendation

- Report detailing the crashworthiness review and comparison with modern rolling stock features
- Risk assessment of future train accident risk
- Cost benefit analysis with control measures

61. On 15 February 2023 RSSB provided the following response:

Vehicle owners have commissioned SNC-Lavalin to undertake a literature search of previous relevant accidents. This has been used to inform a Finite Element Analysis of the HST trailer vehicles. This work will inform the need, or otherwise, for structural enhancements on HST trailer vehicles. Similar work is planned for other pre-1994 stock in due course.