Seasonal Challenge Steering Group

GB Rail Industry Approach to Cold Weather Management

Version 1.0

Version history

Version	Notes	Issue date
1.0	Issued to SCSG and approved by SCSG for issue to the wider industry	11/08/2023

Notes

1. Where links to Rule Book references have been added to the tables in section 4.1, these links direct the user to Rule Book modules on RSSB.co.uk. However, it was not possible to establish links to specific Rule Book sections using files readily available on RSSB.co.uk. Access to these modules is via free registration.

2. Where links to Network Rail standards have been added to the tables in section 4.1, these links direct the user to the relevant page of Network Rail's Accuris standards portal. These standards are freely available via free registration to Network Rail's Accuris standards portal.

3. The Seasonal Challenge Steering Group (SCSG) is not a regulatory body and compliance with guidance notes produced by SCSG is not mandatory; they reflect good practice and are advisory only. Users are recommended to evaluate the guidance against their own arrangements in a structured and systematic way, noting that parts of the guidance may not be appropriate to their operations. It is recommended that this process of evaluation and any subsequent decision to adopt (or not adopt) elements of the guidance should be documented. Compliance with any or all of the contents herein, is entirely at an organisation's own discretion.

Contents

Executive Summary

This document sets out the approach to the management of cold weather on the mainline GB rail network. It follows on from the creation of two previous documents covering adhesion and hot weather management, building a suite of documents aimed at sharing good practice within the rail industry on management of seasonal effects.

The document was requested by the industry Seasonal Challenge Steering Group (SCSG) and aims to:

1. Be a single reference source for all known proven and practical control measures that will help Duty Holders manage risk arising from cold weather; and
2. Set out future control measures being developed that if successful will give new tools for Duty Holders to improve the management of these risks.

The control measures have been categorised into four groups (infrastructure, trainborne, operational, and management processes). Each control measure has a Lead Duty Holder identified and is classified as being mandatory or discretionary. All include links to information from existing standards, guidance notes, published research, or custom and practice.

Duty holders are Infrastructure Managers (IMs) (Network Rail in most cases) and Railway Undertakings (RUs) (Train Operating Companies or Freight Operating Companies in most cases).

This document is owned by SCSG and will be updated when needed.

Section 1 - The Purpose of the Document

1.1 Aims of the Document

The purpose of this document is to set out the industry approach to managing the impact of cold weather on the GB rail network. It aims to improve consistency leading to lower system risk, improved system performance and customer satisfaction.

This document follows similar approach documents produced at the request of SCSG covering adhesion and hot weather management. The aim is to provide greater clarity on existing tools and guidance and to highlight future tools being developed by the industry. It will also assist railway management staff by sign-posting standards and guidance concerning management of cold weather on the railway.

Existing tools or control measures listed are understood by SCSG to be proven and practical and have been authorised through recognised industry processes.

This document will provide reference sources that identify control measures currently available and whether they are understood to be mandatory or discretionary.

1.2 Target Audience

The target audience for the document is railway staff responsible for carrying out cold weather control measures (practitioners) and staff responsible for assuring those control measures (assurers) within Duty Holder organisations.

Within Infrastructure Manager organisations, it is likely that the ‘infrastructure’ and ‘operations’ groups of control measures will be mainly used. Within Railway Undertakings it is likely that ‘trainborne’ and ‘operations’ groups will be mainly used. All users are likely to refer to the ‘management process’ group of control measures.

1.3 Control of the Document

The document is owned by SCSG on behalf of Network Performance Board (NPB). SCSG will update it when necessary and will add any new control measures once they are both proven and practical to deliver.

Changes to the document will be briefed to sub-groups of SCSG. It is intended that sub-group members will brief the target audience via the assurance processes implemented by Duty Holders.

1.4 References and Links

The control measures included in Section 3 of this document have all been given short references to allow ease of use, for example PN1C:

- The first letter defines the status of the measure as either P or N. P means proven and practical; N means new and emerging
- The second letter defines the group to which the measure belongs. N means infrastructure, T means trainborne, P means operational, and M means management process
- The number is simply the order in which the measures are listed in the group
- The final letter in the reference in this document is always the letter C. C means Cold Weather (and differentiates the measure from those measures included in the similar documents for adhesion and hot weather management)

The links included in the tables in Section 4 will, as far as possible, take the user directly to the relevant reference standard or guidance document. However, where direct access to the reference document is not possible for all industry users, the reference will need to be accessed by other means (for example, NR standards are accessible to non-NR employees, by registering with the IHS online standards portal).

Section 2 - The Approach

2.1 The Application of Control Measures

The cold weather control measures are intended to reduce the risk to as low as reasonably practicable (ALARP) while allowing the network to maintain operational effectiveness.

The control measures are generally aimed at:

- Reducing the impact of cold weather on the railway system
- Carrying out mitigations to control the risk arising from cold weather
- Maintaining the comfort and safety of employees and passengers

The selection of control measures and how they are used is for Duty Holders to determine.

When control measures fail ‘on the day’, Lead Duty Holders need to carry out processes, agreed jointly with other affected Duty Holders, which:

- Quickly identify that a planned control measure has failed ‘on the day’
- Jointly with other affected Duty Holders, consider carrying out other control measures to manage the risk, recording the conclusions reached

The control measures in Sections 3 and 4 have been categorised as belonging to one of four groups:

- Infrastructure control measures – those measures that apply to the fixed infrastructure (excluding stations and depots operated by Railway Undertakings)
- Trainborne control measures – those measures that mitigate risks to service trains and onboard passengers (also includes depots operated by Railway Undertakings or third-party rolling stock maintainers)
- Operational control measures – those measures that mitigate risk to the operational railway (including stations and passengers on failed and stranded trains)
- Management processes – those processes or control measures, not included in any of the above three categories

2.2 Cold Weather Management Plans

Relevant Duty Holders are jointly responsible for producing a cold weather management plan which sets out the mix and scope of control measures for each part of their network and the way they are used. Duty Holders should decide if the plan forms part of an all-seasons weather management plan or stands alone.

It is expected that each cold weather management plan will normally include the following details:

- The contributing Duty Holders
- The extent of the network to which the plan applies
- The range, scope and timing of the (infrastructure, trainborne, operational and management) control measures to be used
- The justification, if the Lead Duty Holder concludes, after consultation with potentially affected Duty Holders, that a control measure will not be used for any reason (including a lack of funding or resources)
- Who is responsible for implementing each selected control measure
- The process for preparing each control measure in advance of winter
- The process for assuring preparations and use of each control measure
- The process for assessing the adequacy of the cold weather plan as conditions change, and making suitable changes as necessary
- The process for identifying other risk mitigations when a planned control measure fails ‘on the day’
- The input measures and targets set for the readiness and use of each control measure

2.3 Joint Seasonal Management Groups

Relevant Duty Holders are recommended by SCSG to hold local joint seasonal management groups in order to create cold weather management plans. The exact form of each group (for example, its name, terms of reference, meeting arrangements, the form of the agreed plan, etc) is for relevant Duty Holders to decide. In many cases, existing joint management meetings are expected to operate as joint seasonal management groups.

Each control measure to be used on the network should have a Lead Duty Holder. The Lead Duty Holder, as understood by SCSG, is shown in the tables in Section 4. The Lead Duty Holder is responsible for satisfying itself that the control measure is being properly applied in accordance with the cold weather management plan. If the Lead Duty Holder is not satisfied, then it must escalate the matter to the joint seasonal management group.

The Lead Duty Holder is responsible for defining the assurance processes for the control measures they lead. Where assurance processes require joint actions with other Duty Holders, these should be agreed with the other affected Duty Holders and documented in the cold weather management plan. SCSG expects that assurance processes will be largely based on the existing industry stage-gate process. SCSG is developing a weather-related maturity model which will complement the Industry Performance Risk Management Maturity Model (RM3P). This is expected to be adopted, in due course, by Duty Holders as part of their weather-related assurance processes.

2.4 Mandatory or Discretionary Control Measures

Where a control measure is identified as mandatory, this is because a statutory or regulatory requirement has been imposed by an authorised body (for example, DfT or ORR). The tables in Section 4 include references to the source of the mandatory requirements. These are typically:

- A Railway Group or Railway Industry Standard
- A designated mandatory Duty Holder company standard
- Contractual terms and conditions

In some instances, Lead Duty Holders may conclude that full compliance with mandatory control measures is not possible for reasons such as insufficient time, resources or funding. In these cases, the Lead Duty Holder will need to follow the derogation or deviation process specified by the relevant authorising body or contract.

Where a control measure is discretionary, the decision of whether and how to employ it lies with the Lead Duty Holder, in consultation with other affected Duty Holders. It is recommended that the Lead Duty Holder records the justification, rationale and the outcomes of any consultation with other potentially affected Duty Holders if the Lead Duty Holder decides not to adopt a discretionary control measure.

2.5 The Role of SCSG

SCSG is an industry-wide steering group, not a formal authorising body. It is a sub-group of the NPB and takes direction from it. SCSG cannot direct Duty Holders or authorise new control measures. This responsibility remains with the relevant industry authorising bodies. The role of SCSG is to endorse new or emerging control measures once proven and include them in this document.

In verifying control measures as ‘proven and practical’, SCSG will consider several factors, for example, that:

- The control measure has received system approvals from a competent body, there has been a suitable trial, a trial report has been produced and peer reviewed, etc
- Any parts and materials needed when employing the control measure can be procured in time and cost-effectively from approved suppliers
- Where a control measure requires funding and where industry funding schemes exist, that the supporting business case is robust
- Where standards and guidance notes have been produced, they are fit-for-purpose

- Any contractual issues between Duty Holders can be mutually agreed

Legacy control measures are those which have been routinely used for many years. SCSG will, over time, verify that these measures are proven and practical. This will usually require one of following:

- A simple statement by SCSG that a control measure can be considered proven and practical
- SCSG to commission a check on the fitness-for-purpose of any historic verification process
- SCSG to commission new research to verify that the legacy measures are proven and practical.

SCSG offers guidance and support to organisations developing new control measures. SCSG can help with the authorisation process and will verify, but as noted above, is not able to authorise those which are proven and practical.

In offering guidance and support to developers of new and emerging control measures, SCSG will not support control measures which require ‘boots on ballast’ in Red Zone Working.

Many different organisations lead the development of new control measures. These include industry research bodies such as the Rail Safety and Standards Board (RSSB) and Network Rail (NR), UK Rail Research and Innovation Network (UKRRIN) universities, private industry, small and medium enterprises (SMEs), etc. SCSG actively encourages new control measures to be developed. However, SCSG cannot assume lead responsibility for developing new control measures.

Section 3 - The List of Control Measures

Notes:

1. Control Measures shown as **bold text** are deemed by the industry to be 'Mandatory'. Others are 'Discretionary'.
2. The Lead Duty Holder is shown in brackets after each control measure.

3.1 Control Measures verified as being PROVEN AND PRACTICAL good practice

3.1.1 PROVEN AND PRACTICAL Infrastructure Control Measures

- PN1C - Briefing track asset management teams about cold weather control measures (IMs)
- **PN2C - Managing track in cold weather (IMs)**
- PN3C - Managing joints during cold weather (IMs)
- PN4C - Managing staff and track during exceptionally low temperatures (IMs)
- **PN5C - Managing periods of heavy snowfall (IMs)**
- **PN6C - Restressing track with a SFT above 30°C (or 32°C for crimp-ended sleepers) (IMs)**
- **PN7C - Maintaining a register of track locations at risk during cold weather (IMs)**
- **PN8C - Managing cold weather related track incidents (IMs)**
- **PN9C - Managing suspension of visual track inspections (IMs)**
- **PN10C - Managing the suspension of Risk Based M'nance (RBM) track inspections (IMs)**
- **PN11C – Responding to extreme weather at structures, earthworks and other locations (IMs)**
- **PN12C - Managing snow and ice on structures, earthworks and drainage installation (IMs)**
- **PN13C - Managing excavations, concreting, applying coatings and waterproofing (IMs)**
- **PN14C - Laying brickwork, blockwork and masonry during cold weather (IMs)**
- **PN15C - Managing the effects of snow and ice on Overhead Line Equipment (OLE) (IMs)**
- **PN16C - Managing the effects of snow and ice on conductor rail equipment (IMs)**
- **PN17C - Managing physical boundaries lineside and roadside foliage during cold weather (IMs)**
- **PN18C - Monitoring and maintaining signalling equipment during cold weather (IMs)**
- **PN19C - Managing the risk of cold and inclement weather at Level Crossings (IMs)**
- PN20C - Managing the risk of bridge strikes during cold and inclement weather (IMs)

3.1.2 PROVEN AND PRACTICAL Trainborne Control Measures

- PT1C - Clearing depot infrastructure of snow and ice (RUs)
- PT2C - Providing insulation and heating for staff, depot equipment and fluid supplies (RUs)
- PT3C - Reviewing and modifying depot facilities to reduce impact of cold weather (RUs)
- PT4C - Preparing and refining winterisation maintenance instructions for rolling stock (RUs)
- PT5C - Preparing plans for deferring non-safety critical maintenance (RUs)
- PT6C - Preparing recovery plans for deferred work and affected or isolated systems (RUs)
- PT7C - Stocking up with materials required during cold weather at strategic locations (RUs)
- PT8C - Carrying out external train cleaning before cold weather commences (RUs)
- PT9C - Preparing rolling stock for cold and associated weather conditions in advance (RUs)
- PT10C - Isolating systems likely to be affected by cold conditions (RUs)
- PT11C - Clearing snow and ice from vehicles (RUs)
- PT12C - Draining air systems, checking drain valves and trace heaters function (RUs)
- PT13C - Suspending washing of trains when temperature drops below freezing (RUs)
- PT14C - Implementing winterisation training and competency plan (RUs)
- PT15C - Planning staff deployment for cold weather (RUs)
- PT16C - Implementing winterisation maintenance and extreme weather instructions (RUs)

3.1.3 PROVEN AND PRACTICAL Operational Control Measures

- PP1C - Improving traincrew rolling stock knowledge (RUs)
- **PP2C - Maintaining safe access to operational locations (All Duty Holders)**
- **PP3C - Preventing icing of conductor rails (IMs)**
- **PP4C - Clearing snow and ice from the infrastructure (IMs)**
- **PP5C - Maintaining safe underfoot conditions on stations (All Duty Holders)**
- **PP6C - Preparing to drive to the conditions (RUs)**

- **PP7C - Managing the needs of stranded trains and passengers (RUs)**
- **PP8C - Managing the operation of points during falling snow (IMs)**
- **PP9C - Implementing Key Route Strategies and Amended Timetables (IMs)**
- **PP10C - Managing and removing of icicles on structures and within tunnels (IMs)**
- **PP11C - Route Proving (All Duty Holders)**
- **PP12C - Managing risk to response staff/alternative transport via road (All Duty Holders)**
- **PP13C - Providing suitable PPE for the conditions (All Duty Holders)**
- **PP14C - Providing welfare and contingency arrangements for staff (All Duty Holders)**
- **PP15C - Providing welfare equipment on trains (RUs)**
- **PP16C - Assessing suitability of rolling stock to operate routes in winter weather (RUs)**
- **PP17C - Reducing service to align with component supply chain (RUs)**
- **PP18C - Managing the risk of wagon derailment from partial, frozen loads (RUs)**

3.1.4 PROVEN AND PRACTICAL Management Processes

- **PM1C - Responding to non-delivery of control measures 'on the day' (Lead Duty Holder)**
- **PM2C - Creation of a joint cold weather contingency plans (All Duty Holders)**
- **PM3C - Sourcing, sharing and responding to weather forecasts (All Duty Holders)**
- PM4C - Using cold weather forecasting tools (IMs)
- **PM5C - Managing the evacuation and recovery of stranded trains (IMs)**
- PM6C - Supporting development of new and emerging control measures (All Duty Holders)

3.2 NEW AND EMERGING Control Measures not yet verified as being proven and practical good practice

3.2.1 NEW AND EMERGING Infrastructure Control Measures

- Nil

3.2.2 NEW AND EMERGING Trainborne Control Measures

- NT1C - Fitting sleet brushes to 3rd & 4th rail DC electric trains (RUs)
- NT2C – Fitting heated couplers (RUs)
- NT3C – Installing external warning horns in heated horn pockets (RUs)

3.2.3 NEW AND EMERGING Operational Control Measures

- Nil

3.2.4 NEW AND EMERGING Management Processes

- Nil

Section 4 - The Control Measures in Practice

4.1 Control Measures verified as being PROVEN AND PRACTICAL good practice

4.1.1 PROVEN AND PRACTICAL Infrastructure Control Measures

PN1C - Briefing track asset management teams about cold weather control measures

Purpose	To reduce the risk of problems during cold weather by undertaking effective preparation work before the onset of cold weather.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/GN/TRK/7001/TWI3G023 [Issue: 1] How to manage cold weather
Indicative metrics	• Briefings and preparation completed before cold weather
Key preparedness tasks and key advice offered	• Switch heaters and S&C rodding: ○ Make sure that your list of locations is current and correct. Keep an ongoing database, both before and right through the winter of all the heaters and how they perform. During the summer arrange for those that caused the most failures to be replaced or thoroughly overhauled and tested ○ Check, with all involved, the state of all the installations so that you are aware of where there may be problems and take appropriate management action ○ Have a commissioning week some time in advance of the onset of cold weather - say October - to test everything is working correctly ○ Do not undertake any work that is barred during cold weather unless it is essential to restore track to enable traffic to run ○ Check staff have relevant competencies to manage the switch heating equipment that is present • Common problems associated with the track during cold weather are: ○ Pulled apart joints - tracks that already have wide joints are weak to begin with ○ Broken rails – it is a fact that there are more rail breaks during the change from relatively mild weather to that of cold and vice-versa. Once the change has taken place the number of breaks settles down. It is worth re-briefing staff to anticipate problems - be prepared with welding teams and supplies of closure rails ○ Broken welds ○ Curve radius alterations – check ballast levels on the inside of curves - particularly those of less than 600m radius or with more than 90mm cant. During cold weather these types of curves can go ‘downhill’ – the track may migrate to the inside of the curve. In some cases this can be serious enough to cause de-wirements in OLE areas ○ Broken bolts and fishplates – make sure that the track is adequately packed under the joints and that all the bolts are tight ○ Insulated joints in CWR tend to pull apart in cold weather if there is a weakness present - check the joint and change any suspect items ○ Wide expansion switches - before the onset of cold weather check that the gap is correctly set for all your expansion switches ○ Jointed track movement - have inspection teams look at the behaviour of rails and rail fastenings - are the rails pulling through, are there any seized joints ○ Small alignment faults can deteriorate very quickly. Especially in hot or cold weather ○ Take precautions when dismantling glued joints or blocks in S&C as the glue can shatter when hit with a hammer in cold weather
Mandatory or Discretionary	• Discretionary

PN2C - Managing track in cold weather

<table>
<tr><td>Purpose</td><td>To prepare track for the effects of cold weather by specifying precautions to be taken prior to the start of the cold weather period and limitations on work to be undertaken during cold weather (for on-track machine work and other maintenance works).</td></tr>
<tr><td>Lead Duty Holder</td><td>• Infrastructure Managers</td></tr>
<tr><td>References and guidance</td><td>• NR/L2/TRK/001/mod15 [Issue: 6] Managing track in cold weather
• NR/L2/TRK/001/mod16 [Issue: 7] Adjustment Switches</td></tr>
<tr><td>Indicative metrics</td><td>• Review Ellipse work bank</td></tr>
<tr><td>Key preparedness tasks and key advice offered</td><td>• Adjustment switch gaps and overlaps:
○ Check adjustment switch gaps. Reset if gaps are too large
○ Where the adjustment switch gap dimension is not at the value shown in Table 1, action as shown in Table 4:
<table>
<tr><th colspan="4">Table 4 – Actions for non-standard gaps</th></tr>
<tr><th>Gap opening</th><th>Gap measurement</th><th>Action</th><th>Timescale
(shortest to be used)</th></tr>
<tr><td>Too wide</td><td>Greater than:
Table 1 dimension 'Y' + 25mm tolerance</td><td>Adjust to correct dimension</td><td>within 26 weeks or
before the onset of cold weather</td></tr>
<tr><td>Too tight</td><td>Less than:
Table 1 dimension 'Y' – 25mm tolerance</td><td>Adjust to correct dimension</td><td>within 26 weeks or
before the onset of hot weather</td></tr>
</table>
○ Ball and Claw setting. As part of normal supervisor inspection, check that in cold weather the Ball is towards the crossing
○ Expansion joints – Where expansion joints are too wide, plan rail adjusting for completion before the onset of colder weather to minimise the risk of fishbolt and fishplate failure
○ Insulated joints – Maintain/replace insulated joints to resist rail tensile forces in colder weather
○ Monitoring alignment against fixed references, where there is a history of lateral movement. NOTE: movement is likely when the rail temperature is below 0°C, or where the track radius is below 600m or where the cant is 100mm or more. When inward movement of a curve occurs there will be a reduction in SFT. Restore the alignment and, if necessary, before the onset of hot weather. If structural, OLE and/or passing clearances are compromised, take immediate action to restore the original alignment
○ Maintain the level of ballast in the four foot, in bays containing point operating equipment and stretcher bars, at a level 100mm below bearer top. This is to keep ballast clear of signalling equipment and prevent points operation problems due to freezing resulting from a build-up of snow
○ Do not operate OTMs if the rail temperature is below the values in Table 1:
<table>
<tr><th colspan="4">Table 1 - Minimum rail temperatures for operating on track machines (OTM)</th></tr>
<tr><th></th><th>Tampers:
plain line and S&C</th><th>Stoneblowers:
plain line</th><th>Stoneblowers:
S&C</th></tr>
<tr><td>Cant <90mm</td><td>-7°C</td><td>-4°C</td><td>0°C</td></tr>
<tr><td>Cant ≥90mm</td><td>-7°C</td><td>0°C</td><td>0°C</td></tr>
<tr><td>Cant deficiency >150mm</td><td>0°C</td><td>0°C</td><td>0°C</td></tr>
<tr><td>Radius <600m</td><td>0°C</td><td>0°C</td><td>0°C</td></tr>
<tr><td>Within 90m of any adjustment switch (see note)</td><td>0°C</td><td>0°C</td><td>0°C</td></tr>
<tr><td colspan="4">Note:
Unless site-specific mitigation is agreed in advance with the RAM[T]</td></tr>
</table>
○ At rail temperatures between 0°C and +4°C, consider and review the risks associated with tamping wet or previously frozen ballast.
○ Make a note on TEF3071 if sites are treated between 0°C and -7°C. Monitor track quality following the work and review next track geometry recording information.
○ Non-OTM work - Do not carry out work which may reduce the stability of track if the rail temperature is below the values in Table 2:
<table>
<tr><th colspan="2">Table 2 - Minimum rail temperatures for non-OTM work</th></tr>
<tr><th>Location</th><th>Temperature</th></tr>
<tr><td>Cant ≥90mm (stressed curves)</td><td>0°C</td></tr>
<tr><td>Cant >150mm</td><td>0°C</td></tr>
<tr><td>Radius <600m</td><td>0°C</td></tr>
<tr><td>Within 90m of any adjustment switch (see note)</td><td>0°C</td></tr>
<tr><td>All other locations</td><td>-7°C</td></tr>
<tr><td colspan="2">Note:
Unless site-specific mitigation is agreed in advance with the RAM[T]</td></tr>
</table></td></tr>
<tr><td>Mandatory or Discretionary</td><td>• Mandatory</td></tr>
</table>

PN3C - Managing joints during cold weather

Purpose	To reduce the risk of rail and track circuit failures by ensuring that Insulated Rail Joints (IRJs) are in good condition and adequately maintained prior to hot weather.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L2/TRK/001/MOD04 (Issue: 7) Rail Joints • NR/GN/TRK/7001/TWI2C027-2G032 [Issue: 2] How to Maintain Insulated Block Joints • NR/GN/TRK/7001/TWI2C045 [Issue: 1.1] How to maintain tight joints
Indicative metrics	• Review Ellipse work bank
Key preparedness tasks and key advice offered	• The correct size bolts must be used as fitting of undersize bolts in cold weather could cause an IRJ failure in warm weather • Worn and dipped IRJs have the highest risk of failure during cold weather • If tight joints are removed in cold weather, the joint may open, and you will be unable to replace the tight joint fishplate
Mandatory or Discretionary	• Discretionary

PN4C - Managing staff and track during exceptionally low temperatures

Purpose	To prepare track and staff for exceptionally low temperatures.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/GN/TRK/7001/TWI3G024 [Issue: 1] How to manage exceptionally low temperatures
Indicative metrics	• Briefing and Planning Complete
Key preparedness tasks and key advice offered	• Assess the following track risks: ○ Temperatures as low as -10degC or colder are rare in some parts of the country, but when they occur, they carry major risk. If temperatures of -10degC are forecast, then additional risk assessments are required ○ Great care must be taken in sending staff out for extended periods. Make sure they have clothing, protection and hot food and drink. Make sure their vehicles are suitably equipped and that they have a reliable means of communication ○ Monitor the performance of the heaters in normal cold weather conditions and check that all the switch mechanism is being heated ○ Do not plan any critical work unless it is related to the cold weather
Mandatory or Discretionary	• Discretionary

PN5C - Managing periods of heavy snowfall

Purpose	To prepare staff and track for periods of significant snowfall.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L2/TRK/001/mod05 [Issue: 8] Switches and crossings (S&C) • NR/GN/TRK/7001/TWI3G027 [Issue: 1] How to manage snow
Indicative metrics	• Ellipse workbank and availability of staff during periods of snow fall or severe frost
Key preparedness tasks and key advice offered	• If snow is allowed to build up or drift, it can cause severe operating difficulties - particularly in switches and crossings • Management of flangeways: ○ Keep all flangeways clear of obstructions to permit the free passage of the wheel flange. During winter keep flangeways sufficiently clear of snow and ice to permit the free passage of the wheel flange ○ Underfoot conditions can be especially treacherous when the equipment is unreliable and is being overwhelmed. Staff should be available to manually clear ice and snow under protection of the Signaller. As these conditions become more difficult Network Rail will consider implementing the predetermined 'operational' plan when both the equipment and the staff are overwhelmed. At this stage the points need to be set in accordance with the Network Rail Integrated Weather Management Plans and joint Key Route Strategies. At this stage trains on minor lines may be cancelled. Under these conditions movement by staff on foot or by road may be unsustainable ○ Snowploughs will be in use clearing routes. Staff will be needed at level crossings to clear the track and flangeways once the snowplough has passed ○ You must have your own winter preparedness plan, part of which includes what to do in case of snow ○ When snow falls fast and heavy there are other items that may affect the running of the trains all of which may require the attendance of staff: ▪ Fallen trees or branches ▪ OHLE wires brought down ▪ Signals obscured ▪ Speed boards obscured ▪ Flangeways blocked including in stations where staff shovel snow from platforms onto the track
Mandatory or Discretionary	• Mandatory

PN6C - Restressing track with a SFT above 30°C (or 32°C for crimp-ended sleepers)

Purpose	To reduce the risk of broken rails or track pulling in on curves during periods of cold weather
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L2/TRK/3011 [Issue: 7] Continuous Welded Rail (CWR) Track
Indicative metrics	• SFT and CRT register is up to date and complete for all overstressed CWR and where rail cutting has shown the SFT is not correct • Ellipse workbank to monitor work completed before periods of cold weather
Key preparedness tasks and key advice offered	• High installation temperature: ○ Make arrangements for re-stressing when the temperature has fallen sufficiently and before the onset of cold weather. If there is evidence to suggest that the SFT is above 30°C (or 32°C for crimp ended steel sleepers), then the section of track concerned should be re-stressed before the onset of cold weather ○ Stressing of CWR on curves - Stressing of rail on curves may induce a lateral shift of the track and for this reason the maximum pull applied shall be limited as follows: ▪ Curves of radius 600-500m Maximum pull not to exceed 58 tonnes - equivalent to raising the SFT by 34°C for 113A or 31°C for CEN60 rail ▪ Curves of radius below 500m Maximum pull not to exceed 46 tonnes - equivalent to raising the SFT by 27°C for 113A or 25°C for CEN60 rail ▪ In cold weather these limits may preclude the achievement of the desired SFT, in which case the rail shall be re-stressed in warmer weather ○ Lateral resistance end plates shall also be fitted at radii below 500m ○ During cold weather thermal stressing using rail warmers may be used as an alternative to tensors ○ Check rail movement when the rail is cut (stress restoration): ▪ above 27°C No movement (SFT approximately equal to rail temp.) - No tensors required Re-stress fully before cold weather ▪ Gap opens (SFT is above rail temperature) No tensors required - Re-stress fully before cold weather
Mandatory or Discretionary	• Mandatory

PN7C - Maintaining a register of track locations at risk during cold weather

Purpose	To maintain a register of track locations at risk of cold weather.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L3/TRK/3013 [Issue: 2] Management of cold weather precautions
Indicative metrics	• Cold weather risk register complete and up to date
Key preparedness tasks and key advice offered	• The Track Maintenance Engineer (TME) shall arrange that a register of sites at risk of cold weather effects is maintained • Arrange enhanced inspections at sites with jointed track which may be susceptible to fishbolt failure or pulling apart due to the cold weather • Salt shall not be used as a de-icing agent on any permanent way asset. Only Network Rail approved de-icing agents are to be used
Mandatory or Discretionary	• Mandatory

PN8C - Managing cold weather related track incidents

Purpose	To reduce the frequency of incidents and the effects on track and S&C during cold weather.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• RT/CE/C/008/220C [Issue: 1B] SECTION 220 - Permanent Way Incident Management • NR/GN/TRK/7001/TWI2S008 [Issue: 1] How to use de-icer
Indicative metrics	• Ellipse workbank and cold weather risk register
Key preparedness tasks and key advice offered	• During and following heavy falls of snow or severe frost, a clear passage shall be maintained for wheel flanges, and all flangeway gaps, particularly in continuous check rails on curves, at level crossings and at crossing check and wing rails, shall be kept clear of compacted ice and snow for the safe passage of traffic • The gap between the open switch rail and the stock rail, for the moveable length of the switch rail of switches, between switch rails and wing rails of switch diamonds and between the moveable nose and wing rails or saddle of swing nose crossings shall be kept clear • Following a period of line closure during severe cold weather or following heavy falls of snow, the passageways for wheel flanges in plain line and S&C shall be checked, and if necessary, cleared of compacted ice and snow for the safe passage of traffic prior to the track being handed back to traffic • In addition, the following shall be kept clear of snow and ice: ○ permanent speed restriction signs ○ temporary speed restriction equipment ○ emergency speed restriction equipment ○ point rodding ○ signal operating wires ○ authorised walkways • Level crossing road surfaces - It is Network Rail's responsibility to ensure that the section of road within the railway boundary is kept clear of snow. On public roads this is undertaken on their behalf by the local highway authority. Highways authority gritters are supposed to turn off the gritting mechanism whilst on the crossing. This rarely happens resulting in components corroding due to the application of salt. Special attention should be paid to ensure flangeway gaps are kept free of hard packed ice to prevent trains lifting • During severe frost the roofs of tunnels, the underside of overbridges and rock and chalk cuttings shall be inspected and all icicles, loose soil, or rock as applicable which may be dangerous to traffic, shall be removed • Locations where a severe frost may also cause heaving or lifting of the track, such as locations which are normally wet or where the ballast is shallow, particularly over culverts or overbridges shall be inspected, and any track heaving or lifting due to frost action shall be reported • Where necessary an emergency speed restriction shall be imposed
Mandatory or Discretionary	• Mandatory

PN9C - Managing suspension of visual track inspections (weather conditions)

Purpose	To manage the risk associated with visual track inspections when assets are obscured due to the presence of snow or floodwater.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L2/TRK/001/mod02 [Issue: 7] Track inspection
Indicative metrics	• n/a
Key preparedness tasks and key advice offered	• Temporary suspension of visual track inspections: ○ In conditions where effective visual inspection is not possible (e.g. the asset is hidden from view during flooding or heavy snow cover) the TME shall, in consultation with the RAM[T], implement alternative measures to confirm lines can be safely operated. The process described in Appendix D can be applied (with RAM[T] approval) if the tracks are covered by snow ○ Restrict any suspension of basic visual inspections to the shortest practical period ○ Record the reasons for the suspension and the alternative arrangements in place
Mandatory or Discretionary	• Mandatory

PN10C - Managing the suspension of Risk Based Maintenance (RBM) track inspections (weather conditions)

Purpose	To manage the risk where RBM track inspections are not possible where assets cannot be viewed due to the presence snow, fog [Fog needs to be in this document] or floodwater.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L2/TRK/7014/MANUAL [Issue: 1] Standardised Risk Based Maintenance Regime (RBM) for the Inspection and Maintenance of the Permanent Way
Indicative metrics	• Review the register monthly to make sure any Weather Related Critical Defects (WRCD) are recorded and notified to Electrification and Plant Maintenance Engineer, (EPME) and the Route Asset Manager (E&P) (RAM[E&P])
Key preparedness tasks and key advice offered	• In conditions where an RBM inspection is not possible (e.g., fog), the Section Manager (Track) SMT shall replan the inspection within the maximum planning timescales • Where the asset remains hidden beyond the maximum compliance point the TME shall, in consultation with the Route Engineer [Track] (RE[T]) (or equivalent current job title), implement alternative measures to confirm lines can be safely operated. NOTE: Assets can be hidden by snow, floods etc • Following snow fall or debris deposit and receipt of warning from Control, deploy staff to all at risk level crossings to clear snow / debris to enable inspections to be undertaken • Snow and ice builds up around rodding and stretcher bars. Remove snow, good practice is to closely manage the amount of ballast to provide more space for the snow to occupy.
Mandatory or Discretionary	• Mandatory

PN11C – Responding to extreme weather conditions at structures, earthworks and other locations

Purpose	To plan and mitigate the risk of cold weather on structures.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L1/CIV/032 Management of Existing Structures • NR/L2/OPS/021 [Issue: 8] Weather – Managing the Operational Risks • NR/L3/TRK/1010 (Issue 2) (NR/BS/LI/292 Issue: 1). Management of responses to extreme weather conditions at structures, earthworks and other key locations
Indicative metrics	• Check work is progressing to plan to address WRCDs
Key preparedness tasks and key advice offered	• Railway Operational Code directs Network Rail to provide an integrated weather management plan, IWMP at Route level to manage the operational disruptions resulting from weather hazards. This business process has been put in place to meet this obligation. The IWMPs should list regional threats and required controls to mitigate risks arising from cold weather. This document applies to these activities: • a) forecasting of weather to manage: • routine preparation, planning and response to weather hazards; • seasonal weather preparation and its management; and • near real-time monitoring of weather hazards. • b) recovery and lessons learnt from weather hazard responses; • c) weather hazard contingency planning, plan rehearsal and exercising; and • 19820d) vulnerable asset response planning. • The RAM shall produce a Local Extreme Weather Plan (EWP) in accordance with NR/L1/CIV/032 Management of Existing Structures covering actions to be taken in the event of scour, storms, flooding or high tides and extreme cold weather events. This plan includes a register of structures, earthworks and other key locations (such as location cabinets and cuttings) at risk from rainfall, meltwater, sea water, high winds, lightning, heat, extreme cold, snowfall and ice including subsequent thaw conditions which may affect the operation of traffic. The RAM[Structures] produces the extreme weather plan for bridges, and the RAM[Geotechnical] produces those for earthworks and coastal estuarine defences • For tunnels, consult the Tunnel Management Strategy and ice risk assessment to identify 'at-risk' assets to establish if the tunnel is susceptible to extreme weather events and to identify the actions to be taken following an extreme weather event • The Director, Route Asset Management (DRAM) will have accountability for producing Local Extreme Weather Plans • The register of at-risk assets shall contain as a minimum the following information for each structure: ○ ELR, Track ID, Mileage, Geographical Location Map reference of GPS co-ordinates, Number of structure if applicable, Name of structure if applicable, Form of construction, Element at risk/type of risk, A plan covering how the tunnels will be inspected. Details of the lines of communications and interactions between the Route structures engineers, Infrastructure Maintenance Delivery Manager, (IMDM), Infrastructure Maintenance Engineer, (IME), the Environment Agency, (EA) or the Scottish Environment Protection Agency, (SEPA)
Mandatory or Discretionary	• Mandatory

PN12C - Managing snow and ice on structures, earthworks and drainage installation

Purpose	To mitigate the risk of snow and ice in structures, earthworks, drainage and other key infrastructure locations.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/GN/CIV/100/04 [Issue: 1] Climate Action Design for Buildings & Architecture • NR/GN/CIV/200/07 [Issue: 1] Station Footbridges & Subways • NR/L2/CIV/003/F1990 [Issue: 4] TECHNICAL DESIGN REQUIREMENTS FOR BS EN 1990: Eurocode - Basis of structural design • NR/L2/CIV/035/MOD01 [Issue: 2] Management of Structural Assessments • NR/L3/CIV/023 [Issue: 1] Assessment of Footbridges • NR/GN/CIV/165 [Issue: 1] De-icing of Operational property Assets • NR/L2/CIV/084 [Issue: 3] Management of Tunnels • NR/L3/CIV/006/4A [Issue: 2] Examination of Tunnels • NR/GN/CIV/001 [Issue: 3] Waterproofing of Underline Bridge Decks • NR/L2/ELP/27715/04 [Issue: 3] Electrical and Mechanical Clearances and Separation
Indicative metrics	• Check work is planned to minimise the effects of cold weather • Ellipse Workbank

Key preparedness tasks and key advice offered	• Snow climate change projections indicate that snowfall rate is likely to decline across all areas of the UK. Snow days are likely to become less frequent by the end of the century, but natural climate variation means snow events could still occur
	• Snow can cause physical obstructions that interrupt service, and increases the risk of slips, trips and falls, which can result in station closure. Snow events could also lead to crowding of stations when trains are not running due to snow on the track. The application of road salt can damage structures through corrosion, particularly those made from steel and concrete
	• Consider the installation of roof cover to footbridges and subways using the Roof Cover Assessment Aid
	• Consider the requirements for snow loads and wind actions to be taken into account simultaneously with loads arising from construction activities. When wind loading (or drift snow loading) is included, the permissible stresses are increased by 25%. Snow loads to roofs of footbridges should be applied, where relevant, in accordance with BS 6399- 3. NOTE 1: Drift loads may need to be applied where there are adjacent structures or obstructions. Snow loads can be neglected for open (non-covered) bridges. NOTE 2: This is based on the magnitude of pedestrian live loading being greater than snow loading
	• Prevention of use or, prevention of access to all or part of the structure (e.g. at times of predicted high winds, or during or following high snow falls - the control measures may include subsequent removal of excess snow)
	• Consider the likelihood of frost or snow on the stairs (increased risk of accident)
	• Weather precaution products (de-icers) are used at stations to prevent accidents to passengers or vehicles caused by frost, ice and snow. It is particularly important that the edges of platforms are not slippery as the consequences could be fatal
	• Chemical de-icers can be applied for anti-icing, to prevent ice formation, or de-icing, to melt ice and snow already present. De-icers may have different degrees of effectiveness for anti-icing or de-icing and different application rates may be required for the different situations. RSSB 2005 Report T532 “Evaluation of frost, ice and snow precautions at Stations”
	• Use of Rock Salt promotes corrosion on Platforms, Track, Steel Footbridges, Signal Equipment and Power Cables
	• Chloride de-icers or Rock Salt should not be used on platforms, ramps and footbridges, as Network Rail has sufficient evidence that these cause severe corrosion to:
	  ○ concrete and steel platforms
	  ○ platform surfacing
	  ○ footbridges
	  ○ rail fastenings adjacent to platforms
	  ○ signalling and traction equipment adjacent to platforms
	  ○ rolling stock especially carriage doors and runners
	• Corrosion of footbridges and platforms may result in catastrophic failure, and increased risk of injury to passengers. Corrosion may take place within structural members, without producing any externally visible evidence - typically on steel reinforcement and pre-stressed tendons in concrete, and internal members on steel structures
	• For these reasons, only de-icers containing Acetates and Formates should be used on platforms, ramps and footbridges
	• A tunnel should be temporarily restricted in use or closed when a significant defect that may affect the safety of train operations or otherwise affect the Fitness for Use of the Tunnel is discovered or reported where ice formation that compromises Structure Clearance requirements; icicles of significant size that could fall upon a train using the Tunnel
	• The position and extent of any sheet ice or icicles within the tunnel shall be recorded
	• Network Rail Control shall be notified immediately if the safe passage of trains may be affected and advised not to open the tunnel to rail traffic until this has been corrected
	• The tunnel shall be examined visually for the defects including the presence of icicles

	• Closed drainage systems should be used to prevent:
	  ○ discharges blowing back onto structures
	  ○ icicles forming at outlets
	  ○ ice patches forming on surfaces below structures
	• Waterproofing of the bridge deck to avoid water ingress, to reduce icicles and water run-off coming into contact with live equipment

Mandatory or Discretionary	• Mandatory

PN13C - Managing excavations, concreting, applying coatings and waterproofing

Purpose	To manage, mitigate the effect of cold temperatures on excavations, pouring and curing of concrete and application of coatings.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L3/CIV/140/51N [Issue: 1] SECTION 51 – Excavations • NR/L3/CIV/140/52C [Issue: 1] SECTION 52 – Earthworks • NR/L2/CIV/140/1700C [Issue: 1] Specification for concrete • NR/L3/CIV/140/53C [Issue: 2] SECTION 53 - Grouting and lime stabilisation of embankments • NR/SP/ELP/27202 [Issue: 2] Specification for Concrete for O.H.L.E Structure Foundations • NR/GN/ELP/27186 [Issue: 2] The Installation of Switching Station Slab Foundation Bases
Indicative metrics	• Plan works aligned with expected weather conditions • Workbank and weather forecast

Key preparedness tasks and key advice offered	• Restrictions on excavating in chalk 51/1:
	  ○ Restrictions in accordance with figure 5/1 of the HA Advice Note 44/91 shall apply to the excavation of chalk and to materials other than chalk which cannot be excavated separately from chalk. Excavation of chalk, or trafficking over chalk, shall not be allowed during wet weather. Wet weather shall be taken as meaning during rain or snow, within 2 hours of cessation of rain or snow, when snow is lying on the ground surface or when the ground is frozen, or
	  ○ Earthworks involving chalk shall not be carried out during the period November 1st to March 31st. In the event of suitable weather occurring during this period, the Employer's Representative may permit a relaxation of these dates on a day-to-day basis
	• Placing, compacting and in situ testing of fill material:
	  ○ No filling shall be carried out when snow is lying on the ground or when the ground is frozen
	  ○ Topsoiling shall be carried out only when the subsoil and topsoil are workable, not saturated, and free of frost or snow
	• Cold Weather Work
	  ○ The Contractor shall keep accurate temperature records covering maximum and minimum air temperatures to gauge whether or not precautions will need to be taken. If the air temperature falls below 2°C (due to wind or not) or if the ground receiving concrete is frozen, the following precautions shall be strictly observed: No sand, aggregate or mixing water in which frost or ice is present shall be used
	  ○ Provided the temperature of the fresh concrete is not less than 5°C on placement, concreting may still continue, even in freezing temperatures. However, at the time of placing, a minimum concrete temperature of 10°C is preferable
	  ○ When concrete is placed at air temperatures below 2°C, the requirements in this clause shall be met:
	  ▪ The aggregates and water used in the mix shall be free from snow, ice and frost
	  ▪ The surface temperature of the concrete at the time of placing shall be at least 5°C. Where the concrete is made using CEM I or a CEM II/A cement, the concrete temperature shall not be more than 30°C. Where the concrete is made using a CEM II/B or a CEM III cement, or equivalent combination, the concrete temperature shall not be more than 35°C
	  ▪ The surface temperature of the concrete shall be maintained at not less than 5°C until the concrete reaches a strength of 5 N/mm² as determined by tests on cubes that were cured under identical conditions to the structural concrete
	  ▪ Before placing concrete, the formwork, reinforcement, prestressing steel and any surface with which the fresh concrete will be in contact shall be free from snow, ice and frost
	  ▪ Cement shall not be allowed to come into contact with water at a temperature greater than 60°C
	  ○ For side-bearing foundations, it is necessary to protect against heat loss from the top of the foundation and to protect against wind and rain. This shall be done by the use of Ethafoam Thermal Sheeting (or similar approved thermal polythene)
	  ○ For gravity foundations with a large plan size, curing is more critical and as such the air temperature under the thermal sheeting shall not fall below 5°C and shall be checked with a thermometer

	○ No grout mix shall be made with frozen materials and no grouting shall be carried out if the air temperature or ground temperature at a depth of 0.5 metres or less is below 1.5°C ○ Longer curing time should be allowed in cold weather ○ Coatings should not be applied when the temperature is less than 7°C ○ To be certain that the coatings dry properly, it is advisable to use solvent-based products for coating external surfaces in particularly cold weather.
Mandatory or Discretionary	• Mandatory

PN14C - Laying brickwork, blockwork and masonry during cold weather

Purpose	To manage the effects of cold weather when laying brickwork, blockwork and masonry.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• RT/CE/C/008/150C [Issue: 1C] SECTION 150 - Brickwork, Blockwork and Masonry
Indicative metrics	• Plan works aligned with expected weather conditions • Workbank and weather forecast
Key preparedness tasks and key advice offered	• No bricks shall be laid when the temperature is below 4°C when the temperature is falling, or below 3°C when the temperature is rising • The strength of mortar may be increased during cold weather bricklaying. Work shall not be carried out using frozen materials • During frost, or danger of frost, and in inclement weather, brickwork shall be continuously protected until the mortar is thoroughly set. Brickwork damaged by frost, or any other cause, shall be taken down and rebuilt
Mandatory or Discretionary	• Mandatory

PN15C - Managing the effects of snow and ice on Overhead Line Equipment (OLE)

Purpose	To reduce the risk of failure of OLE during cold weather.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L2/ELP/21090 [Issue: 1] OLE Seasonal Preparation Response for Extreme Weather • NR/L2/ELP/27715/01 [Issue: 1] Fundamental Design Requirements • NR/L2/ELP/21087 [Issue: 10] Specification of maintenance frequency and defect prioritisation of Overhead Line Electrification Equipment • NR/L2/ELP/21090 [Issue: 1] OLE Seasonal Preparation Response for Extreme Weather • NR/L3/MTC/RCS0216/MANUAL [Issue: 26] Risk Control Manual
Indicative metrics	• Plan works aligned with expected weather conditions • Workbank and weather forecast
Key preparedness tasks and key advice offered	• Low ambient temperature, snow and ice: o All OLE ranges are designed with a minimum ambient temperature of -18°C and maximum ice loading of 9.5mm radial ice on the conductor. Whilst it is highly unlikely that these limits will be exceeded, historical performance statistics indicate reliability of the system decreases below 0°C. The key assemblies and components that are vulnerable to these conditions are: ▪ All insulators (but specifically ceramic insulators) ▪ Compression fittings on cantilever strut tubes ▪ OLE tunnel support equipment and arrangement ▪ Balance weight anchors and other tensioning systems ▪ Electrical Jumpers in overlaps and crossovers ▪ Pantograph carbons o To manage the performance of the vulnerable assemblies and components, typical defects affecting the system performance in low ambient temperature which the Route Asset Manager (E&P) (RAM[E&P]) should consider when selecting Delivery Unit (DU) specific WRCDs are: ▪ High wire tension and reduced sag in FT conductors ▪ Cantilever strut tubes without a drainage hole (if required) ▪ Poor electrical in span jumper set up in overlaps and crossovers ▪ Excessive contact wire wear (especially in FT conductors) o The Overhead Catenary System (OCS) design shall be developed with an ice loading radial thickness of 9.5mm. The ice loading shall be calculated in accordance with NR/L2/CIV/072 and NR/L2/CIV/073. The additional sag caused by ice loading shall be determined when determining the height of live parts • Icicle Patrols: o Icicle patrols are detailed in NR/L2ELP/21087 o In cold weather conditions where the ambient temperature is predicted to be below or equal to 0°C. Icicle patrols shall be applied to bridge and tunnel locations where icicles are known to have an operational impact on the OLE. Patrol periodicities shall be determined by local knowledge of the speed and effect of icicle growth at specific locations o Icicle patrols shall check for loose waterproof sheeting in tunnel and bridge roofs NOTE: Long periods of sub-zero temperatures can lead to icicles forming on overhead line equipment (OLE), within tunnels, air shafts and under bridges o The formation of icicles on OLE shall be reported immediately to the Electrical Control Room o The Electrification & Plant Maintenance Engineer (EPME) shall identify all high-risk locations and WRCDs and be able to demonstrate risk levels and weather-related trigger points. These risks shall be reviewed periodically by the Infrastructure Maintenance Engineer and the RAM[E&P] to confirm risks are adequately controlled o To identify the risk the EPME shall: ▪ Maintain a register of tunnels and overbridge which are known risk locations for icicles. ▪ Create a register where icicle formation can cause a risk to the OLE (short circuits) ▪ Check for formation of icicles around overbridges and tunnels ▪ Check for areas for icicle build up on the contact wire ▪ Plan ice breaker trains for early morning run ▪ Use of live line poles to clear icicles ▪ Avoid standing directly under the icicles when effecting removal ▪ Always remove icicles by pushing and knocking away from the removal tool operator ▪ Icicles shall only be removed using approved icicle removal attachment which shall be used with a primary and insulated pole set
Mandatory or Discretionary	• Mandatory

PN16C - Managing the effects of snow and ice on conductor rail equipment

Purpose	To manage the effects of snow and ice on conductor rail equipment.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L3/ELP/27051/01 [Issue: 2] General Instructions for Working on or Near Conductor Rail Equipment • NR/L3/ELP/3091/Mod01 [Issue: 1] General Requirements • NR/L2/ELP/27023 [Issue: 1] Conductor Rail Heating Standard • NR/L2/ELP/27032 [Issue: 1] Management of incidents involving damage to the OLE • NR/L3/ELP/27237/MANUAL [Issue: 23] Overhead Line Work Instructions
Indicative metrics	• Plan works aligned with expected weather conditions • Ellipse workbank and weather forecast

Key preparedness tasks and key advice offered	• Ice or snow on permanent way:
	  ○ If the conductor rail is likely to be affected by ice or snow, Operations Control will arrange for the action to be taken, in accordance with the Network Rail/TOC cold weather working arrangements
	• Ice or snow on the conductor rail:
	  ○ If the conductor rail is likely to be affected by ice or snow, Infrastructure Control shall arrange, in accordance with Network Rail Instructions, for the following actions to be taken as appropriate:
	  ▪ The running of de-icing trains and/or for service trains fitted with de-icing equipment to apply the solution over the affected section(s) of line. When it has been necessary to apply de-icing solution from service trains, this shall be recorded. De-icing solution is an acceptable fluid to apply to the conductor rail and the stipulation in Instruction 3.1.7 of this module does not apply
	  ▪ The running of electric trains throughout the night to keep the line clear of ice or snow, in which case the ECO shall be advised accordingly
	  ▪ The attachment of additional units to service electric trains to increase the number of collector shoes in contact with the conductor rail
	  ▪ The provision of assisting locomotives for electric trains
	  ○ In the event of heavy snow or formation of ice on the conductor rail surface which may cause difficulty in the operation of electric trains, Infrastructure Control shall be immediately advised. In addition, any other special instructions concerning winter arrangements shall be observed
	  ○ In the event of heavy snow or formation of ice on the conductor rail surface which may cause difficulty in the operation of electric trains, Network Rail Control and the Electrical Control Operator (ECO) shall be immediately advised
	  ○ Allow the conductor rail heating system to maintain the operational integrity of the DC traction network during cold weather conditions
	  ○ The conductor rail heating system shall be designed and manufactured to allow safe operation throughout its service life including the installation, operation, maintenance, repair and eventual disposal of the conductor rail heating system
	  ○ All apparatus and connections for the safe and satisfactory operation, control and protection of the conductor rail heating system, shall be provided whether or not they are specifically mentioned
	  ○ The conductor rail heating system shall be designed to enable compliance with the requirements of all relevant statutory acts, rules, regulations and orders
	  ○ Safe access shall be provided for operation and maintenance purposes. Where access doors or covers are provided to permit access to all equipment or connections within the conductor rail heating system, locking facilities shall be provided to mitigate the risk of unauthorised access
	  ○ The supplier shall, when required by legislation, provide a risk assessment covering the life of the conductor rail heating system and its eventual disposal
	  ○ Materials containing asbestos, chlorinated fluorocarbons, or polychlorinated biphenyls, shall not be used
	  ○ The system shall be designed so that the maintenance activities for the conductor rail heating system aligns with Network Rail's Lifesaving Rules
	  ○ During exceptionally long shifts particularly during cold weather and where staff may have already worked prior to commencement of the incident, (management & technical staff particularly), due consideration shall be given to their welfare and their travelling arrangements home. This may dictate that additional support is required in the form of drivers and additional transport
	  ○ Thermit welding for traction bonding - Materials and Equipment must be kept dry at all times, and welding must not be carried out during rain or falling snow. Do not install jumpers if it is raining or snowing.

Mandatory or Discretionary	• Mandatory

PN17C - Managing physical boundary lineside and roadside foliage during cold weather

Purpose	To manage boundary measures to prevent trespass and vegetation and foliage during cold weather to allow adequate visibility of the lineside signs and clearances to OLE and signals to be maintained.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L2/OTK/5100 [Issue: 5] Boundary Measure Management Manual • NR/L2/OTK/5201/01 [Issue: 4] Lineside vegetation inspection and risk assessment • NR/L2/RMVP/0200/P301 [Issue: 4] Road rail access points (RRAP) • NR/L2/ENV/123 [Issue: 1] Prevention of Pollution to Land and Water
Indicative metrics	• Ellipse work bank
Key preparedness tasks and key advice offered	• Assess the effectiveness of boundary measure reduced by external occurrence such as change in ground level next to the boundary due to landslip, snow loading, wind-loading, waterlogging and washout of footings • Consider where snow and ice loading may bring vegetation closer to or within the immediate action area • When installing, maintaining or using a Road Rail Access Point, RRAP consideration should be given to how they are used if they are likely to be affected by poor weather conditions e.g. strong wind, heavy rains, electric storms, ice or snow • Consideration should also be given to factors that can produce unsafe conditions after inclement weather has ceased e.g. waterlogged and unstable ground following a period of heavy rain. The Safe System of Work (SSOW) should set out what measures or actions need to be taken for weather conditions e.g. grit, snow clearance • Weed spray, de-icing and anti-icer restrictions: ○ When weed spraying and de-icing measures are required, these shall be planned in advance to meet requirements for protecting Network Rail's biodiversity responsibilities. NOTE 1: This applies in particular to protected sites, areas and species legislation
Mandatory or Discretionary	• Mandatory

PN18C - Monitoring and maintaining signalling equipment during cold weather

Purpose	To monitor, maintain and operate signalling equipment during weather.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L2/SIG/19820/M01 [Issue: 1] Signalling and Level Crossing Product Specifications • NR/L1/SIG/50021/04 [Issue: 1] Environmental and Social Performance • NR/L2/SIG/19820/C01 [Issue: 2] Electronic treadle • NR/L2/SIG/19820/E03 [Issue: 1] Colour Light Signals • NR/L2/SIG/19820/E04 [Issue: 1] Signal Structures • NR/L2/SIG/30009/C410 [Issue: 1] Application of Tail Light Cameras • NR/L2/SIGELP/27501 [Issue: 1] Specification for Temporary Insulating Covers for Network Rail Signalling Location Cases • NR/L3/SIG/19810 [Issue: 3] Signal Engineering Involvement in Track and Civil Engineering Work • NR/L2/SIG/11400 Manual [Issue 8] – section ER/R/1/0111 PAGE 33, HPSS Snow Covers (also known as the HPSS Winter Kit) • NR/FP C001 [Issue: 5] Maintenance of Electric Points Heating
Indicative metrics	• Instructions and plans are in place and maintenance activities undertaken before cold weather
Key preparedness tasks and key advice offered [Brian to add changes]	• POE shall operate in ambient air temperatures within the range of -25°C to +43°C for indefinite periods. • Point Operating Equipment (POE) Points fail at temperature extremes and will be adversely affected by Snow/Cold/Ice ▪ Install electric points heating, check the operational state of remote condition monitoring equipment • Undertake seasonal preparedness maintenance activities a) Check precipitation and temperature sensors are free of obstructions especially vegetation that would prevent snow activating the device. Report any permanent obstructions e.g. wall b) Check temperature sensor(s) resistance against rail temperature using temperature chart, see EPF/LV/001a c) Reconnect temperature sensor(s) to controller d) Check that the controller temperature reading is within 2ºC of the rail reading • If a treadle is susceptible to the effects of snow and ice then a suitable test should be suggested by the supplier • The signal face shall be designed such that the aspects are not obscured by the build-up of falling or driven snow (driven by wind or passing traffic) • Snow load on signal gantries shall be taken into account if the deck plate is solid or with a small, perforated mesh • Special Box Instructions shall be produced and submitted to the Local operations Manager for agreement and shall: ○ State the action(s) to be taken if the signaller fails to observe the train or is unable to confirm the presence of an operational tail lamp (e.g., due to fog, snow or poor quality/corruption of the picture) • Snowplough. The impact of this activity could be damage to the axle counter caused by the impact of the snow being pushed by the snowplough. If necessary, the axle counter equipment needs to be protected or removed by a signal technician Install HPSS Snow Covers (also known as the HPSS Winter Kit).
Mandatory or Discretionary	• Mandatory

PN19C - Managing the risk of cold and inclement weather at Level Crossings

Purpose	To manage the risk of cold and inclement weather at Level Crossings.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L2/XNG/310 [Issue: 1] Product specification for an obstacle detection system at level crossings • NR/L2/SIG/30017/H [Issue: 1] Lighting and CCTV systems at level crossings
Indicative metrics	• Instructions and plans are in place and maintenance activities undertaken before cold weather

Key preparedness tasks and key advice offered	• Confirm that obstacle detection systems at level crossing are designed and installed to the correct specification. Falling precipitation with a rain intensity of 15mm/min and hail stones up to 15mm (e.g., rain, snow, hail) shall not affect the ability of the Obstacle Detection System to detect objects:
	  ○ of the required size;
	  ○ reject objects smaller than the unwanted object detection size within the range of the scanner appropriate to the protection system taking into account falling snow and snow driven by wind or passing vehicles
	• The design of lighting at level crossings shall be co-ordinated with CCTV camera mounting positions and heights to provide the optimum lighting combined with minimum glare. The design shall take into consideration:
	a) reflection from wet or snow-covered road or railway surfaces
	b) reflection from adjacent buildings
	c) any effect from other nearby sources of light
	d) natural sources of light, in particular the position of the sun at any time of day in any season
	• Confirm that preparation work has been undertaken at Level Crossings to reduce the impact of Wind/Cold/Snow. Barrier packs can fail at low temperature extremes.
	• Consider and manage the following risks at level crossings to allow operation during cold and inclement weather:
	  ○ Wind damage to barrier booms when in raised position and during lowering/raising cycles
	  ○ Install heaters within barrier pedestals
	  ○ Use skirt retaining brackets on barriers fitted with skirts
	  ○ Assess Level Crossings Snow/Ice Safety risk associated with vehicle incursion due to snow and ice on the road

Mandatory or Discretionary	• Mandatory

PN20C - Managing the risk of bridge strikes during cold and inclement weather

Purpose	To monitor and manage the build-up snow and confirm operation of bridge strike cameras during inclement weather.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/GN/CIV/202 [Issue: 3] Management of the risk of Bridge Strikes
Indicative metrics	• Instructions and plans are in place and maintenance activities undertaken before cold weather
Key preparedness tasks and key advice offered	• If any of the bridge strike cameras fail to function, or the image of the Bridge is blurred due to rain, fog, falling snow, or a technical reason prevents a clear picture being obtained from every camera of all the features of the Bridge, the existing Rule Book arrangements should be applied, and train movements stopped until the Bridge is examined on site by a BSN or BSE
Mandatory or Discretionary	• Discretionary

4.1.2 PROVEN AND PRACTICAL Trainborne Control Measures

PT1C - Clearing depot infrastructure of snow and ice

Purpose	To reduce the risk to staff; enable movement of trains into, around and out of the depot and storage siding sites; and local authority clears approach roads.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan) • GEGN8628 Issue 2 Preparation for and Operation during Winter • GIGN7621 Issue 1 Guidance Note for the Development and Design Considerations of Passenger Rolling Stock Depots
Indicative metrics	• Slips, trips and falls • Fleet availability • Depot facility management and maintenance records are appropriate and up to date • Equipment & appropriate PPE availability • Time spent undertaking clearing (to inform resource planning for future cold weather) • Usage of consumables (to inform material quantity required for future cold weather)
Key preparedness tasks	• Depot facility management and maintenance instructions • Provision of and maintaining of the equipment • Sourcing of consumables (such as salt and grit)
Mandatory or Discretionary	• Discretionary

PT2C - Providing insulation and heating for staff, depot equipment and fluid supplies

Purpose	To ensure staff can undertake their activities, the depot equipment functions correctly and reliably, and fluids (water, fuel, etc) do not freeze.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan) • GEGN8628 Issue 2 Preparation for and Operation during Winter • GIGN7621 Issue 1 Guidance Note for the Development and Design Considerations of Passenger Rolling Stock Depots
Indicative metrics	• Depot facility management and maintenance records are appropriate and up to date • Vehicle availability • Vehicle maintenance up to date
Key preparedness tasks	• Depot facility management and maintenance instructions • Maintenance and inspection of depot equipment
Mandatory or Discretionary	• Discretionary

PT3C - Reviewing and modifying depot facilities to reduce impact of cold weather

Purpose	To reduce the risk of depot access routes, shortages of materials and equipment failure preventing the depot from servicing and maintaining trains.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GIGN7621 Issue 1 Guidance Note for the Development and Design Considerations of Passenger Rolling Stock Depots
Indicative metrics	• Depot adverse weather risk register
Key preparedness tasks	• Review of depot facilities and issues encountered in previous cold weather • Modifying facilities to be more resilient in cold weather – for example installing underground heating to prevent ice and snow building up on access routes
Mandatory or Discretionary	• Discretionary

PT4C - Preparing and refining winterisation maintenance instructions for rolling stock

Purpose	To reduce the risk to persons and rolling stock failures due to cold temperatures and associated weather conditions.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan) • GEGN8628 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Maintenance instructions issued and briefed to relevant staff • Fleet reliability performance (for example miles per technical incident [Mp701D]) • Fleet availability versus target
Key preparedness tasks	• Review of performance and issues encountered in previous cold weather periods • Update and issue of vehicle winterisation maintenance instructions
Mandatory or Discretionary	• Discretionary

PT5C - Preparing plans for deferring non-safety critical maintenance

Purpose	To permit depot resources to be deployed on maintenance aspects most important to delivering a service in cold conditions.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan) • GEGN8628 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Maintenance instructions are up to date and issued • Fleet reliability performance (for example miles per technical incident [Mp701D]) • Fleet availability versus target • Fleet maintenance deferral records
Key preparedness tasks	• As detailed in vehicle and/or subsystem maintenance instructions
Mandatory or Discretionary	• Discretionary

PT6C - Preparing recovery plans for deferred work and affected or isolated systems

Purpose	To reduce the risk of poor train performance and availability following passing of cold weather conditions.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan)
Indicative metrics	• Maintenance instructions are up to date and issued • Fleet reliability performance (for example miles per technical incident [Mp701D]) • Fleet availability versus target
Key preparedness tasks	• Prepare and issue instructions for reinstating and repairing systems isolated or affected by cold weather • Record all deferred maintenance
Mandatory or Discretionary	• Discretionary

PT7C - Stocking up with materials required during cold weather at strategic locations

Purpose	To ensure anti-freeze, low temperature fuel, de-icer, grit, pantograph carbons, windscreen and side window glazing units, PPE etc and other associated consumables and spare parts are available at train maintenance facilities, even if deliveries might be delayed by the weather conditions or seasonal holidays.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan) • GEGN8628 Issue 2 Preparation for and Operation during Winter • GIGN7621 Issue 1 Guidance Note for the Development and Design Considerations of Passenger Rolling Stock Depots
Indicative metrics	• Store's stock take for each location
Key preparedness tasks	• Review previous cold weather consumables and spare parts usage • Order likely sufficient consumables and spare parts in good time • Consumable and spare parts delivered
Mandatory or Discretionary	• Discretionary

PT8C - Carrying out external train cleaning before cold weather commences

Purpose	To reduce the risk of build-up of detritus, oil, brake dust, etc. before below freezing temperatures prevent washing.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GEGN8628 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Number of days since last wash for each vehicle
Key preparedness tasks	• Determine date or trigger condition criteria for implementing plan • Checking and servicing train washing facilities • Obtaining washing supplies • Wash vehicles to the plan
Mandatory or Discretionary	• Discretionary

PT9C - Preparing rolling stock for cold and associated weather conditions in advance

Purpose	To reduce the risk of rolling stock failures due to cold or winter weather by carrying out winterisation tasks, ensuring heaters and pre-heaters are functioning, fitting trace heating to horns and couplers and mini snow ploughs to suitable locomotives or units, and reduce quantity of deferred maintenance before onset of the conditions.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GEGN8628 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Completion of fleet winterisation tasks prior to start of winter
Key preparedness tasks	• As detailed in vehicle winterisation instructions • Ensure adequate availability of materials and consumables • Set date or trigger condition criteria for implementing winterisation jobs
Mandatory or Discretionary	• Discretionary

PT10C - Isolating systems likely to be affected by cold conditions

Purpose	To reduce the risk of water tanks, CET tanks, pipework and other non-critical systems becoming damaged by cold conditions and freezing water.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan) • GEGN8628 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Completion of fleet winterisation tasks or extreme weather plan prior to onset of cold conditions
Key preparedness tasks	• Identify systems which can be isolated • Determine date or trigger condition criteria for isolating systems • Vehicle winterisation instructions or extreme weather plan
Mandatory or Discretionary	• Discretionary

PT11C - Clearing snow and ice from vehicles

Purpose	To ensure external lights are visible; horns, doors, couplers and windscreen wipers function correctly; and steps, doorways and floor surfaces do not present a hazard.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan) • GEGN8628 Issue 2 Preparation for and Operation during Winter • RIS 3437 TOM Issue 3 Defective On Train Equipment
Indicative metrics	• Fleet reliability performance (for example miles per technical incident [Mp701D]) • Fleet availability
Key preparedness tasks	• Extreme weather plan with resources identified • Availability of equipment and consumables
Mandatory or Discretionary	• Mandatory where explicitly listed in RIS 3437 TOM Issue 3, otherwise Discretionary

PT12C - Draining air systems checking drain valves and trace heaters function

Purpose	To reduce the risk of vehicle air systems not functioning or being damaged due to water freezing.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan) • GEGN8628 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Fleet reliability performance (for example miles per technical incident [Mp701D]) • Material usage
Key preparedness tasks	• Vehicle winterisation instructions or extreme weather plan • Determine date or trigger condition criteria for implementing
Mandatory or Discretionary	• Discretionary

PT13C - Suspending washing of trains when temperature drops below freezing

Purpose	To avoid trains becoming covered in ice or carriage washing machines failing.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GEGN8628 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Depot facility management and maintenance records are appropriate and up to date
Key preparedness tasks	• As detailed in depot facility management and maintenance instructions • Determine trigger condition criteria for implementing
Mandatory or Discretionary	• Discretionary

PT14C - Implementing winterisation training and competency plan

Purpose	To ensure depot staff are familiar with the winterisation plan and tasks expected of them.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan)
Indicative metrics	• Depot facility management and maintenance records are appropriate and up to date
Key preparedness tasks	• As detailed in depot facility management and maintenance instructions • Training plan and notes
Mandatory or Discretionary	• Discretionary

PT15C - Planning staff deployment for cold weather

Purpose	To ensure depot staff can travel from home to a suitable maintenance facility location and winter response teams are planned.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GEGN8628 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Fleet availability
Key preparedness tasks	• As detailed in depot facility management plan • Determine staff travel arrangements • Undertake staff inductions and training for alternative sites • Plan and train response teams for cold weather
Mandatory or Discretionary	• Discretionary

PT16C - Implementing winterisation maintenance and extreme weather instructions

Purpose	To ensure resources are prioritised on critical activities.
Lead Duty Holder	• Railway Undertakings
References and guidance	• RDG Fleet Management Good Practice Guide Issue 15 (20 Point Plan) • GEGN8628 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Fleet availability
Key preparedness tasks	• Vehicle winterisation maintenance instructions • Supplies of equipment and consumables • Staff training and competence assessment
Mandatory or Discretionary	• Discretionary

4.1.3 PROVEN AND PRACTICAL Operational Control Measures

PP1C - Improving traincrew rolling stock knowledge

Purpose	To ensure train drivers are familiar with the variabilities in the different unit types that they operate, especially heating, ventilation and battery power considerations.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GERT8000 Module TW1 Preparation and movement of trains
Indicative metrics	• Driver management assessments of drivers (local rules)
Key preparedness tasks	• Briefing of rolling stock module knowledge (basic principles)
Mandatory or Discretionary	• Discretionary

PP2C - Maintaining safe access to operational locations

Purpose	To ensure that access to key operational locations, including authorised walking routes, are kept clear of ice and snow to enable safe access for staff.
Lead Duty Holder	• All Duty Holders
References and guidance	• GEGN8626 Issue 2 Preparation for and Operation during Winter • RDG-OPS-GN-027 Winter Arrangements for Stations • NR/L3/OPS/021 Module 3 Winter Management
Indicative metrics	• Slip, trip and fall statistics • Use of grit or de-icer
Key preparedness tasks	• Any necessary equipment checked and repaired • Risk assessments available for snow/ice removal tasks • De-icer or grit ordered well in advance • De-icer or grit in place before freezing event – relies on weather reports • Ice awareness posters in place • Passenger announcements
Mandatory or Discretionary	• Mandatory

PP3C - Preventing icing on conductor rails

Purpose	To ensure that conductor rails are treated with anti-icing agents, or have conductor rail heating enabled, ahead of cold weather to prevent icing of conductor rail surfaces.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• GEGN8626 Issue 2 Preparation for and Operation during Winter • NR/L3/OPS/021 Module 3 Winter Management • Network Rail Route Cold Weather Working Arrangements
Indicative metrics	• Reports of icing / loss of line light • Use of de-icer
Key preparedness tasks	• Conductor rail heating checked and operational, with process to enable, if appropriate • Anti-icing trains planned and resourced • Ghost train running
Mandatory or Discretionary	• Mandatory

PP4C - Clearing snow and ice from the infrastructure

Purpose	To ensure that accumulating snow and ice is safely cleared from the infrastructure to enable safe passage of trains, and that snowploughs are operated in line with operational restrictions.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• GERT8000 Module M3 Managing incident, floods and snow • NR/L3/OPS/021 Module 3 Winter Management • Network Rail Route Cold Weather Working Arrangements • GEGN8268 Issue 2 Preparation for and Operation during Winter • RAIB Report 03/2011: Derailment of a freight train at Carrbridge
Indicative metrics	• Use of snowploughs • Stranded trains
Key preparedness tasks	• Rule book module knowledge • Operational staff briefing
Mandatory or Discretionary	• Mandatory

PP5C - Maintaining safe underfoot conditions on stations

Purpose	To ensure that safe underfoot conditions - free of ice and snow - are maintained on and around stations for customers and staff.
Lead Duty Holder	• All Duty Holders
References and guidance	• GEGN8626 Issue 2 Preparation for and Operation during Winter • NR/L3/OPS/021 Module 3 Winter Management
Indicative metrics	• Slip, trip and fall statistics • Use of grit or de-icer
Key preparedness tasks	• Any necessary equipment checked and repaired • Risk assessments available for snow/ice removal tasks • De-icer or grit ordered well in advance • De-icer or grit in place before freezing event – relies on weather reports
Mandatory or Discretionary	• Mandatory

PP6C - Preparing to drive to the conditions

Purpose	To ensure that operational staff are familiar with fleet and rule book restrictions for driving in falling snow, foggy and freezing conditions.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GERT8000 Module SP Speeds • GERT8000 Module TW1 Preparation and movement of trains • GERT8000 Module M3 Managing incident, floods and snow, section 5, 6 • GEGN8268 Issue 2 Preparation for and Operation during Winter • RAIB Report 02/2011: Near miss involving a freight train and two passenger trains, Carstairs
Indicative metrics	• Number of operational incidents • Awareness of speed / operating restrictions in place
Key preparedness tasks	• Driver manager assessments of drivers (local rules) • Local Operations Manager assessments of signallers (local rules) • All appropriate checks carried out in accordance with company generic and location specific booking on procedure prior to shift start
Mandatory or Discretionary	• Mandatory

PP7C - Managing the needs of stranded trains and passengers

Purpose	To ensure that the welfare of passengers on stranded trains is considered, that they are kept safe and informed, and that they are expediently moved to safety.
Lead Duty Holder	• All Duty Holders
References and guidance	• RDG-OPS-GN-049 Issue 5 Meeting the Needs of Passengers Stranded on Trains • NR/L3/OPS/045/4.15 Managing Stranded Passengers and Train Evacuation • RDG-GN015 Issue 4 Guidance Note – Extreme Weather Arrangements, including Failure or Non-Availability of On-Train Environment Control Systems • RAIB Report 02/2019: Self-detrainment of passengers onto lines that were still open to traffic and electrically live at Lewisham
Indicative metrics	• Safe management and evacuation of stranded passengers
Key preparedness tasks	• Briefings for key operational staff developed and distributed • Water and blankets available at key locations for distribution • 'Trapped trains' timer and risk assessment implementation
Mandatory or Discretionary	• Mandatory

PP8C - Managing the operation of points during falling snow

Purpose	To ensure that operating staff manage points as required to mitigate the risk of ice and snow build-up that may foul the pointwork.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• GERT8000 Module M3 Managing incident, floods and snow • GEGN8268 Issue 2 Preparation for and Operation during Winter • NR/L3/OPS/021 Module 3 Winter Management
Indicative metrics	• No incidents due to non-operational points caused by snow or ice
Key preparedness tasks	• Briefing of operational staff • Points heating checked to be working effectively • Proactive checks of points for ice build-up
Mandatory or Discretionary	• Mandatory

PP9C - Implementing Key Route Strategies and Amended Timetables

Purpose	To ensure that Key Route Strategies and Amended Timetables are implemented effectively.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• NR/L3/OPS/045/3.23 Train Service Management • NR/L3/OPS/021 Module 3 Weather Management • Network Rail Route Cold Weather Working Arrangements • GEGN8268 Issue 2 Preparation for and Operation during Winter
Indicative metrics	• Effective and consistent implementation of Key Route Strategies
Key preparedness tasks	• Pre-defined key route strategies taking into account key risk areas and minimising points usage • Pre-defined Amended Timetables to align with key route strategy • Agreed process and timescales for implementation
Mandatory or Discretionary	• Mandatory

PP10C - Managing and removing of icicles on structures and within tunnels

Purpose	To ensure that icicles and ice build-up on structures and within tunnels & tunnel shafts are identified and safely removed.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• RAIB Report 16/2011: Derailment in Summit tunnel • GEGN8268 Issue 2 Preparation for and Operation during Winter • NR/L3/OPS/021 Module 3 Winter Management
Indicative metrics	• No incidents due to icicles or ice build-up. • Proactive removal of icicles and / or ice build-up
Key preparedness tasks	• Plans developed to proactively assess and manage • Running ghost trains
Mandatory or Discretionary	• Mandatory

PP11C - Route Proving

Purpose	To ensure that routes that have been closed due to Key Route Strategy, or due to severe weather, are proven to be safe for the passage of trains prior to reopening to freight and passenger services.
Lead Duty Holder	• All Duty Holders
References and guidance	• GEGN8268 Issue 2 Preparation for and Operation during Winter • GERT8000 Module G1 General safety responsibilities and personal track safety for non-track workers • GERT8000 Module TW1 Preparation and movement of trains • NR/L3/OPS/021 Module 3 Winter Management • NR/L3/OPS/045/3.41 Route and Line Proving Process
Indicative metrics	• Safe reopening of routes closed due to Key Route Strategy
Key preparedness tasks	• Route-proving after KRS is lifted • Confirmation that station platforms are clear of ice / snow and safe for public use • Confirmation that stock is available • Confirmation that infrastructure has been declared available and clear / safe
Mandatory or Discretionary	• Mandatory

PP12C - Managing risk to response staff/alternative transport via road

Purpose	To ensure that due consideration is given to the risks imposed by severe weather on road travel, particularly with reference to response staff attending incidents and alternative transport for passengers should an incident occur.
Lead Duty Holder	• All Duty Holders
References and guidance	• GEGN8268 Preparation for and Operation during Winter
Indicative metrics	• Decisions made to run service or not depending on road conditions
Key preparedness tasks	• Review of weather forecasts for road conditions, as well as rail • Suitable vehicles available, inc. 4x4s, as appropriate.
Mandatory or Discretionary	• Mandatory

PP13C - Providing suitable PPE for the conditions

Purpose	To ensure that operational staff are equipped with the current PPE for the conditions, especially those working in freezing, icy and snow conditions.
Lead Duty Holder	• All Duty Holders
References and guidance	• GEGN8628 Preparation for and Operation during Winter • NR/L3/OPS/021 Module 3 Winter Management
Indicative metrics	• Data from incidents due to lack of improper PPE • Feedback from staff working outside in wintry conditions
Key preparedness tasks	• Review of PPE for suitability • Issuing of suitable PPE, if appropriate
Mandatory or Discretionary	• Mandatory

PP14C - Providing welfare and contingency arrangements for staff

Purpose	To ensure that due consideration is given to the welfare of staff working in freezing, icy and snowy conditions, and that contingency arrangements are in place should travel become challenging.
Lead Duty Holder	• All Duty Holders
References and guidance	• GEGN8268 Issue 2 Preparation for and Operation during Winter • NR/L3/OPS/021 Module 3 Winter Management
Indicative metrics	• Consideration given to welfare of staff working in wintry conditions
Key preparedness tasks	• Winter 'survival kits' created • Contingency arrangements developed if travel becomes challenging
Mandatory or Discretionary	• Mandatory

PP15C - Providing welfare equipment on trains

Purpose	To ensure that adequate welfare equipment is in place on trains, including, but not limited to, survival blankets.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GEGN8628 Issue 2 Preparation for and Operation during Winter Section G5.3.17.
Indicative metrics	• Completion of survival blanket checks on trains
Key preparedness tasks	• Survival blankets checked for fitness for use • Survival blankets available on trains
Mandatory or Discretionary	• Mandatory

PP16C - Assessing suitability of rolling stock to operate routes in winter weather

Purpose	To ensure that the suitability of rolling stock is taken into account in operating routes during winter weather to prevent undue risk being imported to passengers or staff.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GEGN8628 Issue 2 Preparation for and Operation during Winter section G5.4.1.8
Indicative metrics	• Events where rolling stock has faced issues due to winter weather
Key preparedness tasks	• Rolling stock class knowledge with regard to weather risks. • Review of key incidents where rolling stock has faced issues due to winter weather
Mandatory or Discretionary	• Mandatory

PP17C - Reducing service to align with component supply chain

Purpose	To ensure that due consideration is given to the reduction in service of rolling stock to align with available component supply from the supply chain to prevent fleets becoming non-operational awaiting parts.
Lead Duty Holder	• Railway Undertakings
References and guidance	• GEGN8628 Issue 2 Preparation for and Operation during Winter Section G5.4.1.9
Indicative metrics	• Level of service planned to operate due to rolling stock constraints
Key preparedness tasks	• Understanding wear / risks to components of running in winter conditions • Understanding supply chain risks for key components
Mandatory or Discretionary	• Mandatory

PP18C - Managing the risk of wagon derailment from partial, frozen loads

Purpose	To manage the risk of a wagon remaining partially loaded due to freezing load, resulting in uneven axle loading
Lead Duty Holder	• Railway Undertakings
References and guidance	• Rail Freight Operations Group Code of Practice: Loading Bulk Wagons, Version 2
Indicative metrics	• Vehicles moved with partially frozen loads within wagons
Key preparedness tasks	• Risk assessments • Fully unloading wagons in cold weather
Mandatory or Discretionary	• Mandatory

4.1.4 PROVEN AND PRACTICAL Management Processes

PM1C - Responding to non-delivery of control measures 'on the day'

Purpose	To take corrective actions when a control measure, which is an element of the plan described in PM2C, is not or cannot be applied. Such corrective action should continue to reduce cold weather risk to acceptable levels, as required by ROGS regulations.
Lead Duty Holder	• Whichever Duty Holder is the Lead Duty Holder for the control measure not delivered
References and guidance	• The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended)
Indicative metrics	• Command structure implemented • Route proving completed
Key preparedness tasks	• Preparation and agreement of a plan, as described in PM2C • For expected extreme conditions, consider additional resources required • Ensure command structure considers cold weather risks • Creation of a cold weather management plan
Mandatory or Discretionary	• Mandatory

PM2C - Creation of joint cold weather contingency plans

Purpose	To have a plan which sets out the mix and scope of control measures for each part of the Duty Holders' network and the way they are used.
Lead Duty Holder	• All Duty Holders
References and guidance	• NR/L3/OPS/021/10 Joint Seasons Management Groups • GEGN8628 Issue 2 Preparation for and Operation during Winter Part 3 • NR/L3/OPS/021/03 Winter Management, Section 5 • RDG-GN015 Issue 4 Guidance Note – Extreme Weather Arrangements, including Failure or Non-Availability of On-Train Environment Control Systems
Indicative metrics	• Creation of a Key Route Strategy (KRS) • Creation of contingency plans • Number of assets or sites which will remain a risk after the on-set, and throughout the period of cold weather • Number and location of switches
Key preparedness tasks	• Joint consultation amongst Duty Holders in advance of cold weather
Mandatory or Discretionary	• Mandatory

PM3C - Sourcing, sharing and responding to weather forecasts

Purpose	To ensure that weather forecasts are received, reviewed and shared in good time to enable mitigations to be put in place, as required.
Lead Duty Holder	• All Duty Holders
References and guidance	• NR/L2/OPS/021 Weather - Managing the Operational Risks • NR/L3/OPS/045/3.17 Weather Arrangements • GEGN8628 Issue 2 Preparation for and Operation during Winter Section 2.2
Indicative metrics	• Provision of forecasts to key stakeholders • Scheduling of EWATs (Emergency Weather Action Teleconferences), as required
Key preparedness tasks	• Sources of weather forecasts confirmed • Distribution lists for weather forecasts confirmed • Key risks and triggers identified
Mandatory or Discretionary	• Mandatory

PM4C - Using cold weather forecasting tools

Purpose	To aid decision making, conductor rail and overhead line equipment (OLE) forecasts are available on the Network Rail Weather Service (NRWS).
Lead Duty Holder	• All Duty Holders
References and guidance	• GEGN8628 Issue 2 Preparation for and Operation during Winter Section 2.2 • NRWS Help Menu
Indicative metrics	• Snow risk status established • Ice risk status established
Key preparedness tasks	• Understanding of the operation of snow and ice risk forecasts
Mandatory or Discretionary	• Discretionary

PM5C - Managing the evacuation and recovery of stranded trains

Purpose	To maintain the safety and welfare of passengers when a train is stranded.
Lead Duty Holder	• Infrastructure Managers
References and guidance	• GEGN8628 Issue 2 Preparation for and Operation during Winter Section 3.3.3 • NR/L3/OPS/045/4.15 Managing Stranded Passengers and Train Evacuation
Indicative metrics	• Length or time train has been and is expected to be stationary • Length of time to recover to enact recovery plan
Key preparedness tasks	• Complete NR/L3/OPS/045/4.15FA Stranded Trains Risk Assessment • Establish whether customers' comfort is impacted, e.g. air con on, water available when deciding if train should be evacuated • If the decision is made to evacuate, complete NR/L3/OPS/045/4.15FB Train Evacuation Risk Assessment
Mandatory or Discretionary	• Mandatory

PM6C - Supporting development of new and emerging control measures

Purpose	To facilitate, by providing a reasonable and appropriate level of support to the development, testing and trialling of new and emerging cold weather control measures.
Lead Duty Holder	• All Duty Holders
References and guidance	• Key Train Requirements Version 7 • Challenge Statements on NR website
Indicative metrics	• Current number of offers of support made and active involvement with new and emerging control measures • Quantity of trials undertaken
Key preparedness tasks	• Active documented offers reported to SCCG/SCSG
Mandatory or Discretionary	• Discretionary

4.2 NEW AND EMERGING Control Measures not yet verified as being proven and practical good practice

4.2.1 NEW AND EMERGING Infrastructure Control Measures

Nil

4.2.2 NEW AND EMERGING Trainborne Control Measures

NT1C - Fitting sleet brushes to 3rd & 4th rail DC electric trains

Purpose	To remove ice and snow from the 3rd rail and improve current collection by the shoegear (note that this control measure builds on LUL experience of operating trains in ice and snow).
Organisation responsible for development	• RSSB
Research body currently commissioning research	• n/a
Trials and pilots underway	• Sleet brushes fitted to London Underground trains which collect current from 3rd and 4th rails.
References and Reports on File	•
Target Timescales for Gaining PROVEN AND PRACTICAL Status	• 1-3 years
Envisaged sources of further funding	• n/a
Current Technical Readiness Level (TRL) attained	• n/a

NT2C - Fitting heated couplers

Purpose	To assure reliable coupling and uncoupling of units atter berthing and operating in freezing or snowy conditions
Organisation responsible for development	• RSSB
Research body currently commissioning research	• n/a
Trials and pilots underway	• Heated couplers fitted to some new order multiple unit fleets in recent years
References and Reports on File	•
Target Timescales for Gaining PROVEN AND PRACTICAL Status	• 1 – 3 years
Envisaged sources of further funding	• n/a
Current Technical Readiness Level (TRL) attained	• n/a

NT3C - Installing external warning horns in heated horn pockets

Purpose	To assure reliable operation of external forward facing warning horns after operating in freezing or snowy conditions
Organisation responsible for development	• RSSB
Research body currently commissioning research	• n/a
Trials and pilots underway	• n/a
References and Reports on File	• n/a
Target Timescales for Gaining PROVEN AND PRACTICAL Status	• 1 – 3 years
Envisaged sources of further funding	• n/a
Current Technical Readiness Level (TRL) attained	• n/a

4.2.3 NEW AND EMERGING Operational Control Measures

Nil

4.2.4 NEW AND EMERGING Management Control Measures

Nil

Definitions

ALARP	ALARP is short for "as low as reasonably practicable". Reasonably practicable involves weighing a risk against the trouble, time and money needed to control it. Thus, ALARP describes the level to which we expect to see workplace risks controlled.
Amended timetable	A modified timetable, often with fewer services, changed stopping patterns and lengthened journey times, used during periods of severe weather disruption with the aim of improving reliability.
Assurer	A person within a Duty Holder organisation that is involved in an assurance process to make sure control measures have been implemented properly.
Boots on ballast	A term describing activities which necessitate personnel carrying out tasks on or about the operational railway line.
Competent Body	Competent Body means any body that has authority to issue standards, guidance or recommendations for the delivery of control measures.
Compliance	The act of obeying an order, rule, or request.
Control measures	Protective precautions put into place to reduce performance and safety risks, and hazards.
Custom and practice	Unwritten and unofficial practice within an industry or organisation that has become accepted as the norm.
Duty holder	Infrastructure Managers (e.g. Network Rail) – companies responsible for infrastructure such as track, stations, signalling and electrification – and Railway Undertakings (e.g. Train Operating Companies and Freight Operating Companies) – the train operators. Each is responsible for its own part of the railway.
Good practice	A process or method that has been shown to work well, succeeds in achieving its objectives, is widely accepted and therefore, can be recommended as a reasonable approach.
Hazard	A condition that could lead to a performance or safety loss.
Infrastructure	Any fixed assets or features of the operational railway.
Infrastructure Manager (IM)	Is any person or organisation that: ● is responsible for developing and maintaining infrastructure (not including a station) or for managing and operating a station; and ● manages and uses that infrastructure or station, or allows it to be used for operating a vehicle. Source ROGS.
Key Route Strategy	A key route strategy (KRS) sets out the policy for managing the reduced availability of infrastructure when normal operations cannot be maintained.
Mainline railway	Excludes metros and other light rail systems; networks that are functionally separate from the Mainline; heritage, museum or tourist railways; and privately owned infrastructure as defined in the regulations. Source ROGS.
New and emerging	A control measure which is under development, but which has not yet been approved by SCSG as being proven and practical.
Practitioner	Someone involved in a skilled job or activity to implement control measures.
Proven and practical	A control measure which has been approved by SCSG as being effective in the reduction of performance and safety risk.
Railway system	The structure composed of lines and fixed installations of the existing rail system in Great Britain plus the vehicles of all categories and origin travelling on that infrastructure. Source: RIR.
Railway Undertaking (RU)	Is any person or organisation that operates a vehicle in relation to any infrastructure. Source ROGS.
Risk	The combination of the likelihood of occurrence of performance or safety loss and the severity of that loss.
RM3P	Performance Risk Management Maturity Model developed by a group of industry stakeholders to encourage organisations to achieve excellence in performance and safety management.
ROGS	Railways and Other Guided Transport Systems (Safety) Regulations 2006 (as amended).
Trainborne	Carried on, fitted to, or directly affecting rail vehicles.