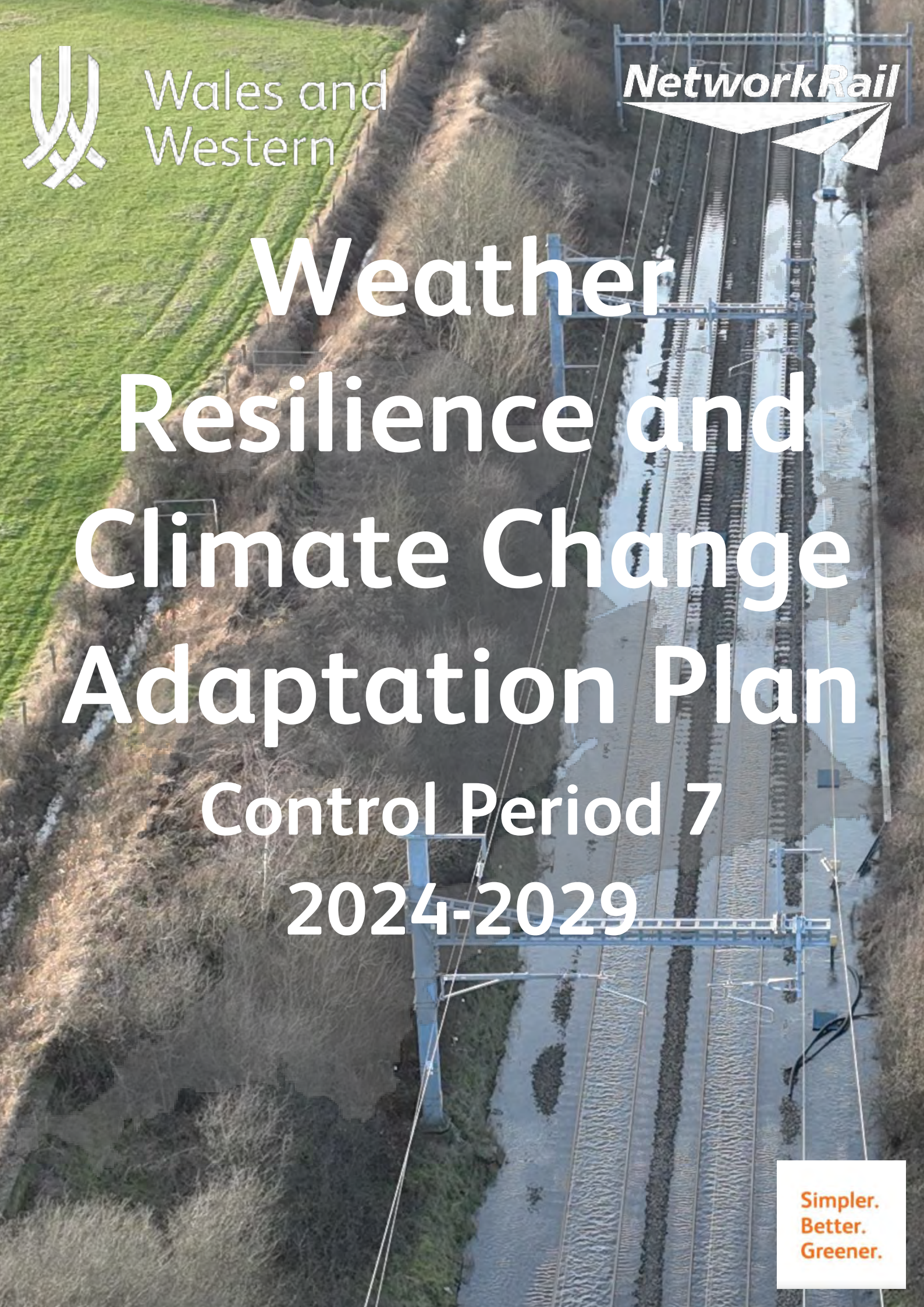

Wales and Western

NetworkRail

Weather Resilience and Climate Change Adaptation Plan

Control Period 7

2024-2029

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CONTENTS

Document Control

Version	Date	Comments
FINAL	11/04/2024	Final version for publication

Submitted as part of Network Rail Wales and Western CP7 Strategic Business Plan.

This plan (contents of this document, including proposed actions) has been updated based on:

- draft (June 2023) and final (November 2023) determinations from ORR;
- the Network Rail Third Adaptation Report (2021);
- the Network Rail Third Adaptation Report: Appendix A Integrated ARP3 Climate Risk Assessment;
- the Network Rail Environmental Sustainability Strategy 2020 – 2050 (2020);
- The Wales and Western Strategic Business Plan (2023)

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Purpose of this document

This document; defines the W&W Region Weather Resilience and Climate Change Adaptation (WRCCA) Plan for CP7, against the backdrop of the WRCCA Plan published for CP6. This is supported by an evaluation of the resilience of rail infrastructure to historical weather events and an awareness of potential impacts from regional climate change projections. The resilience of the rolling stock and passengers within the Region is not specifically assessed.

Executive Summary

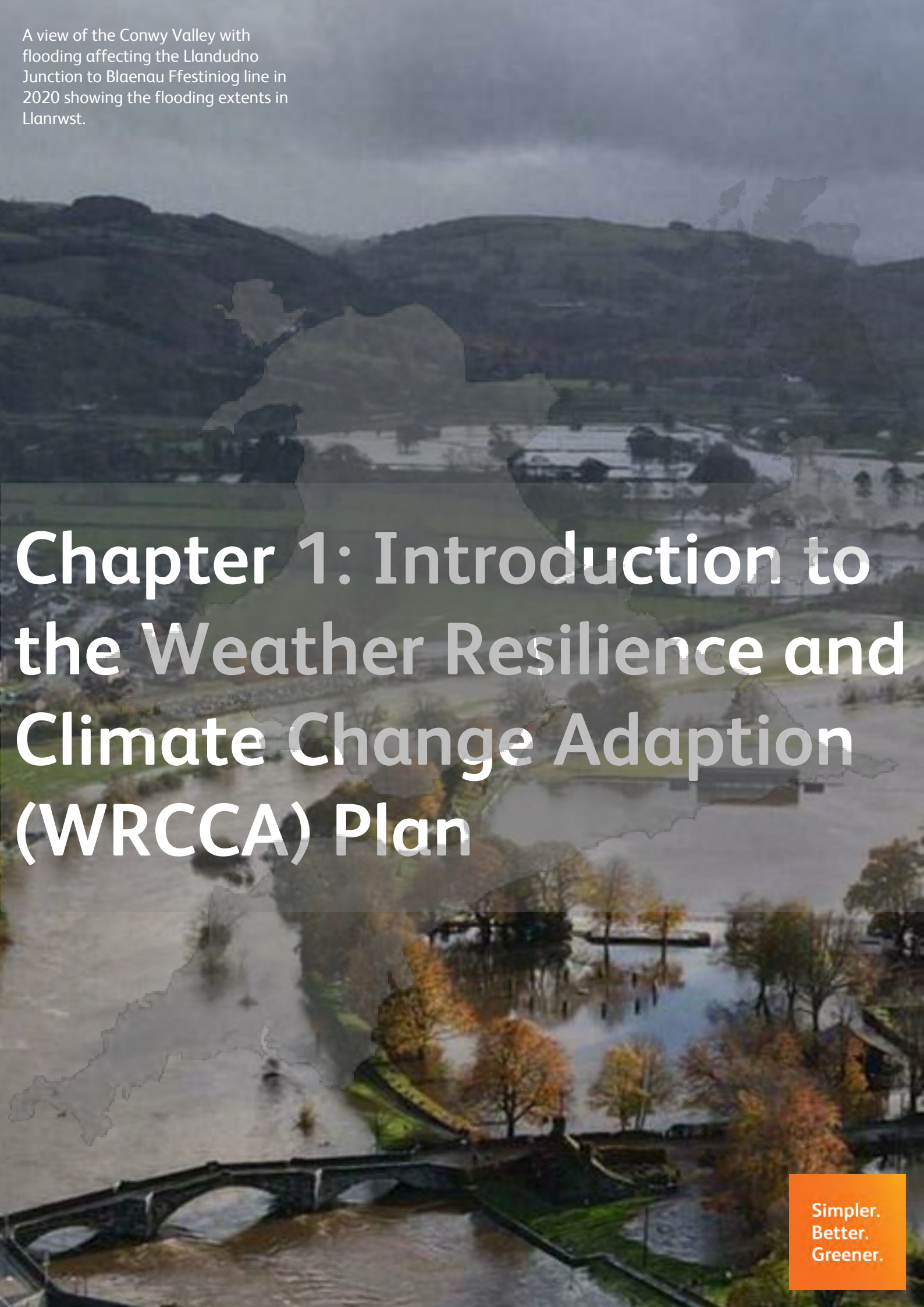
Climate change poses a significant and escalating threat to the operational integrity of the Wales and Western (W&W) railway network. Severe weather events, such as intense rainfall and strong winds from the Southwest, are increasing in frequency, demanding urgent action. The W&W region is committed to addressing this challenge through a comprehensive plan extending into Control Period 7 (CP7) and beyond, focusing on safeguarding assets, embedding resilience into daily operations, and adapting to climate change impacts.

As climate change continues to present unprecedented risks, this plan focuses on becoming resilient, mitigating vulnerabilities in our network, and ensuring the long-term sustainability and reliability of rail operations and services.

Key components of the CP7 plan include:

1. The plan begins with a thorough assessment of climate-related risks to Wales & Western regions infrastructure, including extreme weather events, rising temperatures, and changing precipitation patterns.
2. Investment in infrastructure with capital investment in pure resilience schemes along with BAU work bank activities with primary resilience to climate impacts. This includes measures such as improving earthworks, improving drainage systems, and making embankments more resilient to withstand extreme weather events and prolonged exposure to changing environmental conditions.
3. Wales and Western is committed in this WRCCA plan to creating an operationally resilient railway which will allow key decision to be made at the right time which will improve the reliability for our passengers.
4. The success of the CP7 plan relies on collaboration with stakeholders, including local communities, government agencies, and industry partners. Engaging stakeholders in the planning and implementation process fosters cooperation and ensures that adaptation measures are tailored to local needs and priorities. There will be a focus on working outside of the railway boundary where possible with a focus on Nature based solutions and whole catchment works to be planned.
5. The plan emphasizes the importance of research and innovation in developing cutting-edge solutions to climate-related challenges. Network Rail will invest in research initiatives to advance understanding of climate impacts on rail infrastructure and explore innovative technologies and materials to enhance resilience and sustainability.
6. Remote condition monitoring of at risk assets will be implemented in order to enable better decision making for asset renewals into CP7 and beyond.
7. Adaptation Pathways planning will start in CP7 to ensure that the climate threats that we are facing are being dealt with now and into the future with key thresholds decided for our most vulnerable sections of railway.

Overall, the Wales and Western Weather Resilience and Climate Change Adaptation CP7 plan demonstrates the Wales and Western regions commitment to addressing the urgent challenges posed by climate change. We support the Simpler, Better, Greener initiative that Network Rail are proposing. By implementing proactive adaptation strategies and investing in resilient infrastructure, Network Rail aims to ensure the continued reliability and safety of rail services in the face of a changing climate.



A view of the Conwy Valley with flooding affecting the Llandudno Junction to Blaenau Ffestiniog line in 2020 showing the flooding extents in Llanrwst.

Chapter 1: Introduction to the Weather Resilience and Climate Change Adaption (WRCCA) Plan

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1. Introduction to the WRCCA plan

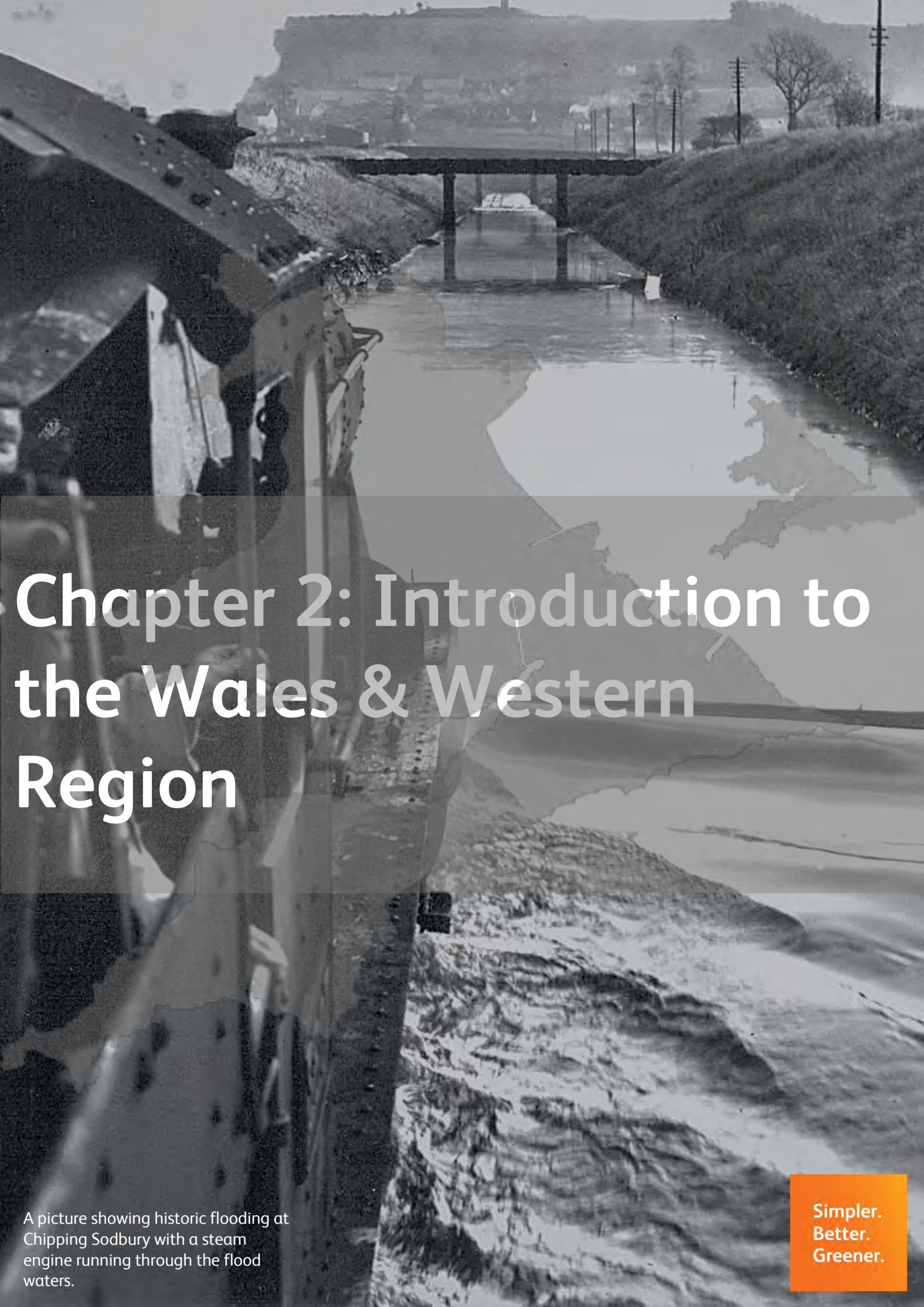
Climate change presents a substantial and escalating threat to the operational integrity of our railway network. Year after year, the Wales and Western (W&W) region contends with a rising frequency of severe weather events, including high-intensity rainfall leading to flooding, and fierce winds prevailing from the Southwest. Recognising the urgency of this situation, the W&W region is resolute in its commitment to delivering a comprehensive plan that extends into Control Period 7 (CP7) and beyond, with a primary focus on safeguarding assets vulnerable to the impacts of climate change and embedding resilience and climate change adaptation into the day-to-day operations of the region. This initiative builds upon the foundation laid during Control Period 6 (CP6) and is a testament to our dedication to proactive approach to weather and climate resilience.

Our CP6 Weather Resilience and Climate Change Adaptation (WRCCA) plan encompassed both routine operational activities and dedicated resilience workstreams, with a particular emphasis on earthworks, drainage, off-track areas (including vegetation management), and the implementation of remote monitoring at priority locations. We also addressed risks associated with structures, including scour, adverse rainfall, and flooding. However, given the extensive coastal assets within our region, heavy rainfall and high winds continue to pose significant threats and challenges, resulting in operational disruptions that impact all facets of our infrastructure. Recommendations from weather-related incidents such as Carmont and subsequent recommendations from the Lord Mair and Julia Slingo reports are being swiftly implemented to bolster earthworks resilience through a raft of measures including enhanced drainage and water management These challenges are poised to intensify in CP7 and beyond.

In CP7, our principal focus will be to mitigate the impact of climate change so that we protect our asset base and reduce the operational impact so that the impact on passengers and freight users is reduced. The CP7 plans have been developed to support the delivery of our funder's and our stakeholder's key priorities and, therefore, include interventions that should enable us to minimise and mitigate the impact of extreme weather and climate change on the network and schemes that should improve the environmental sustainability of our business. However, recognising the broader funding context and pressures, we have had to make some tough choices and trade-offs about how we balance our spending in CP7 to provide the most value to our customers and the taxpayer. Whilst we cannot be certain of the future frequency of weather extremes, we know that the physical processes involved are those that will accelerate degradation of our assets. We expect it to become increasingly challenging to keep pace with the frequency and intensity of extreme weather events which we will be a significant factor in future control period plan.

Looking ahead into CP7 and beyond, we will actively develop adaptation pathways, considering all areas but with particular focus on low-lying and coastal infrastructure, to create long-term plans that empower decision-makers with trigger points and thresholds for prioritizing future investments. We will also work closely with our partners Transport for Wales (TFW) and National Resources Wales (NRW) to ensure that a combined approach with shared outcomes that benefit the end user are put in place. Our regional Adaptation Pathways work will seek to take a strategic look at assets vulnerable to climate change and put in place plans for them following on from extreme weather events. We are committed to exploring the intricate interdependencies along our railway corridors, building upon the substantial groundwork laid during CP6. Our aim is to identify opportunities and risks collaboratively with our partners to deliver a railway that is both resilient and robust.

Chapter 2: Introduction to the Wales & Western Region



A picture showing historic flooding at Chipping Sodbury with a steam engine running through the flood waters.

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2. Introduction to the Wales & Western region

Figure 2-1: Map of the Wales and Western Region

The Wales and Western region which is situated in the western and coastal parts of mainland UK, boasts a variety of geographical, topographical, and climatic features. Geographically, this region encompasses the westernmost reaches of the British Isles and is bordered by the expansive waters of the Atlantic Ocean to the west. Its eastern boundary extends into the heart of England, creating a transition zone between the exposed coastal landscapes and the more central, continental-like regions.

Across the region we have a significant stretch of coastal railway that is at the forefront of challenges, particularly concerning overtopping during storms, a problem further intensified by the rise in sea levels induced by climate change. The vulnerability is particularly acute in Wales, where approximately 80 miles of coastal railway could potentially be under threat.

The coastal railway lines linking Aberystwyth with Pwllheli and Holyhead with Chester faces a daunting present-day scenario with over 10 miles of sea walls in place to shield the railway from the relentless assault of waves which will only get worse with future climatic change. The Western section, which spans the Exe and Teign estuaries and includes an open-coast segment, contributes an additional 11 miles of protective infrastructure. Additionally, there is over a mile of exposed coastal railway on the approach to Penzance. Together, these areas underscore the pressing need for strategic interventions and resilient solutions to safeguard vital coastal rail infrastructure.

Topographically, the Wales and Western Region is a land of stark contrast. To the south and southwest, low-lying plains stretch across Cornwall, Devon, and Somerset, offering a gentle and picturesque landscape. Here, the rolling hills and fertile valleys give way to some higher ground around Dartmoor and North Devon, adding undulating relief to the terrain. The key Bristol to Exeter railway route on the low-lying Somerset levels has historically been subject to flooding during wet winters and is a key route for adaptation to climate change.

In striking contrast, Wales is characterised by its impressive mountainous terrain, extending from the south to the northernmost points. These majestic mountain ranges, including the renowned Snowdonia and Brecon Beacons, dominate the Welsh landscape and provide breath-taking scenery. These mountainous regions add its own unique risks to the Wales Routes' railways in terms of its geotechnical vulnerability to assets from climate change to weather induced events caused by its unique topography.

Climatically, our region experiences a unique amalgamation of maritime and continental influences. Situated in close proximity to the Atlantic Ocean, the region benefits from the impact of the Gulf Stream, bringing in mild temperatures and moisture-rich air masses. However, this its geographical location also exposes the area to the unpredictable nature of Atlantic weather systems, contributing to unpredictable and changeable weather patterns.

In the context of coastal railways, this climatic vulnerability heightens the significance of climate change in the region. As previously alluded to the influence of Atlantic weather systems can translate into challenges for coastal rail infrastructure, particularly with the increased risk of overtopping events (where water is above track level on an embankment with a positive head of water on a particular side of the track which then allows water to move from positive head to lower head which can induce washout of the track formation from the flow of water) during storms and the potential exacerbation of these issues due to climate change-induced sea level rise. The frequent occurrence of rainfall, especially in the western portions of England and Wales, adds another layer of concern, as saturated grounds can impact the stability of coastal embankments, cuttings and structures. Additionally, the susceptibility to convective storms, especially in areas like the Thames Valley, raises the potential for intense localized weather events along the railway routes, necessitating robust resilient engineering solutions and proactive maintenance strategies to mitigate the impact of extreme weather and climate change on the rail network.

Following the tragic sequence of events at Carmont on 12th August 2020 where a train derailed because of a landslip after heavy rainfall, our Weather Risk Task Force (WRTF) was established to address the recommendations from the Lord Robert Mair and Dame Julia Slingo reports. For further information on the WRTF's activities in CP7, please see our System Operator's delivery plan.

2.1 Past weather impacts in Wales and Western Region

During CP6, our region has contended with a complex array of weather-related challenges that have impacted our asset base. Flooding events, exacerbated by heavy and persistent rainfall, have posed significant threats to the stability of embankments, cuttings and track formation, resulting in service disruptions, costly schedule 8 payments (Figure 2.1-1) and extensive recovery efforts. Gale force winds, characteristic of the regions exposure to Atlantic weather systems, have proven disruptive, leading to fallen trees (exacerbated by dead, diseased, or dying trees (DDDT) across the region), debris on tracks, and structural damage to rail assets. Low temperatures, on the other hand, have triggered concerns related to frost and freezing conditions, impacting the integrity of our rail infrastructure. Conversely, periods of elevated temperatures have raised issues such as track buckling, stressing the need for thermal management measures.

Recurring flooding at Wooten Bassett has significantly impacted the railway infrastructure. The low-lying geography, combined with heavy and sustained rainfall events, has made it prone to flooding, affecting the adjacent railway lines. Floodwaters have submerged tracks, leading to service disruption, and necessitating immediate response measures to assess and mitigate the damage. The flooding at Wootton Bassett has not only posed operational challenges and high schedule 8 costs (Figure 2.1-1) but has also underscored the critical need for resilience in the railway infrastructure, demanding ongoing efforts to enhance drainage systems, reinforce embankments, and implement adaptive strategies to minimize the impact of future flooding events on this segment of the Wales and Western Region's rail network.

High winds, particularly along coastal and exposed areas often associated with Atlantic weather systems, have led to instances of fallen trees and debris on tracks, disrupting rail services. For instance, in the coastal sections connecting Holyhead with Chester, the railway has been extremely susceptible to structural damage and obstructions caused by high winds.

Over the last five years the railway has seen an increase of 50 % in weather-related service affecting failures compared to the previous ten years, as shown in Figure 2. Recognising that climate change

will continue to have an increased impact on the railway, the management of weather resilience will be integral to the running of the railway in the future.

Heat has had less of an impact on our assets in Wales and Western compared to other regions, despite the higher schedule 8 for Western heat related delays. The reason can partly be attributed to the differing overhead line equipment specification and the use of modern automatic tension systems which can manage a higher rate of expansion in the Overhead Line Equipment (OLE). Our highest risk assets susceptible to head stress is limited to the OLE on the 12 miles on the approach to Paddington as this is an older system. This is a short-term risk as it is due for renewal in CP7. The effect of heat on our track assets is minimised because of the realisation of a long-standing replacement programme to eliminate these susceptible assets, such as wooden S&C layouts, jointed, and lightweight continuously welded track.

The traditional controls associated with hot weather management will continue but careful and considered preparation by our track maintenance teams each year helps reduce the impact to the operational railway.

In Wales and Western Region we have experienced several infrastructure failures during the extreme heat of summer 2022. Most of the failures occurred during the periods of July 18 & 19th and August 8th-11th. The region experienced 2 track buckles, three minor lineside fires, and several power failures. The highest recorded air temperature in the region currently stands at 37.1°C. In contrast, the rail temperature has reached 59°C at Cam and Dursley.

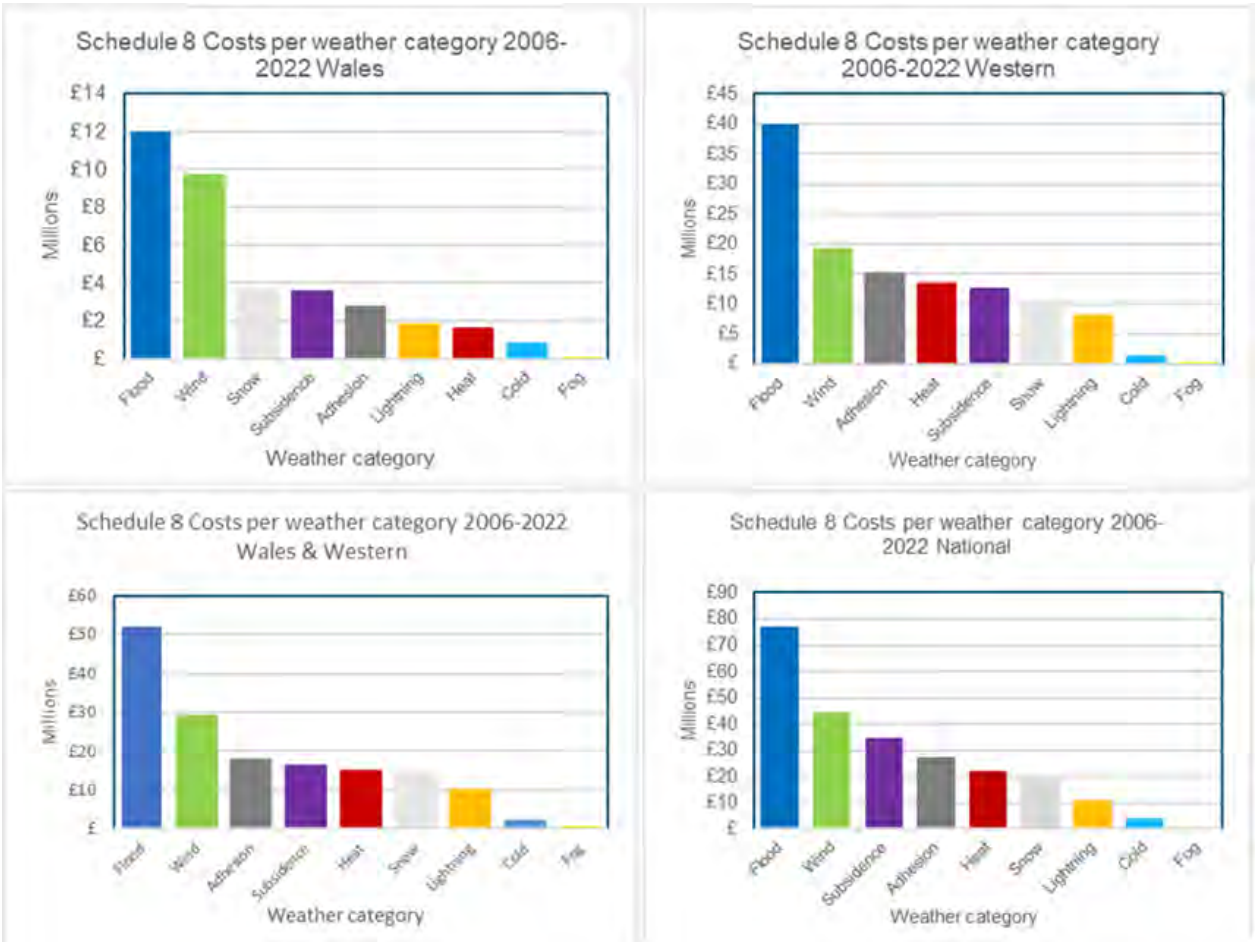
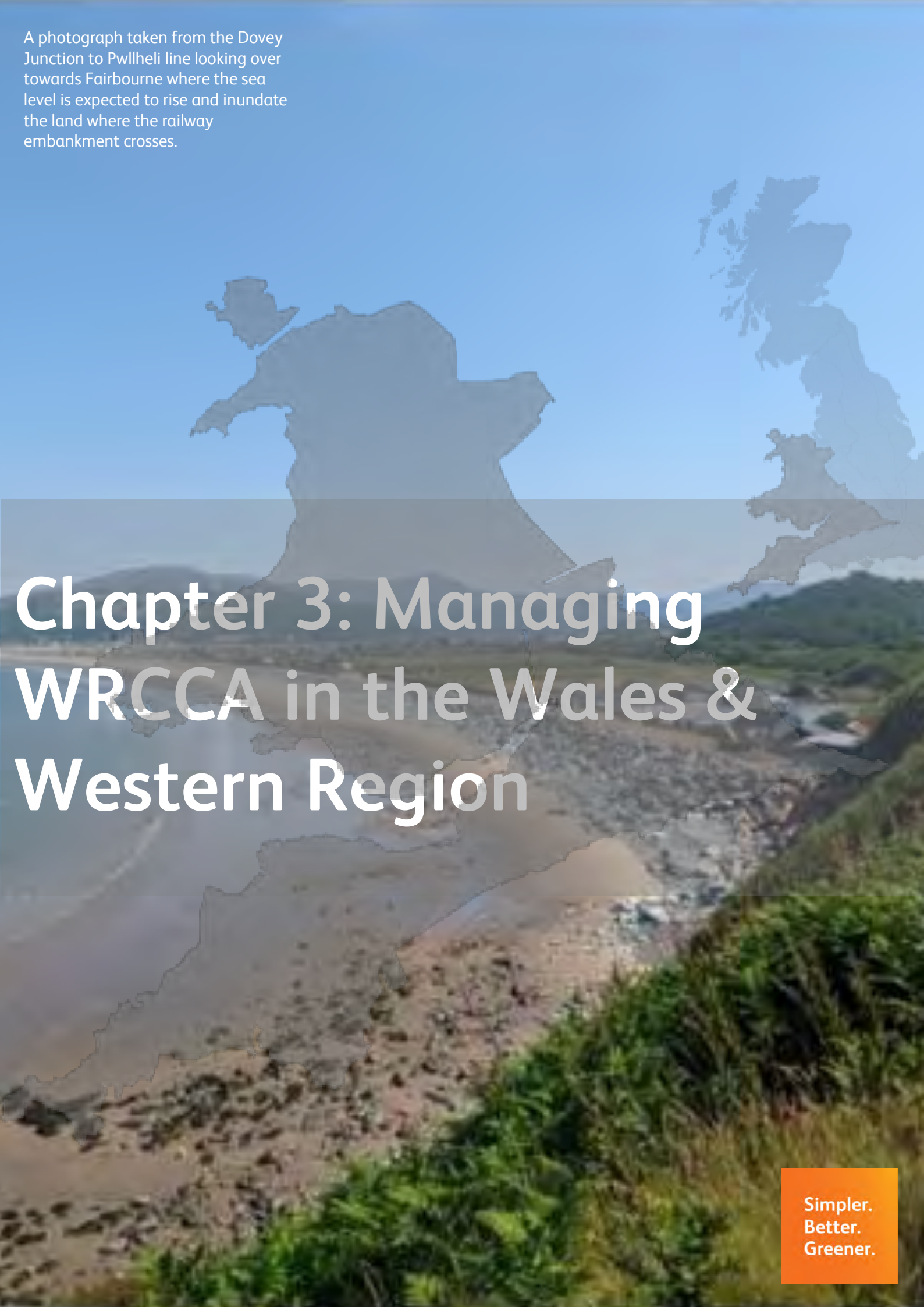


Figure 2.1-1: Schedule 8 costs for the Wales and Western Region due to impacting weather events.

The collective impact of these weather extremes during CP6 highlights the importance of a comprehensive and adaptive approach to weather resilience, infrastructure maintenance, and strategic planning within the Wales and Western Region to ensure the continued reliability of the rail network.



A photograph taken from the Dovey Junction to Pwllheli line looking over towards Fairbourne where the sea level is expected to rise and inundate the land where the railway embankment crosses.

Chapter 3: Managing WRCCA in the Wales & Western Region

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3. Managing WRCCA in the Wales & Western region

Mitigating the impact of extreme weather and climate change in CP7 is a priority. To deliver this, we have established a number of working groups, including the Strategic Weather Group and Seasonal Delivery Group. The flowing sections will outline the Wales and Western regions approach to managing WRCCA.

3.1 Governance of WRCCA in the Wales & Western region

Mitigating the impact of extreme and adverse weather, and planning for further changes in our climate, cuts across various areas of Wales and Western Region.

Our two routes (Wales and Borders route and Western route) have responsibility for the day-to-day operations of the railway, overseeing the implementation of, and updates to, the Seasonal Delivery Plans. Which support the initiatives in this plan.

Elements of this responsibility are formally covered through the risk management process. Risks associated with the resilience of our operations during extreme or adverse weather, and associated mitigations, are reviewed quarterly as part of this process and is now a key deliverable with the engineering and asset management function.

The engineering and asset management director has overall responsibility for the assets and investment plans. Dedicated asset engineers provide advice and guidance on specific assets where there may be an increased risk of failure associated with impacts of weather. They also develop work banks of planned interventions on the assets, with many of these interventions delivering weather and climate resilience benefits.

The engineering and asset management director (DEAM) provides the overview, and monitoring, of delivery of most Network Rail actions in this plan. A dedicated weather resilience and climate change adaptation strategy lead provides strategic oversight of the activities set out in this plan and provides climate data, information, and insight to support other teams in taking more effective climate action. The role also coordinates regular monitoring and reporting activities and provides updates to the head of sustainability periodic meeting and to the DEAM through periodic leadership meetings.

At national level, our Technical Authority is accountable for developing the environmental sustainability strategy and corporate risk register for managing weather and climate change risk, supporting collaboration with teams across the organisation.

The national weather resilience and climate change adaptation team also defines the company vision, strategy, and policy for the management of weather and climate change resilience within Network Rail.

3.2 Strategic Weather Group

Our Strategic Weather Group (SWG) is a periodic meeting, and plays a vital role in enabling us to coordinate our weather resilience and seasonal readiness and supports frequent engagement with stakeholders. This is achieved by sharing knowledge on current seasonal and weather-related issues and solutions. This has been piloted in Wales and Borders Route throughout CP6 and will be rolled out across the region for CP7.

The meeting is attended by cross regional representatives from all relevant functions.

Each member is responsible to represent their individual area raising concerns in addition to contributing knowledge and skillsets to undertake weather and seasonal project actions arising from SWG meetings.

3.3 Weather Risk Task Force

Following the tragic sequence of events at Carmont on 12th August 2020 where a train derailed because of a landslip after heavy rainfall, four reports were produced containing a series of recommendations:

- The Rail Accident Investigation Branch (RAIB) report contains 20 recommendations covering all aspects of the accident from train crashworthiness to how asset data is properly recorded. Each region is responsible for closing out one recommendation related to asset data gap analysis
- Network Rail's own H&S team produced a report following a Level 3 investigation containing 21 recommendations. W&W region have responsibility (with the other regions) for closing out six of these.
- An expert report was commissioned from Lord Robert Mair (focusing on earthworks/geotechnical risks for Network Rai). W&W are working to close out six regional action plans.
- A further expert report focussing on weather information was commissioned from Dame Julia Slingo. The Slingo recommendations are all being led centrally; as a region Wales and Western are contributing as required.

The following forums are attended to ensure a fully integrated approach:

- Lord Mair Recommendations Working Group – a periodic group led by the TA with representation from all Regions and other action plan owners;
- Weather Risk Task Force – Management Steering Group: a periodic group focussing on ensuring progress against the actions are being made – Regional Representation to provide updates;
- Slope Safety Review Group – regular regional meeting set up as part of the recommendations now being used to share best practice, peer review and focus on progress against remaining actions;
- Regionally periodic meeting held with ORR to report progress.

In CP6 as part of the recommendations from the WRTF, we increased our drainage maintenance expenditure by £16m. This has been delivered through existing maintenance teams and contractor resources across Wales and Western. The CP7 business plan has seen an increase in the following areas from CP6 in line with the recommendations:

- Drainage maintenance
- Aerial surveys
- Increased assessments and monitoring

3.4 WRCCA within the Wales & Western Sustainability Strategy

Our approach for delivering sustainable transformation is purpose driven and is a key part in delivery our WRCCA plan actions. Sustainability is complex, and trying to establish the actions and benefits without considering the role of the railway in mitigating climate change could lead to unintended consequences.

It is for this reason that the approach has been to cross-reference the role of the railway against the 17 UN Sustainable Development Goals (SDGs) to establish how we can best have an impact on global sustainability and what actions are required for that transformation. These key targets within the UN SDGs are linked in a spider diagram (below) to establish what direct and indirect areas we should focus on.

The areas of influence identified in the spider diagram are displayed in Figure 4. The WRCCA Plan has a direct influence on Land Use via the Target 13.1 (above), however there are indirect influences on the areas of Infrastructure and Mobility – whether this is designing greener infrastructure for resilience or improving the recovery of adverse weather impacts to get the railway mobile again.

Actions prescribed in this document will link in with the CP7 Wales and Western Sustainability Strategy as initiatives to meet the needs for a railway fit for the future. This will be reviewed upon the release of the national sustainability strategy version 2 later in 2023.

Link to national WRCCA Strategy which will be agreed in the summer.

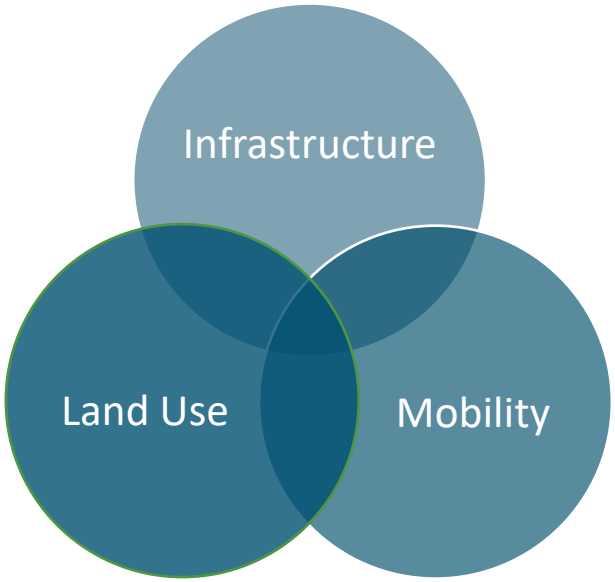

Figure 4.4.1: CP7 Wales and Western Sustainability Strategy.

3.5 Operations

The points below detail the operational plans for CP7, some of which continue from CP6. We recognise that this list of initiatives is will evolve over CP7.

1. The rollout of the regional seasonal weather group piloted in Wales and Borders in CP6.
2. The continuation and ongoing development of EWAT (Extreme Weather Action Teleconference) and AWAT (Adverse Weather Action Teleconference) processes to manage adverse and extreme weather events to turn forecasts and alerts into real time actions to mitigate operational risks and protect the infrastructure (ORR lever 4 forecasting – see section 6.3).
3. Collaborative work with the route reliability improvement specialists, intelligent infrastructure technicians, performance teams and asset management and engineering teams to provide a fit-for-purpose infrastructure monitoring system.
4. For ice in tunnels, Wales & Western have incorporated the monitoring system into the control room automating response using real time data. The new ice in tunnels regional project has briefed out to controllers for the last two years of CP6 and will continue to be briefed into CP7

and beyond. The trial project could be expanded to include shaft locations at risk of ice formation.

5. Roll-out of asset recovery plans to assist control with the recovery of the asset when an event triggers line closure or the implementation of operational restrictions.
6. Operations Control room monitor all existing weather monitoring systems and respond to alerts and alarms triggered to initiate required response. The systems monitored include:
    a. Tilt sensors
    b. Track movement sensors
    c. CCTV drainage monitoring
    d. Flood monitoring
    e. Ice in tunnels system
    f. CAT/ PAT tool
7. Introduction of a new 24/7 IC infrastructure desk in CP6 year 5 will support continuous monitoring of the existing remote condition monitoring systems and support the introduction of additional remote condition monitoring systems in line with intelligent infrastructure aspirations.
8. Training development established for each rail incident commander in order to support the implementation of strategic command where required in response to extreme weather or infrastructure faults relating to extreme/ adverse weather events.
9. Exercising and testing carried out within control for each season (heat, cold weather and rail adhesion) in order facilitate continued improvements and ensuring all processes, roles and responsibilities are understood ahead of each change in season. This also provides an opportunity to share lessons learnt across the organisation.
10. Implementation and improve of contingency plans and traffic management plans in the event of degraded working as a result of weather at high risk locations to be developed and embedded during CP7.

A photograph showing a landslide at the Severn Estuary site along the South Wales mainline with a significant amount of material reaching the cess.

Chapter 4: Wales & Western Region Climate Change Risks

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4. Wales & Western Climate Change Risks

This section outlines the specific climate change risks for the Wales and Western Region. Over the last control period the region has experienced a lot of these events first hand. which have led to some large-scale failures which has caused disruption to the network. With the projected increase in the frequency of these events due to climate change, it is essential that we continue to invest in mitigating the impact of extreme weather and climate change on the railway. In addressing the pressing challenges posed by climate change, we have undertaken a comprehensive risk assessment to systematically evaluate and prioritize climate change risks.

This ARP3 Risk Assessment (Appendix A) involves a meticulous examination of vulnerabilities across the region, considering factors such as coastal overtopping leading to embankment failure, flooding in low-lying areas like Wootton Bassett, and the impact of high winds. By engaging with the regional asset teams and stakeholders, we identified key vulnerabilities and assessed their potential consequences on railway operations across the region. This methodical approach enables us to proactively address and mitigate climate change challenges, emphasizing asset resilience and operational resilience, operational recovery post events and the implementation of targeted resilience mitigation measures to ensure the ongoing functionality and reliability of the regions rail network amidst a changing climate landscape.

The remaining section in this chapter will highlight the top climate change risks that have been identified in the ARP3 Risk Assessment (Appendix A) and discuss the key implications of these risks in terms of asset vulnerability across the region.

4.1 Sea Level Rise

Wales has the largest amount of coastal rail network across the UK and so sea level rise presents a significant challenge, with discernible impacts on coastal areas and rail infrastructure. Over recent years, the sea level in these regions has been rising at an average rate of approximately 3 millimetres per year. This gradual but persistent increase in sea levels heightens the susceptibility of coastal railways and low-lying regions to the risks of overtopping during storms and tidal events. Areas like Penzance and the Exe and Teign estuaries, along with Wales, with its extensive coastal routes, faces a collective challenge in adapting to this changing coastal dynamic.

In 2014, failures of coastal defences occurred following a storm event resulting in damage to the sea wall at Dawlish. This caused significant disruption to both the railway network and the local economy with an estimated £50 million in economic loss to the surrounding area due to an absence in network connectivity. The south-west of England remained disconnected from the railway network for 2 months.

The National Flood Risk Assessment identified 21 % of railways are at risk (Environment Agency, 2009) with the Government office of Science estimating 4–5 per cent of the UK railway network length and stations are in areas with ‘significant’ or ‘moderate’ annual chance of coastal flooding (Dr Tamsin Edwards, 2017).

	RCP2.6				RCP4.5				RCP8.5			
	2100*	2100†	2200†	2300†	2100*	2100†	2200†	2300†	2100*	2100†	2200†	2300†
London	0.30 – 0.71	0.30 – 0.72	0.5 – 1.5	0.6 – 2.2	0.38 – 0.84	0.36 – 0.84	0.7 – 1.8	0.8 – 2.6	0.54 – 1.16	0.52 – 1.13	1.1 – 2.8	1.5 – 4.3
Cardiff	0.28 – 0.70	0.28 – 0.71	0.4 – 1.5	0.5 – 2.2	0.36 – 0.83	0.34 – 0.82	0.6 – 1.8	0.8 – 2.6	0.52 – 1.14	0.50 – 1.11	1.1 – 2.8	1.4 – 4.2
Edinburgh	0.09 – 0.50	0.08 – 0.51	0.1 – 1.1	0.0 – 1.6	0.16 – 0.62	0.14 – 0.61	0.2 – 1.4	0.2 – 2.0	0.30 – 0.91	0.28 – 0.88	0.6 – 2.3	0.7 – 3.5
Belfast	0.12 – 0.53	0.11 – 0.54	0.1 – 1.2	0.0 – 1.7	0.19 – 0.66	0.17 – 0.65	0.3 – 1.5	0.3 – 2.1	0.34 – 0.95	0.31 – 0.92	0.7 – 2.4	0.8 – 3.6

Figure 4.1-1 Comparison of the UKCP18 21st century mean annual sea-level change (m) at UK capital cities in 2100 relative to 1981-2000 average, for a low (RCP2.6), medium (RCP4.5) and high (RCP8.5) emissions scenario (left most column for each scenario) and the extended projections in 2100, 2200 and 2300. Numbers beyond 2100 are quoted to the nearest 0.1m, given the lower confidence associated with projections on these extended time horizons.

Figure 4.1-1 from the Met Office provides a comprehensive comparison of the UKCP18 (United Kingdom Climate Predictions 2018) 21st-century mean annual sea-level change at major UK capital cities. The data is presented for three emissions scenarios - low (RCP2.6), medium (RCP4.5), and high (RCP8.5) - each depicted in the leftmost column for the year 2100 relative to the 1981-2000 average. The subsequent columns extend projections into the years 2100, 2200, and 2300. Both London (Paddington Station and west) and Cardiff are geographically in the region and the data shows that for all emission scenarios London and Cardiff will see the biggest increase in sea level rise. Figure 4.1-2 illustrates this for the RCP2.6 scenario.

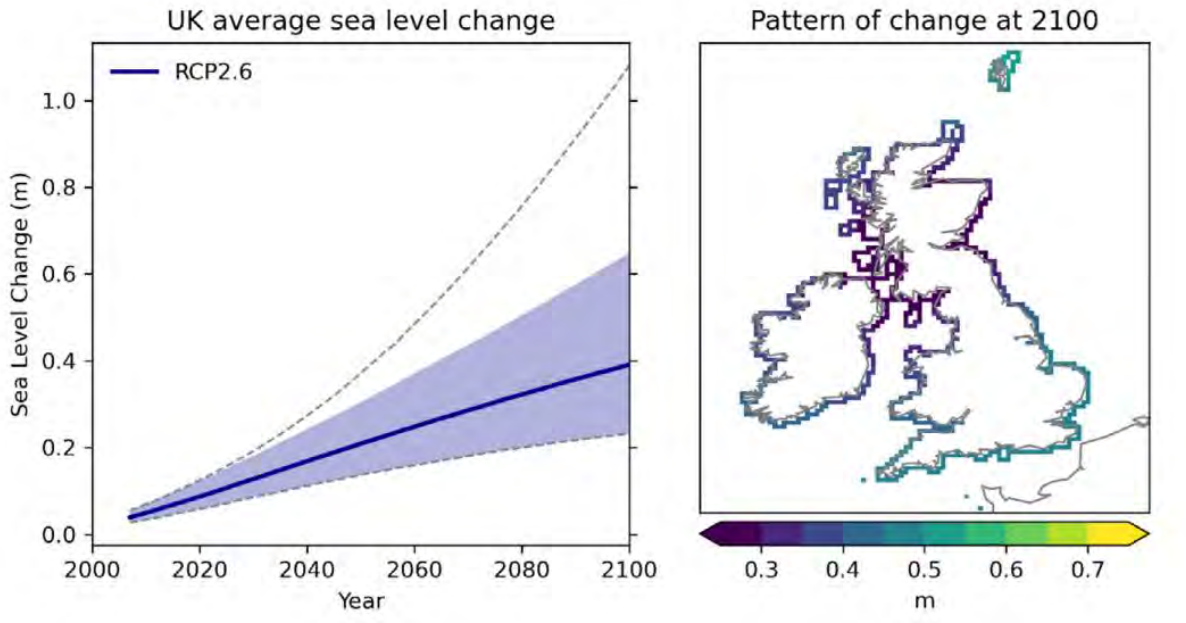

Figure 4.1-2: Graph: Time series of time-mean sea-level change based on the average of the UK ports. Map: The spatial pattern of change at 2100 associated with the central estimate of each RCP scenario

4.1.1 Shoreline Management Plans

As a result of the threat of sea level rise, Shoreline Management Plans (SMPs) have been produced for the coastlines of England, Scotland and Wales; developed by the relevant Coastal Groups, with members mainly from the local authorities and the Environment Agency and/or Natural Resources

Wales (NRW). These have been completed in line with the guidance from the Department for Environment, Food and Rural Affairs (Defra).

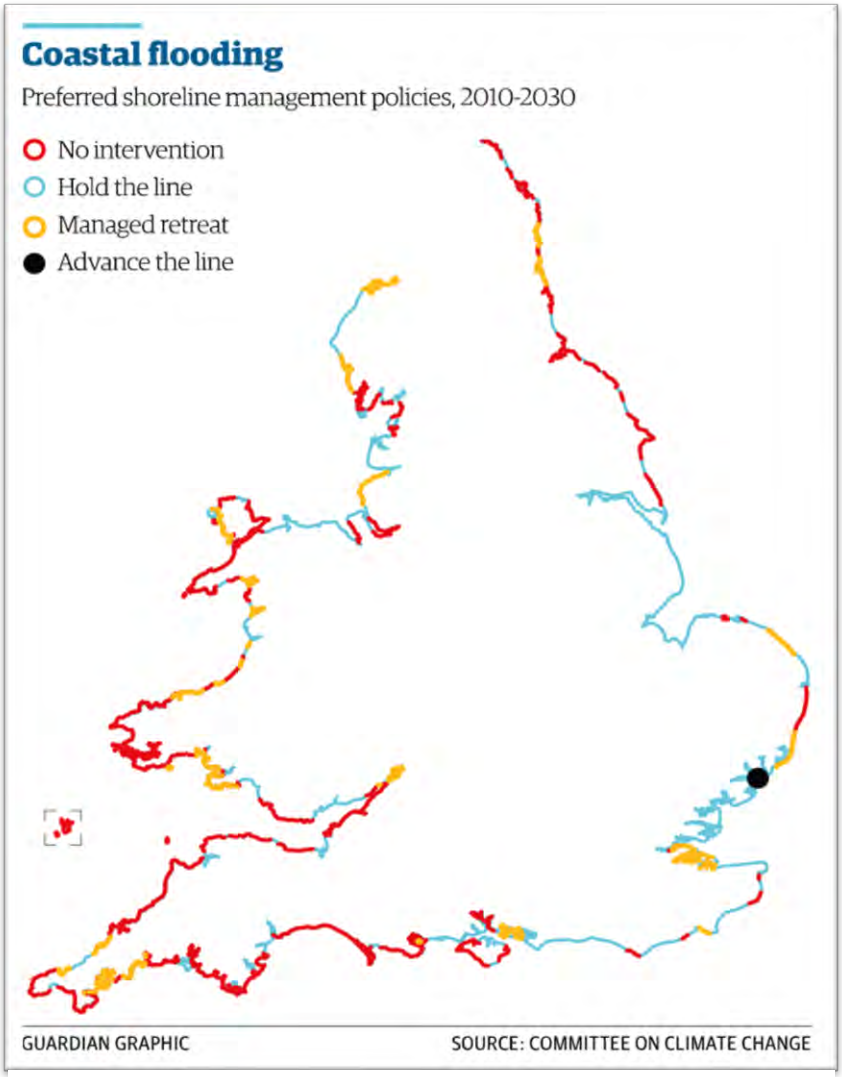

Figure 4.1-3: Map showing coastal flooding areas with preferred shoreline management plans. Note that the majority of the Wales & Western region is no active intervention.

The SMPs identify the most sustainable approach to managing the flood and coastal erosion risks to the coastline and support efforts to prepare for future sea level rises and increased likelihood of flooding caused by severe weather events over a 100-year period. The SMPs are being utilised as the guidance which local authorities and other stakeholders are using for their future plans for communities, infrastructure, and land on the coast.

To better protect the railway against future changes in sea level rise and the impact of coastal changes, Network Rail will continue to be involved in the coordination and alignment of both strategic planning and asset management. Network Rail is not a Coastal Protection Authority but at certain locations it serves as the first line of defence.

4.1.2 Wales Specific Coastal Impacts

Wales has the largest coastal railway network in the UK, and rising sea levels prompt a need for a long-term perspective on the potential impacts on railway assets, passengers, and freight users. These coastal lines, mainly serving rural communities, are crucial for social connectivity. Climate change is already significantly affecting the National Rail network, with extreme weather events and rising sea levels negatively impacting infrastructure and performance annually.

Extreme weather affecting the Conwy Valley Line in 2019 and 2020 and emergency works at Afon Wen in 2021 highlight this impact. Each section of the Welsh coastline is categorized under Shoreline Management Plans (SMP) – Hold the Line, Managed Realignment, and No Active Intervention, aligned with specific EPOCH periods (Up to 2025, 2026–2055, and 2056–2105). SMPs forecast likely effects over short, medium, and long terms, each with three assigned policies for implementation during respective epochs.

Shoreline Management Plan epoch periods are as follows:

- Epoch 1 Up to 2025
- Epoch 2 2026 – 2055
- Epoch 3 2056 – 2105

SMP Policy Definition:

- No active intervention (NAI) - A decision not to invest in providing or maintaining coastal defences
- Hold the line (HTL) - Maintain or upgrade the standard of protection offered by existing defences.
- Managed realignment (MR) - Allowing the shoreline to move backwards or forwards, to realign the natural coastline configuration.

Work will be undertaken throughout CP7 to identify the key assets that will be at risk of sea level rise and where they will become the first line of defence if no active intervention is states in the SMP. This work will form part of the Adaptation Pathways (Chapter XX) and will require extensive collaboration between Network Rail, Natural Resources Wales and Transport for Wales.

4.1.3 Western Specific Coastal Impacts

Western Route has experienced several high-profile coastal flooding events, however, with sea levels due to rise by the end of century, relative to 1990 levels (based on UKCP18), water inundation will become more prevalent within coastal sections of the Route. Western Route has 245 miles of coastal boundary. With sea level rise, there are numerous branch lines to coastal resorts that are inherently more vulnerable to flooding, coastal erosion, and potential loss of the railway.

Within the Western route, there are multiple high-risk areas from sea level rise, with the Penzance area forecasted to be the most impacted in the UK by 2050 with Weston-Super-Mare a close second. Sea level is expected to rise with increasing storm intensity and frequency along the southwest coast posing significant risk to Network Rail infrastructure.

4.2 Changing precipitation patterns & flooding

Climate change is instigating noticeable shifts in precipitation patterns across the Wales and Western Region, bringing with it new climatic challenges. As a consequence, the region is experiencing alterations in its usual rainfall distribution and intensity. These changing precipitation patterns hold profound implications for Network Rail's infrastructure, as increased rainfall heightens the risk of flooding in low-lying areas and coastal regions. Furthermore, these shifts may also influence the stability of embankments and cutting supporting the tracks, requiring a strategic and adaptive approach to railway management in response to the evolving climate dynamics.

Figure 4.2-1 illustrates the anticipated changes in winter precipitation expressed as a percentage for three different future periods: the 2030s, 2050s, and 2070s. These projections are made in comparison to a baseline established during the years 1981-2000. The left-to-right progression shows an increase in winter precipitation for Wales and Western. The most noticeable increase is in the Southwest with the highest increase across the UK.

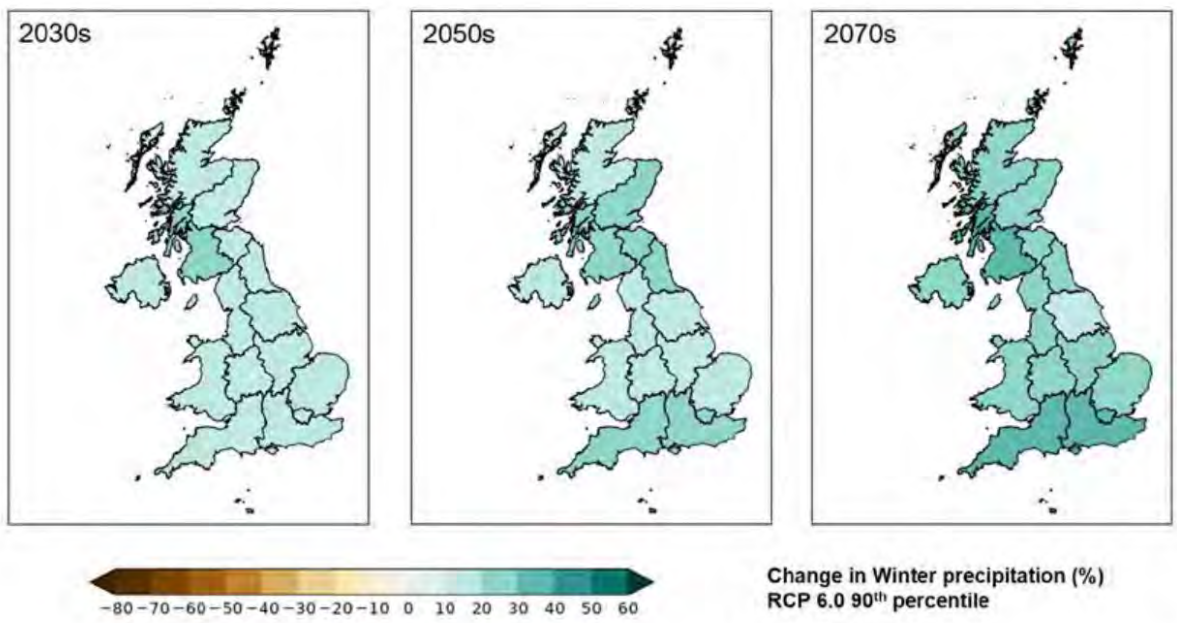

Figure 4.2-1: Change in Winter precipitation (%) (left to right; 2030s, 2050s and 2070s) based on a 1981-2000 baseline.

Flooding (fluvial & Pluvial) continues to be a significant issue in Wales & Western and carries the most significant portion of our weather-related delay minutes, representing £51m in schedule 8 costs and over 1.2 million delay minutes between 2006 to 2022. Our earthwork adverse and extreme weather plan relies on operational restrictions to mitigate risk from earthwork failure. The risk in the Wales and Western Region is greater than the national risk scores due to the influence of the Atlantic Weather systems and gulf stream arriving at our topography before the rest of the country.

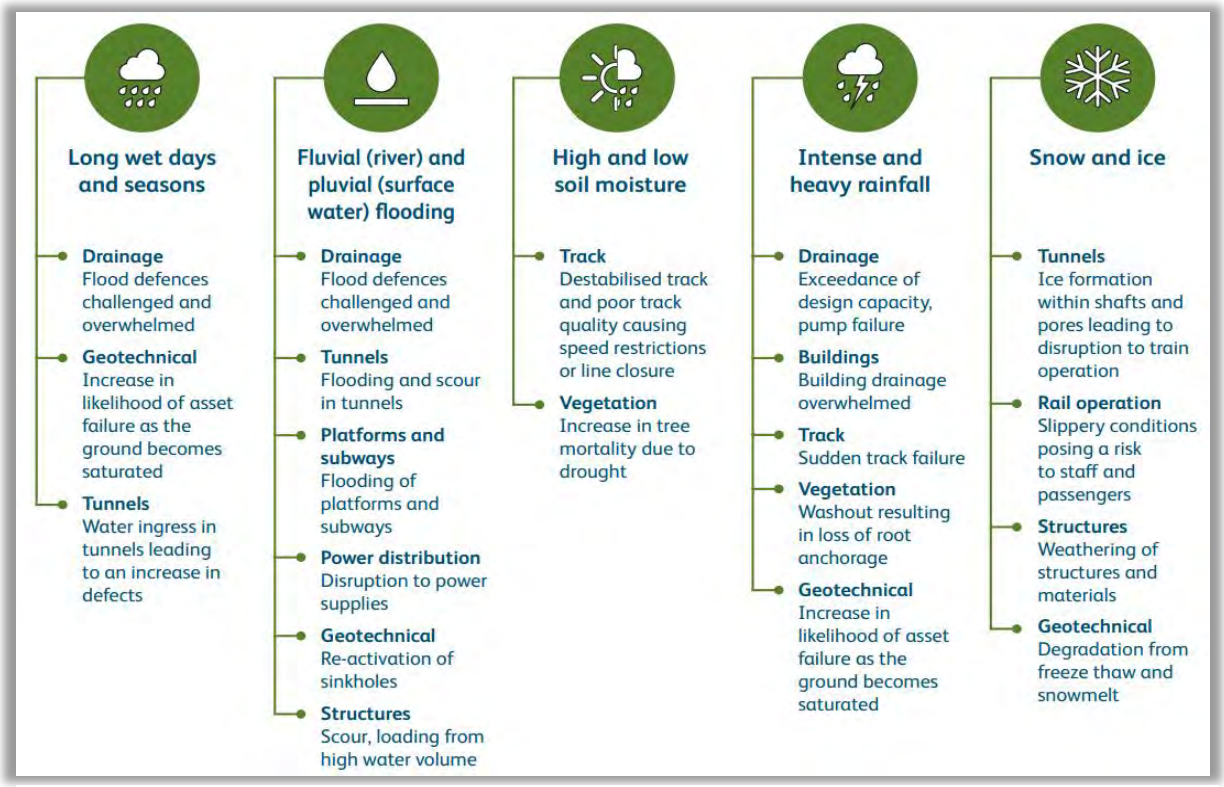

Figure 4.2-2: Key rainfall risk to our network *(Network Rail, 2021)*.

To represent this increased risk Wales and Western have increased the likelihood associated with rainfall on our ARP3 climate risk assessment scores. Figure 4.2-1 highlights our key precipitation risks to our network and the key failure mechanisms to our assets and Table 4.2-1 highlights the key risks and identifies the CP7 plan to address these climate risks.

Table 4.2-1: Table highlighting key precipitation risks to our network from Figure 4.2-1 and the CP7 plan to address.

Asset Type	Climate Implication	Climate Future Risk	CP7 Plan
Drainage	Long wet days and seasons	Flood defences challenged and overwhelmed	As our drainage systems are renewed, they are being designed to manage current and future predicted extreme weather conditions in line with our drainage design standards. Due to underinvestment in the drainage assets over the last 30+ years, many of the systems which reach capacity are also at the end of their serviceable life and are therefore funded from the asset condition driven core business plan. This approach covers off multiple ORR levers (2 – whole systems, 5 – design redundancy, 6 – design reliability and 7 – design resistance) due to the systems approach established in
	Fluvial and Pluvial flooding		

	Intensity in heavy rainfall	Exceedance of design capacity, pump failure	the region to drainage assets complimented by the design standards which ensure all drainage systems are fit for the future climate change projections.
Geotechnical	Long wet days and seasons	Increase in likelihood of asset failure as the ground becomes saturated.	The risk is mitigated through operational restrictions which has a detrimental effect on performance, this is managed through the earthwork adverse weather plan which looks to reduce the consequence and not the likelihood of failure. The CP7 earthworks business plan seeks to manage all sites identified as adverse weather risk locations within the adverse weather plan. This indicated a commitment to remediate the existing known locations identified within the adverse weather plan in CP7. Fluvial flooding has become a major issue for Wales and Borders Route in CP6 with multiple failures of embankments in floodplains. In response to the 5 washouts that occurred between 2019 and 2022 on Wales and Borders at Welshpool (as shown in Figure 18), Llanrwst, and Pandy, a project has been created to determine embankment flood risk. The purpose is to identify embankments at high-risk of washout failure during overtopping events and prioritise future flood resilience works.
	Fluvial and Pluvial flooding	Reactivation of sinkholes and overtopping of embankments,	
	Intense and heavy rainfall	Increase in likelihood of asset failure as the ground becomes saturated.	
	Snow and ice	Degradation due to freeze thaw action.	
Structures	Long wet days and seasons	Water ingress in tunnels leading to an increase in defects	A revised version of NR/L2/CIV/295 (Scour assessment of bridges, culverts and retaining walls) dated December 2022 incorporates the effects of climate change on structures subject to scour with factors added to the design flood waters and velocities. The design flood is the flood that a structure should be capable of withstanding without suffering damage; the probability of this is normally expressed by the return period, the average period between events of a similar magnitude. The design flood would therefore require the following actions: Tunnels deemed at high risk of ice formation are included in the extreme weather plan. The extreme weather plan details a trigger level
	Fluvial and Pluvial flooding	Flooding, scour and loading from high water volume	
	Snow and Ice	Ice formation within tunnels	

		and shafts and weathering of materials.	action plan including the operation response during periods of sustained cold weather, further details can be found in the document 'Plan for managing ice in Tunnels – Regional' held by the senior asset engineer for tunnels.

4.3 Temperature Range

One of its most tangible impacts on railway infrastructure lies in the altering temperature patterns that affect the Wales and Western Region. The pervasive warming of the Earth's climate introduces a suite of challenges and considerations for Network Rail. Rising temperatures can influence the integrity of rail tracks, embankments, and other critical components, potentially leading to issues such as track buckling. Moreover, extreme temperature events, both high and low, can impose stress on railway systems, demanding adaptive strategies to ensure resilience.

The mean daily minimum temperature for Wales and Western Region is also projected to show increases throughout the year with the highest in Summer. The level of increase is expected to become higher across the century. In Wales and Western Region, on our primary routes our asset can withstand a 35°C air temperature, as the air temperature raised above this operational restrictions may be applied. The highest mean minimum temperatures for Summer are expected to be in July, with increases of 4.1˚C to 14.7˚C by the 2050s and 5.9˚C to 16.5˚C by the 2080s. The lowest mean minimum temperatures will still occur in February with expected increases being 3.2˚C by the 2050s to 3.8˚C, and 4.5˚C by the 2080s to 5.1˚C. The graph demonstrates this in Figure 15

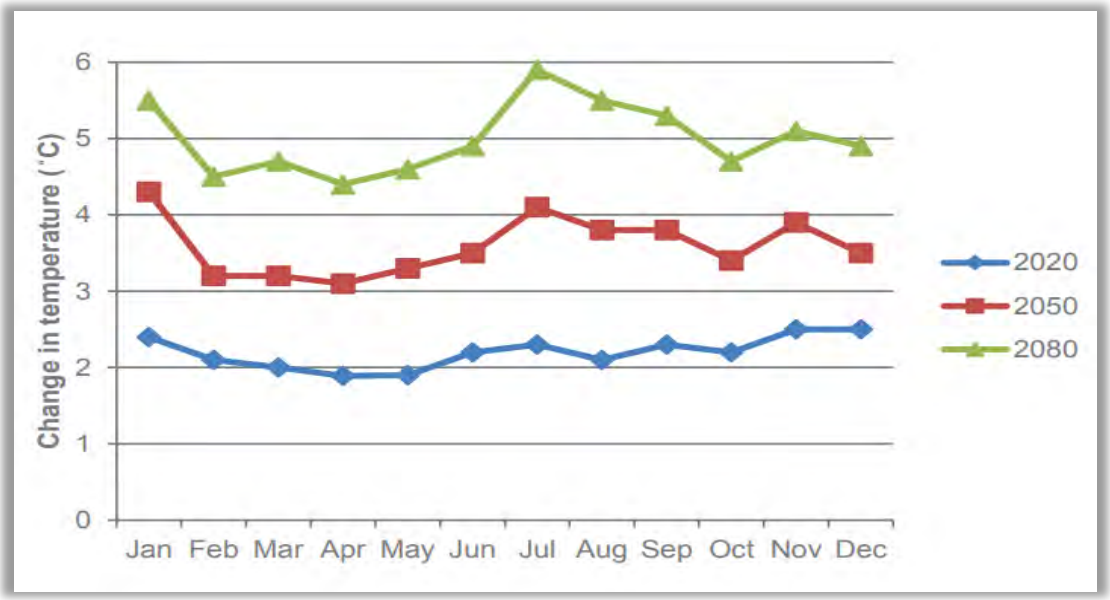

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Figure 4.3-1: Wales, mean minimum temperature changes, medium emissions 90th percentile.

The Wales and Western Region faces an escalating level of risk concerning temperature ranges attributed to climate change (Figure 4.3-2), exerting considerable pressure on the railway infrastructure. Figure 4.3-2 illustrates the projected changes in mean daily maximum summer temperatures, expressed in degrees Celsius, for three future periods: the 2030s, 2050s, and 2070s. The data is compared against a baseline established during the years 1981-2000. The left-to-right progression denotes a chronological timeline, with each subsequent column representing a

subsequent decade. The values in degrees Celsius indicate the expected shift in daily maximum summer temperatures during the specified future periods relative to the baseline.

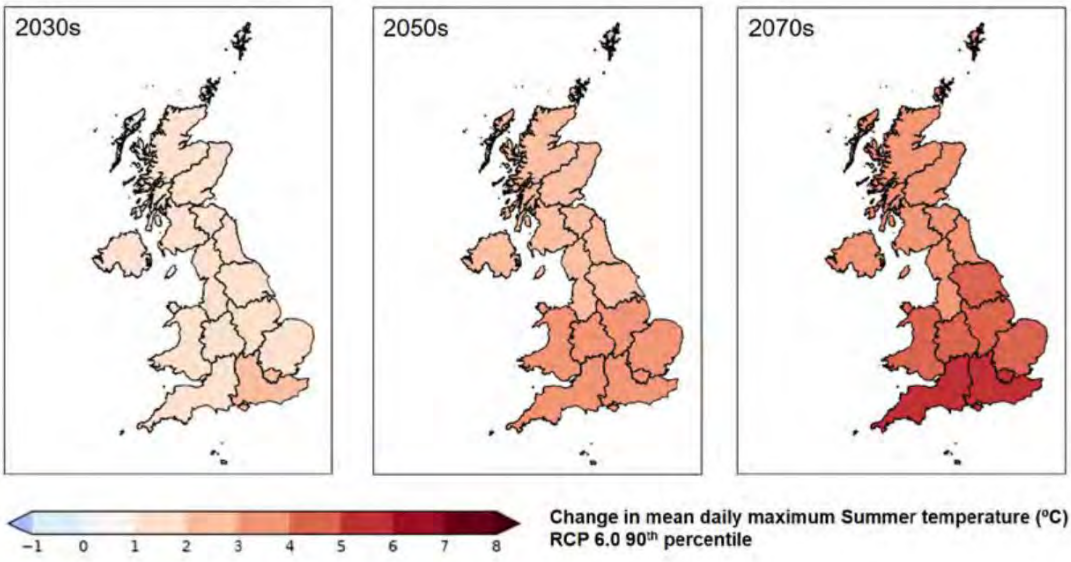

Figure 4.3-2 Change in mean daily maximum Summer temperature (°C) (left to right; 2030s, 2050s and 2070s) based on a 1981-2000 baseline.

Between 2016 and 2022 low and high temperatures have accounted for £17 million in Schedule 8 costs (£2.8 million per year) and just over 300k delay minutes in Wales and Western region. The risks experienced within our region are reflected in Figure 16 and considering climate change projections these are likely to increase in future years.

However, the impacts of both extremes are highly variable within the region. In 2016/17 the Schedule 8 impact of cold temperatures cost £50k whereas 12 months later in 2017/18 the costs were closer to £500k. The impact of high temperatures on the railway have varied from less than £120k in 2012/13 to over £4 million in 2018/19. It should also be noted that extreme temperatures affect a much wider area than other more localised impact types such as flooding.

In recent years, hot summers have put a spotlight on our vulnerabilities to high temperatures particularly around our track, OLE assets and the welfare of lineside personnel and passengers on stranded trains. Additional safety, reputational and performance risks come from the potential for derailments from track buckles in high temperatures. As a result, there is an increased need for incident response which in turn reduces the capacity to undertake tasks.

As climate change progresses, risks associated with the diurnal range are also likely to rise and these can have a considerable impact on our infrastructure.

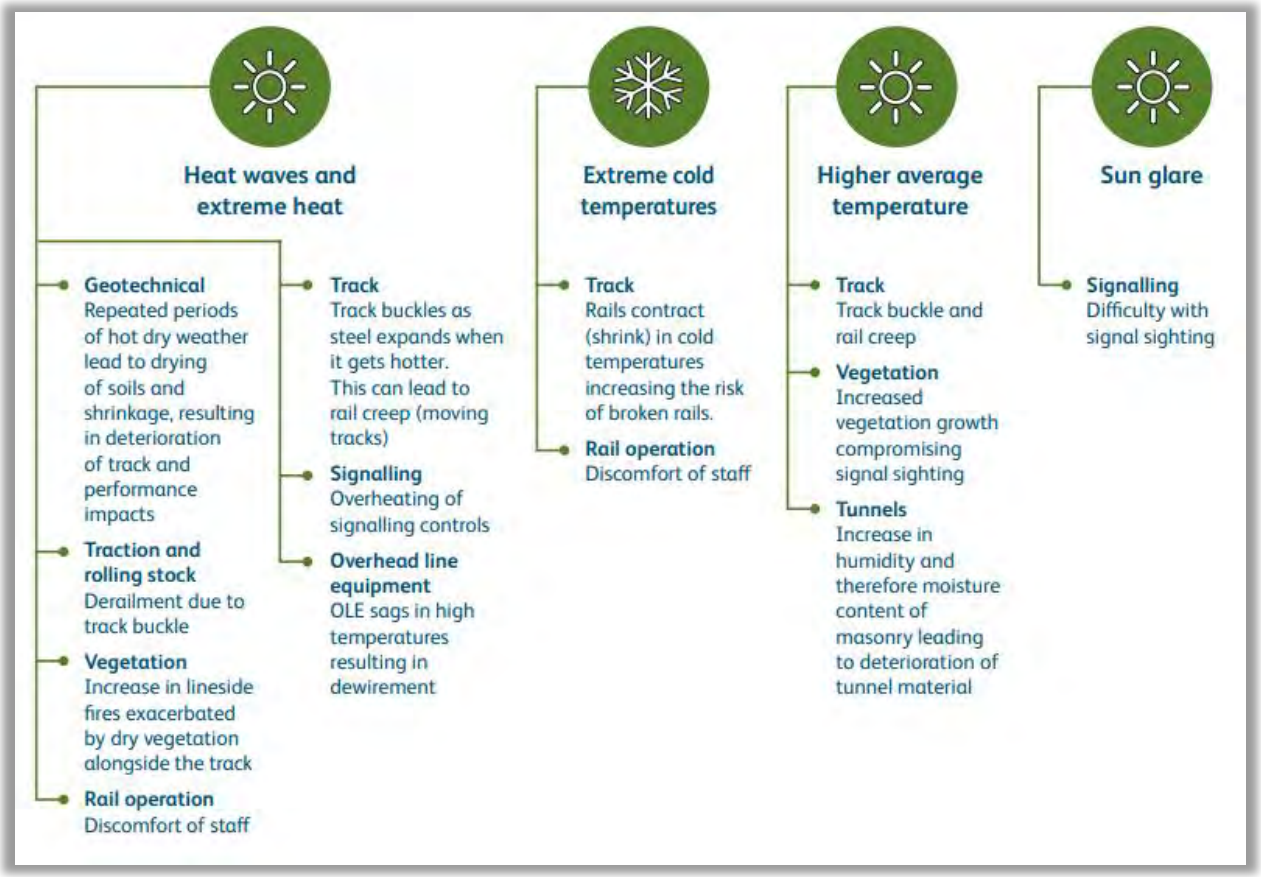

Figure 4.3-3: Key temperature risks to our network (Network Rail, 2021).

4.3.1 Heat

Wales and Western Region has both continuously welded rail and jointed track, with Wales route having a higher proportion of jointed track compared with most routes nationally. Steel rails expand or contract depending on their temperature, and in direct sunshine can be up to 20°C hotter than ambient air temperature. If the temperature rises above the critical rail temperature level, this could lead to a track buckle.

The risk of track buckling can be increased by existing deficiencies in track condition (lack of ballast, changing rails and not restoring stress), track support (poor formation conditions e.g., wet beds) and the activities which may disturb the track (manual and mechanical replacement of ballast, On-Track Machine intervention and track replacement). Other engineering work on or around the track bed which may affect the track support zone can also introduce new instabilities whilst the assets settle. Primarily in jointed track, another phenomenon that increases the risk of a track misalignment is rail creep where the rail moves towards a fixed asset. It does take place in continuously welded rail where certain rail fastenings increase this risk. Locations with significant track gradients and repeated braking of trains also contribute to rail creep.

Figure 4.3-2: Track buckle on Western route in summer 2018.

The mitigation measure for track buckles is to slow trains through temporary speed restrictions when high temperatures are experienced, this does not reduce the likelihood of the track misaligning (see figure 4.3.2) but significantly reduces the consequence. The hot summers experienced over the past few years have resulted in a high number of speed restrictions when track temperatures reach up to 50°C. While the network can continue to operate under a reduced capacity it can cause major disruption particularly if restrictions are widespread with cancellations and severe delays to passengers and freight.

Table 4.3-2: Maximum Monthly Summer Temperatures

Calendar year	Maximum monthly temperature (°C)		
	June	July	August
2018	33.0	31.0	27.8
2019	29.9	30.0	28.8
2020	31.3	31.1	33.5
2021	27.4	31.2	24.5
2022	28.4	37.1 (Wales Record)	33.8

With average global temperatures on the rise, instances of extreme heat are becoming more frequent and are projected to become the norm. According to climate data (highlighted in table 4.3=2), the region has experienced a notable increase in the number of days with temperatures exceeding historical averages. Extreme heat events not only contribute to track deformation, leading to the phenomenon known as track buckling, but also compromise the structural integrity of railway

infrastructure. For instance, prolonged exposure to high temperatures can result in the deterioration of rail tracks and components, elevating the risk of service disruptions and safety concerns.

4.3.2 Temperature impacts on our electrification assets

During extreme hot weather, overhead wires can sag as they expand beyond the capacity of the built-in systems maintaining their tension. Sagging lines can catch on train pantographs which transfer the power to the train, breaking the overhead wires shutting the line down and triggering significant delays.

Wales and Western region currently have a relatively small amount of OLE assets susceptible to temperature related failure compared to other regions. However, the 12 miles out of Paddington are particularly vulnerable to temperature related failure due to the older design. These major assets are due to be renewed in CP7 with future risk in mind and currently subject to an enhanced maintenance regime to mitigate the risk in the interim. Alongside these major asset renewals there will be some component renewals taking place.

4.3.3 Temperature impacts on clay embankments

The impact of heat on clay embankments arises when prolonged periods of elevated temperature and minimal rainfall lead to a relative deficit of water content within the soil matrix. When this occurs some clay rich soils can shrink as the water that was previously locked into the soil matrix is lost to evaporation and contracts/shrinks. Risk areas in railway infrastructure occur in interfaces between fixed structures such as bridges, high water demand trees, and in embankments of different fill material. In these circumstances there is potential for the soils to shrink and contract causing subsidence and poor track quality, which if not properly mitigated can cause derailment risk.

There are no known locations on Wales route which experience significant shrink/swell due to a lack of these clay soils, however there are several locations in Western route which experience this phenomenon see Figure 4.3.4-1 below. These areas align accurately with the BGS map of likely shrink/swell clay locations.

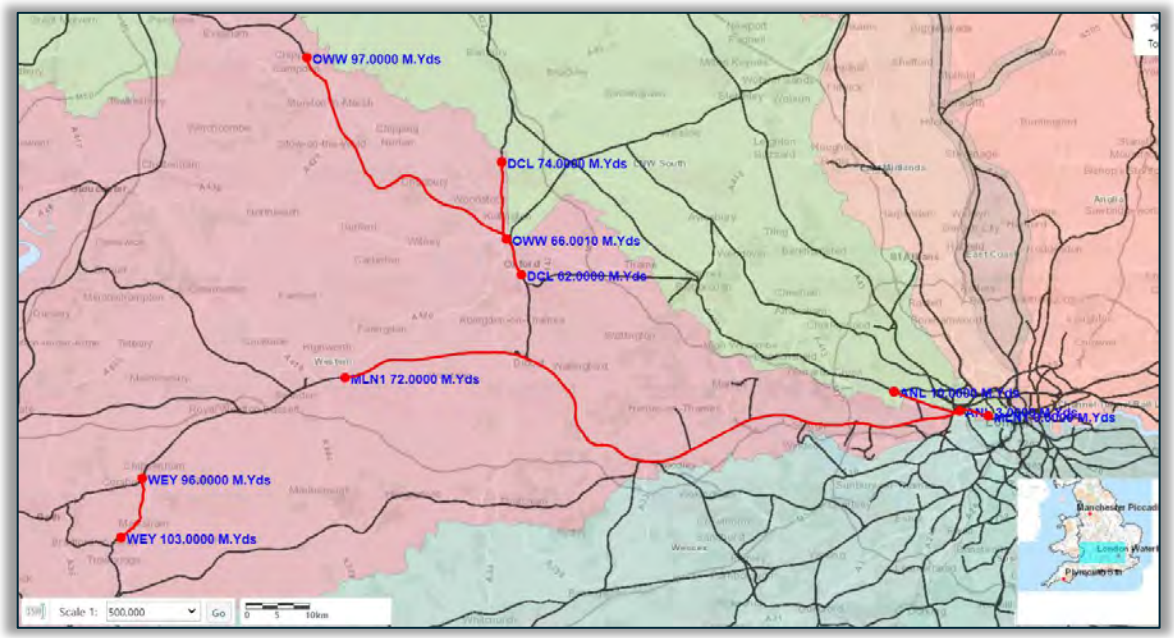

Figure 4.3.4-1: High risk embankment areas from soil moisture deficit highlighted in red

Figure 27 represents the rate of soil moisture deficit change between different calendar years, and highlights the significant challenges faced in 2022 as reflected in section **Error! Reference source not found.**.. The year 2018 was considered as a very significant year for shrink/swell clay embankments and yet 2022 shows a higher rate of change.

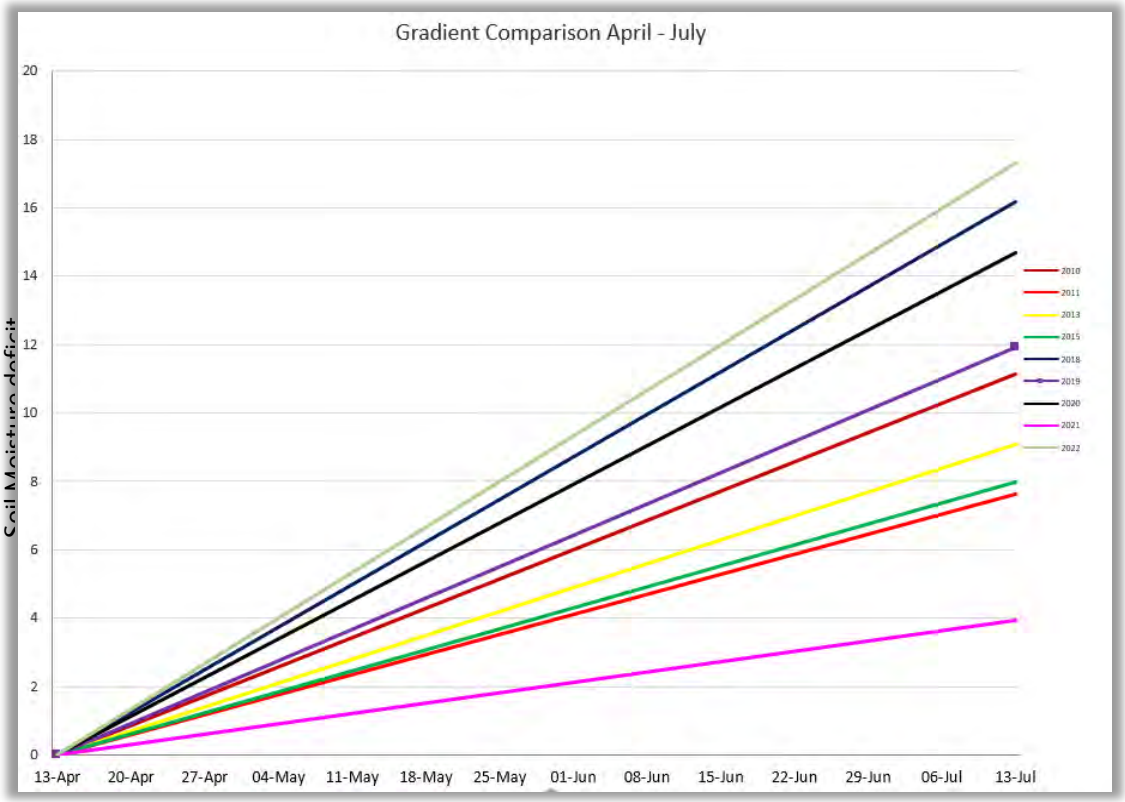

Figure 4.3.4-2: Rate of soil moisture deficit change April to August per year.

4.3.4 Temperature impacts on vegetation.

Shorter periods of temperature close to freezing will increase the active growing season for many plant species. This combined with wetter winters will lead to more vigorous growth in the spring, although it is possible that the drier summers will act as a growth limiter. For some species there may also be a later period of growth in the late summer/early autumn. This suggests that current patterns of vegetation management will need to change, potentially starting earlier and continuing longer leading to greater costs and workforce safety issues. While these risks may increase under future climate projections there is still significant uncertainty in this area and further research will be necessary

4.4 Storms and high winds

Storms and high winds damage lineside trees and can increase the number of trees and branches reaching the track, OLE and the associated impact on the safe operation of trains. This is a risk which will increase further as the number of storms increase and the extended growing season results in more trees remaining in leaf as the stormy period in autumn begins.

An example of this was storm Arwen at the end of November 2021. Following a temperate Autumn there was an unseasonably high windstorm event resulting in several trees falling onto the line and

subsequent delays. These storms lead to performance impacts including the implementation of blanket speed restrictions and performance delays relating to storm induced asset failures.

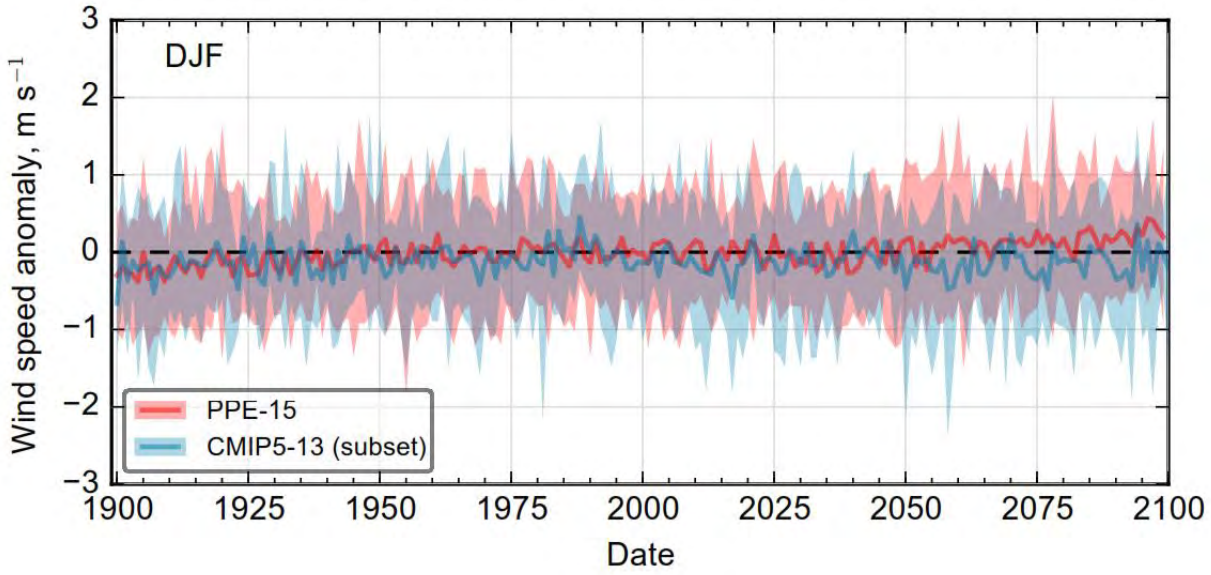

Figure 4.4-1: Global projections for changes in winter (DJF) mean near surface wind speed over the UK for 1900-2100 with respect to 1981-2000.

Figure 4.4-1 provides global projections for changes in winter (DJF) mean near-surface wind speed over the UK spanning the period from 1900 to 2100 in relation to the 1981-2000 baseline. Two main datasets are represented: the red line depicts the mean of the PPE-15, while the blue line represents the mean of the CMIP5-13. The accompanying red and blue shading illustrates the range of values derived from the respective datasets, highlighting the variability in projections. It's important to note that among the CMIP5-13 models, only nine have available wind speed data for the entire 1900-2100 period.

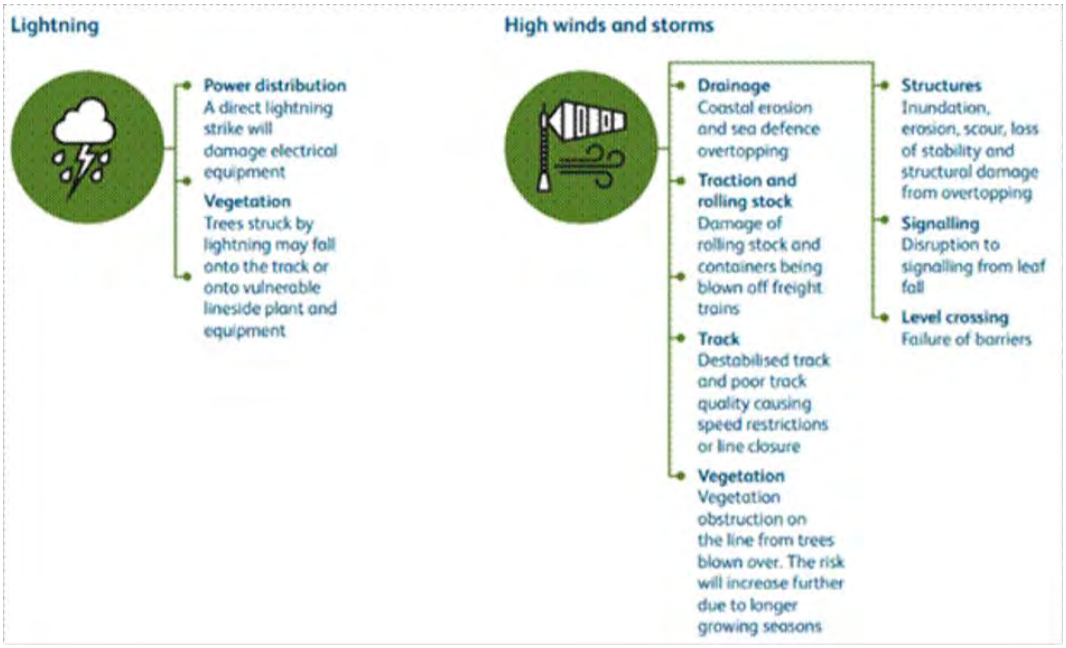

Figure 4.4-2: Key storm and wind risks for the region.

Wind effects performance directly in that blanket speed restrictions are imposed when thresholds of wind speed are reached. This is mainly due to the danger of various debris being blown onto the line from our lineside environment and from neighbouring sites. The region saw these types of incidents during both Storms Barney (November 2015) and Doris (April 2017). Other potential impacts include:

- Containers blown off freight trains
- Damage to track protection assets such as fences
- Station roofs, platform canopies and lineside equipment such as signs and lights getting damaged
- Level crossing barriers failing and blocking the crossing

The high winds in storms drive wave formation in both the sea and other significant waterbodies such as estuaries. Large volumes of spray from breaking waves can lead to speed restrictions and even service cancellation in extreme conditions. It can also wash away ballast destabilising tracks, damage earthworks, overwhelm drainage systems and salt water can accelerate asset corrosion.

Wind is currently the second biggest weather-related cost with lightning occupying the 7th position for the region. Between 2016 and 2022, their combined impacts were £38 million in schedule 8 costs and just over 840k delay minutes. Wind alone represented two thirds of the costs and more than half of the delay minutes.

Whilst the UKCP18 data does not contain projections for this type of weather the evidence suggests that they are likely to show increases as the climate changes, therefore we need to plan accordingly.

4.5 Health, Safety Welfare

The health, safety, and welfare of our front-line responders is a critical part of our plan. An example of this is the implementation of blanket speed restrictions for heat in place of watchmen and the application of speed restrictions over the winter period to prevent staff from having to place speed boards during adverse weather.

During extreme high temperature weather events Network Rail staff have increased welfare needs due to an increased risk of fatigue, heatstroke and exhaustion undertaking key trackside duties in hot weather. Sunburn and dehydration may also occur. Passengers may also suffer negative health and safety impacts such as heat exhaustion and dehydration, particularly if cooling systems within trains fail and/or trains are delayed due to other service or asset issues.

Winter weather can cause danger to passenger journeys, as well as the health and well-being of staff. According to our winter safety campaign, the number of major injuries suffered by railway employees peaks every winter. Night-time and other difficult conditions bring hazards of slips, trips, and falls. The proactive plans for the winter adverse weather period and implementation of remote condition monitoring systems reduces the need for staff to drive in poor weather conditions reducing the risk of road traffic accidents.

Climate and weather changes forecasted by climate change modelling infer that there will be future impact on health, safety and welfare with potential increase for the risks described above.

4.6 Interdependencies

The Wales and Western Region WRCCA plan will have an impact on various interfaces where interdependencies exist, these are but not limited to:

- Train paths cross from one region to another, this is particularly the case for CrossCountry and freight services as they rely on the smooth transition between regions.
- Public services rely on one another, such as delivering passengers on time to airports, in Wales and Western region this could be the case for Heathrow, Bristol and Cardiff and feed many others such as Gatwick via Reading. We also connect with Transport to London and Transport for Wales services to enable passengers to reach their end destination on time.
- Our passengers and freight operators rely on a reliable service, on Wales and Borders route specifically between Network Rail and Transport for Wales Infrastructure at Cardiff Central. It is important that our response to weather events and plans for a resilient railway network is aligned.
- Freight flows from within Wales and Western are feeding aggregate from the Mendips and Wales to HS2 and London, oil, and fuel to supply much of the south of the UK and container traffic from Felixstowe to the north of England and south Wales. Without resilient infrastructure these night-time flows cannot reach their destination on time, having a significant impact to the wider supply chain.
- Third party assets which are directly impacted by the resilience of the railway infrastructure. For example, the National Blood Bank in Filton was subject to high flood risk due to the condition of a Network Rail culvert which was partially collapsed and not capable of carrying the volumes of water experienced, an emergency culvert repair was undertaken after months of over pumping to protect this asset. Another example is the residents of Parc Y Eryr Estate in Llanrwst where our embankment was holding water causing flood risk, here Network Rail installed 6 culverts to drop the water level behind the embankment as part of the 2019 resilience and repair work.
- Internally, track and earthworks rely heavily on drainage assets and signalling assets rely on the buildings assets to keep their assets dry. Resilience needs to be considered and applied with the railway system in mind to ensure fixing one issue in isolation doesn't create another. This is being mitigated in Wales and Western in line with our regional strategy.
- We have developed a memorandum of understanding (MoU) and joint annual intensions document with Natural Resources Wales (NRW). Through these documents we determine joint programmes and objectives to ensure that both organisations work as one on issues such as coastal squeeze, habitat compensation and licencing. Both parties, under the MoU are responsible to deal with any issues that arise and the formulation of the MoU will enable us to take a collaborative and informed approach to any arising issues in CP7. Any issues associated with habitat compensation or coastal squeeze will be discussed and agreed with NRW through our MoU.
- We will look to increase the use of nature-based solutions when undertaking resilience improvements and will collaborate with third parties to support activities undertaken outside the railway boundary. The region is looking at Nature-based solutions and working with the

EA and NRW to facilitate this. Work is currently being done within the region, working on a pilot within the River Evenlode catchment in the Cotswolds to develop a nature based solution to re-meander the river within the catchment, moving it away from the railway corridor and slowing down the course of the water. Development of new funding mechanisms and procurement mechanisms to enable more cross boundary works to be developed across vital catchments.

Simpler.
Better.
Greener.

Chapter 5: Strategy and investment in Control Period 7 (CP7).

A photograph showing Barmouth Viaduct on the Dovey Junction to Pwllheli line undergoing a large renewal on the metallic spans

5. Strategy and Investment in CP7

In CP7, schemes that mitigate the impact of extreme weather and climate change is a key part of our plan. Our approach in CP7 involves proactively undertake the next round of schemes to mitigate disruption to our railway post-weather event and is linked to the 11 levers (Figure 5.2-1).

Our approach is providing solutions to minimise the damage to the railway post-weather event, enabling us to recover service in hours rather than days, weeks, or months. The resilience of the railway is not about protecting the railway at the detriment of other infrastructure and settlement but allowing the railway to withstand weather events and return to normal working quickly and effectively. Wales and Western developed a solution to at-risk embankments in floodplains. A good example is when the railway is closed following alarms from our telemetry on the lineside, inspected and reopened quickly following the passing of the weather event. Allowing operations colleagues to make informed decisions based on real data and pictures from the site without needing to leave the control room is a big part of providing a resilient railway.

Wales and Western has an allocated, standalone budget of £19m to fund pure resilience activities directly addressing weather impacts facing our region along with dedicated project management resource to develop these resilience sites. The funding will be split into a £1m development pot where NRDD (Network Rail Design & Delivery) will develop 14 schemes and take 6 of them to detailed design and delivery. The remaining £18m budget will be used to deliver the schemes. If the value of the schemes should exceed the current budget arrangements, then we will put a proposal to the region to get the schemes funded.

5.1 Control Period 7 (CP7) Delivery

The Wales and Western CP7 delivery plan, contains many activities which will make our assets more resilient and allow us to deliver our commitments to weather resilience and climate change adaptation with a continuation of the great work undertaken in CP6.

The CP7 delivery plan includes funding for train accident risk reduction (TARR) activities which are intrinsically linked to WRCCA through the delivery of resilience activities aligned to earthwork washout, drainage asset condition and dead, diseased and dying tree management.

Included in the delivery plan:

- In response to the Lord Robert Mair and Dame Julia Slingo's recommendations, we will implement changes to manage earthwork and drainage assets aligned to the 11 levers to reduce the risk of potentially catastrophic failure.
- We will improve environmental sustainability through significant investment in:
    - Decarbonisation
    - Air quality
    - Weather resilience and climate change adaptation
    - Biodiversity
    - Environmental management.

The table below sets out our CP7 investments in the Wales & Western Region, the full work bank in appended in Appendix B.

Table 5.1: Wales and Western Control Period 7 delivery plan.

No.	Asset Class /Team	Category	Location	Description	Cost (£m)	Benefit
1	Resilience	Development	Regional	NRDD to develop 12 highest priority resilience schemes in CP7 year 1 which will likely result in 6 schemes being developed within the control period. Development will include modelling and risk assessment for each site to determine the priority.	**£1.0**	Establishes a representative risk for the region which will establish a prioritised list of sites based on modelling and climate change predictions. Modelling and desk study will have been completed for the majority of sites with potential options available for development at a later date.
2	All Asset Areas	Development	All Region	Adaptation Pathways program to be developed over the whole of CP7 for both the Wales and Western routes to determine the highest risk lines of route along the railway due to climate change. Adaptation pathways for railways involve dynamic, flexible strategies to respond to climate change and evolving needs. They provide	**£4.0**	By adopting flexible and dynamic approaches, the region can incrementally adjust its infrastructure and operational strategies, ensuring resilience to future uncertainties. Adaptation pathways enable efficient resource allocation, facilitating timely

				a structured framework for incremental adjustments in infrastructure and operations. This approach enables timely upgrades, efficient resource allocation, and stakeholder collaboration. Adaptation action plans will be developed based on modelling of climatic risk to the infrastructure and options proposed for the route		upgrades and innovations. Additionally, the adaptive nature of the approach promotes stakeholder engagement, fostering collaboration between communities, authorities, and businesses to collectively address the evolving demands of the rail network.
3	Earthworks	Monitoring	All Region	Enhanced earthworks monitoring of earthwork assets to better understand the risk across a portfolio level. The monitoring will be put in place at the most at risk assets as a result of the increased frequency of increment weather condition that affect the stability of the earthworks as a result of climate change.	**£11.0**	Earthworks monitoring enhances construction safety, detects potential issues early, and ensures project compliance. It improves efficiency, reduces costs, and aids in optimizing resource allocation.
	Based on the outcome of analysis at number 1, six of the following schemes (4-18) will be progressed within the remaining resilience budget:				**£18m**	
4	Resilience	Renewal	Sonning, Western, MLN1	Adverse weather site east of reading which affects Elizabeth line and GWR. Slope and crest drainage. Resilience not BAU.		Reduced flooding damage to the track. and disruption to the railway network. Reduced delay minutes from extreme weather and repair time. Reduced repair costs. TSR will become redundant. Reduced maintenance time and costs.
5	Resilience	Renewal	St Fagans, Wales, SWM2	Once flowing beneath the bridge at 174.61 M.Chns, the River Ely changes direction 90 degrees northeast 50 metres downstream. At high water levels, this river bend could slow water flow leading to flooding of the land surrounding the railway. A flood level could be reached which means water overtops the railway. In January 2023, high water levels in River Ely led to flooding of the railway and washout events. These events will likely increase in the future with climate change.		Reduce damage to bridge and increase life span. Reduce repair cost and time. Lower disruption time. Reduce flooding in surrounding areas as well.
6	Resilience	Renewal	Clawd-Coch, Wales, SWM2	The highest recorded river level of the river that flows beneath the railway at this site is 1.5m below the height of the embankment. In the future, it is expected with climate change that higher river levels will occur. Flood		Reduce damage to bridge and increase life span. Reduce repair cost and time. Lower disruption time. Reduce flooding in surrounding areas as well.

				levels could reach the height of the embankment and therefore the railway could be overtopped. Tan 15 flood maps show that the railway at this site is in a flood zone.		
7	Resilience	Enhance	Chipping Sodbury, Western, SW	Determine size and capacity requirements of the proposed system which is operating at full capacity to provide resilience in the face of increased extreme weather and Climate Change. This is a repeat failure location with 8 major floods occurred in the last 13 years.		Avoid wet beds and voiding which can lead to damage to rail and trains as well. Eliminate main line closure during extreme weather conditions. Quick recovery from extreme weather. Reduced disruption. Reduced repair costs and time.
8	Resilience	Renewal	Llangua court, Wales, HNL1	"At this site, the railway bridge squeezes the channel of the River Monnow. Therefore, at high river levels, it is likely water will build up before the bridge and spill on to the floodplain upstream of the railway. This floodplain has a pinch point due to a road being build close to the railway. As a result, when the flood plain reaches its maximum capacity, water would likely be pushed on to the railway and a washout event could occur. Tan 15 flood maps show that the railway at this site is in a flood zone."		Reduce repair time and costs. Increased protection of railway. Avoid flooding in areas surrounding the railway. Reduced disruption and eliminate TSR.
9	Resilience	Renewal	Nailsea, Western, MLN1	"At this site, the railway bridge squeezes the channel of the River Kenn. Therefore, at high flood levels, it is likely water will build up along the railway at the base of the hills. This floodplain has a pinch point due to hills on both sides of the railway pushing flood water to collect along the railway. This site is in a known floodplain, and it is expected to get worse due to sea level rise as it is exposed to tidal flooding."		Reduce repair time and costs. Increased protection of railway. Avoid flooding in areas surrounding the railway. Reduced disruption and eliminate TSR. Reduce saltwater deterioration. .
10	Resilience	Renewal	Llangyfelach, Wales, SD12	Up size drainage system which is operating at full capacity to provide resilience in the face increasing extreme weather caused by climate change. 500m earthwork renewal ditch/channel and 5 5chl Earthwork Refurb, 1100m track drainage		Reduced flooding damage to the track and disruption to the railway network. Reduced delay minutes from extreme weather and repair time. Reduced repair costs. TSR will become redundant.
11	Resilience	Renewal	Flax Bourton, Western, MLN1	Install infrastructure to protect cutting from flooding in adverse weather.		Avoid flooding damage to the track and disruption to the railway network.

						Reduced delay minutes from extreme weather and repair time. Avoid repair costs. TSR will not be implemented.
12	Resilience	Renewal	Flax Bourton, Western, MLN1	Bringing the existing Rosemount Road SUDS pond back online. Replacing the existing partially blocked culvert. Upsizing approximately 170m of existing track drainage from 450mm diameter to 500mm/525mm		Reduced flooding damage to the track. and disruption to the railway network. Reduced delay minutes from extreme weather and repair time. Reduced repair costs. TSR will become redundant.
13	Resilience	Renewal	Wootton Bassett, Western, MLN1	Remove the pinch point where water drains under the railway into a canal on the down side (south). When this floods both routes between Swindon and Bristol are closed. Take cognisance of recent and planned housing developments to north.		Avoid wet beds and voiding which can lead to damage to to rail and trains as well. Eliminate main line closure during extreme weather conditions. Quick recovery from extreme weather. Reduced disruption. Reduced repair costs and time. Protect equipment.
14	RAM(DOT)	Renewal	Dauntsey, Western, MLN1	Outside party drainage here has caused flooding several times a year including in Jan 2023 and Jan 2024 when a train ran into floodwater at 125mph. Recent targeted intervention to drainage has helped but not prevented flooding.		Avoid wet beds and voiding which can lead to damage to rail and trains as well. Eliminate main line closure during extreme weather conditions. Quick recovery from extreme weather. Reduced disruption. Reduced repair costs and time. Protect equipment.
15	RAM(DOT)	Renewal	Somerton, Western, CCL	Frequent flood site and closes off fast route from Reading to West Country via Westbury. If coupled with a closure at Flax Bourton means both main routes out of west country are closed.		Avoid wet beds and voiding which can lead to damage to rail and trains as well. Eliminate backup for main line closure during extreme weather conditions. Quick recovery from extreme weather. Reduced disruption. Reduced repair costs and time. Protect equipment.
16	RAM(DOT)	Renewal	AvonMouth , Western, AMB	Flood defence protects railway from sea level rise creating salt water marsh nature area.		Reduce repair time and costs. Increased protection of railway. Avoid flooding in areas surrounding the railway. Reduced disruption and eliminate TSR. Reduce saltwater deterioration.

17	RAM(DOT)	Renewal	Powderham , Western, MLN	Protect main line to Devon and Cornwall from threat from erosion of sand spit at mouth of exe estuary accelerating erosion and frequency of overtopping of powderham banks.		Strengthen track stability and support. Reduce flood risk and avoid voids and wet beds. TSR would become redundant. Performance of railway equipment would improve.
18	RAM(DOT)	Renewal	Oxford, Western, DCL	Enlarged culverts under road bridge adjacent to railway to prevent build up of flood water to north impacting railway		Reduced flooding damage to the track and disruption to the railway network. Avoid voids and wet beds that may lead to serious failure events. Reduced delay minutes from extreme weather and repair time. Reduced repair costs. TSR will become redundant
				TOTAL	**£34m**	

5.2 Residual Risks

Across all regions, there will be a lower volume of asset renewals and a greater proportion of refurbishment and maintenance volumes to mitigate decline in asset condition. This could result in more reactive and unplanned interventions on existing assets.

In Wales and Western we have a dedicated resilience budget to develop a number of schemes throughout the beginning of the control period, once the schemes are developed, an assessment on the urgency of the schemes based on likely failure due to extreme weather or changing climate. Off the back of the assessment some schemes will be carried out in the control period and the others pushed into the next control period or form part of the adaptation pathways remit. There is a potential residual risk that some sites may fail sooner than assessed and modelled.

Enabling activities are planned for CP7 that will help us better understand and measure the risks associated with climate change on our infrastructure, for example, improvements to how we undertake climate risk assessments and development of longer-term adaptation pathways for the locations where a more transformational approach to managing climate-related risks will be likely required.

Combined, these approaches will allow us, in time, to better quantify levels of climate-related risk across our railway, and to better articulate the impact of our weather and climate-related resilience interventions on addressing those risks.

5.3 Weather Resilience Levers for Earthworks & Drainage

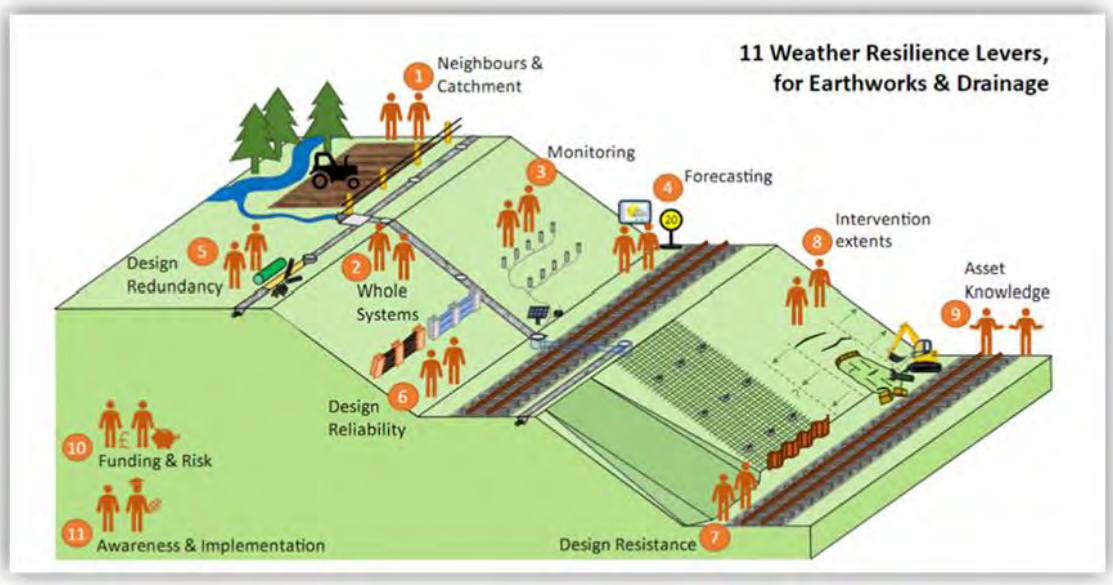

Figure 5.3-1: 11 Weather Resilience Levers for Earthworks & Drainage.

5.3.1 Neighbours and Catchment (Lever 1)

A comprehensive program focused on the clearance and maintenance of lineside vegetation has prioritized sites with the highest risk, eliminating dead, diseased, and dying trees (DDDT). Wales Route have the highest amount of DDDT trees across the country, with approximately 25 %. This initiative enhances the network's resilience to high winds and minimizes disruptions caused by fallen trees and debris from vegetation on the tracks. Collaborative efforts with third parties, including key stakeholders like the Natural Resources Wales, Welsh Government Transport for Wales, are integral to

developing sustainable and holistic management solutions. A memorandum of understanding has been developed between NRW and Network Rail to best develop solutions. Should there be any issues that arise during the course of CP7, the MOU will enable NR and NRW to work collaboratively to deal with these issues and provide us with guidance on how to do so.

5.3.2 Whole Systems (Lever 2)

When implementing new systems, a holistic approach will be taken looking at the system as whole. In the past the siloed nature of asset refurbishments and renewals meant that a drainage renewal would have been constructed to a capacity and then the outfall into a track drainage system that doesn't match the capacity of the other system. Through the CP7 delivery, Wales and Western will now not allow this kind of activity to happen and will look to engineer solutions taking into account the whole system.

5.3.3 Monitoring (Lever 3)

80 5ch earthwork assets that are deemed at risk of failure and could impact safety of trains are now covered with Earthwork Failure Detection (EFD) equipment in W&W. These numbers are ever changing as more assets have EFD equipment installed and other sites have remedial works undertaken therefore negating the requirement for EFD equipment. The equipment consists of tilt sensors installed at the toe of cuttings, cant and twist sensors on sleeper ends to monitor embankment failures and 2D LiDAR mounted cameras. This equipment reports directly into control (as well as the Route Asset Management Team) when a level of movement indicating a potential failure has occurred with Control following a pre-determined process.

Further to this, another 100 5ch assets have Remote Condition Monitoring equipment installed consisting of Inclinometers, Extensometer, Piezometers, flood monitoring and ground water monitoring allowing long term data trends to be established of any potential earthwork movements.

On 5th February 2021, 2D LiDAR equipment was installed along the Severn Estuary at approximately 129.0340-0460yds and recorded movement earthwork movement greater than the threshold. The movement was recorded at 20:47 and by 20:48 both lines had been closed to traffic. The resulting failure had moved a two tier concrete block wall at the cess impacting gauging.

W&W plan to spend> £11 million earmarked for new monitoring equipment in CP7 and to service existing monitoring.

5.3.4 Forecasting (Lever 4)

Trial of the new ROWS platform. Implementation of CAT and the Proportionate Risk Response to Implementing Mitigating Speeds to Assets (PRIMA) tool, to dynamically manage train speeds against risk. Development of risk-based management of train speeds in relation to earthworks and drainage looking at increasing the trigger levels to decrease the frequency of adverse weather speeds. PRIMA is a tool that ensures the most effective operational response is made for each type of rainfall event in each specific area.

5.3.5 Design Redundancy (Lever 5)

Wales and Western Region will ensure that when implementing and installing new designs that the whole life system is taken into account. As above in Lever 2 the system may be governed by its weakest link. Throughout CP7 delivery, more emphasis will be taken on ensuring that primary and secondary resilience benefits are captured within the designs.

5.3.6 Design Reliability (Lever 6)

Design reliability encompasses strategic considerations and engineering solutions aimed at ensuring the robustness and dependability of rail systems. This involves meticulous planning and adherence to Network Rail standards, incorporating redundancy and fail-safes into the design process. By considering factors such as Drainage layout and the resilience of critical components, design reliability becomes a foundational lever in enhancing the overall resilience, performance and safety of the railway network.

5.3.7 Design Resistance (Lever 7)

As a result of climate change the drainage standards have been updated to include climate change projections. Working into CP7 we will build upon this working directly with the technical authority to develop guidance for all standards around climate change adaption, Wales & Western will be leading the way in developing these standards. We will also be designing more resilient solutions in our renewals, ensuring that the solutions consider the climate change risks.

5.3.8 Intervention extents (Lever 8)

Through efficient planning the renewals conducted will be conducted in a joint way across the disciplines, where possible and practicable. For instance, the Severn Tunnel track renewal and 6ft drain renewal will be combined maximise efficiency. This model will be adapted through the development of the local railways initiatives being rolled out across Wales.

5.3.9 Asset knowledge (Lever 9)

In CP7, the region has identified a budget for the strategic planning of WRCCA ahead of CP8. It will include Adaptation Pathways to identify our asset management, maintenance and operational requirements and changes in the future.

5.3.10 Funding and risks (10)

The Wales and Western Region approach to climate resilience in CP7 is different to that of CP6. Following experiences throughout the last control period, Wales and Western Region has brought climate resilience into the plan as part of the core submission. In the CP6 plan, climatic resilience was an option to buy, which was not funded as part of the CP6 determination. As a result, the circa £19m resilience budget to fund the reactive schemes was allocated from the risk budget and through overplanning taking advantage of unspent funds in year.

5.3.11 Awareness and implementation (11)

Sufficient capacity for drainage and lineside, and development More efficient asset management of a competency framework (Mair and Slingo).

5.4 Adaptation Pathways

In CP7, the region has identified a budget for the strategic planning of WRCCA ahead of CP8. It will include Adaptation Pathways to identify our asset management, maintenance and operational requirements and changes in the future. This funding equates to a total of £4m, which will include elements of Adaptation Pathways work that will inform the wider strategy. Wales and Western Region intend to develop an adaptation pathways workstream in CP7.

Adaptation pathways are a sequence of adaptation investments or policy actions that work coherently to achieve resilience efficiently and affordably over time. The pathways approach supports strategic, flexible and structured decision-making. It allows decision makers to plan for, prioritise and

stagger investment in adaptation options with trigger points and thresholds helping to identify when to revisit decisions or actions.

The methodology for undertaking the adaptation pathways work in Network Rail is in development building on the lessons learned during the pilot project undertaken in Southern in 2023. A multicriteria screening will be undertaken of all operational route sections of the rail network to identify those at highest risk from extreme weather and climate change. The outputs of this prioritisation work will be reviewed by asset managers and combined with their understanding of where the highest risk lies prior to shortlisting locations to go through a rapid adaptation pathways assessment. This will do a high level review of the key risks and adaptation options for a particular location. Those areas deemed to be highest priority from a risk/criticality perspective will be put forward for a detailed adaptation pathways assessment with modelling of adaptation solutions.

The output of the adaptation pathways work will be detailed understanding of where and when investment will be required in the railway setting out the pathways for achieving the strategic objective.

The adaptation pathways approach allows decision-makers to plan for, prioritise and structure investment in adaptation options with trigger points and thresholds. This will help identify when to revisit decisions or actions. This is standard practice in adaptation planning because it supports strategic, flexible, and structured decision-making.

The workstream will involve using climate modelling systems to understand better potential future challenges of managing the railway infrastructure in different climate scenarios. This work stream aims to identify key operational vulnerabilities within our assets. This enables us to conduct vulnerability assessments on all facets of the railway asset management system related to climate change scenarios. The output of this work stream will facilitate the discussion around long-term asset management strategies with climate change in mind. Climate change adaptation pathways will support a more strategic, proactive and collaborative (ORR lever 1, neighbours and catchment) approach to long-term adaptation strategies. This guides decision-making regarding intervention and investment across Opex and Capex activities through CP7, into CP8 and beyond.

5.5 Asset Led Activities

The Technical Authority has led a piece of work to better understand the resilience benefit of business as usual investment in asset management. Working with WRCCA Leads across regions, Network Technical Heads of asset engineering teams and the Cost and Volumes team in Finance, a review of the key volume lines (KVL) within the CP7 workbanks was undertaken to determine the resilience benefit of each activity within our workbanks. This analysis includes activities where weather resilience is a primary or secondary benefit of the maintenance or renewals defined as follows:

Table 5.1-1: Difference between Primary and Secondary resilience.

Primary Benefit	Secondary Benefit
• Pure resilience schemes - these are activities that are being undertaken solely for the purpose of improving our network's resilience to extreme weather. • Business as usual asset schemes with resilience - these are activities which are driven by poor asset condition as well as	• Activities where there may be a secondary weather resilience benefit, but this has yet to be determined (i.e. design work for this project has not been undertaken but it could be the case that when we undertake further design of the project, we include some changes to the

weather condition challenges so undertaking this work delivers an improvement in asset condition and a clear improvement in weather resilience (i.e. a primary benefit of the work is improved resilience to extreme weather)	asset which improve its resilience to extreme weather). • Activities where just by the nature of doing a renewal, makes the asset more resilient (e.g., modern standards are more resilient than asset is designed to).

The primary resilience work is comprised of a stand alone pure resilience budget of £19m resilience in addition to the primary benefit associated with the asset core business plan. The elements of the asset business plan which, by design and standard, will provide a secondary benefit have not been included in this plan but will be monitored throughout CP7.

The resilience budget focuses on performance and safety-driven schemes rather than asset condition-driven schemes which is covered in the primary resilience benefit from our asset workbanks. This provides us with a planned and resourced work bank to deal with these proactively. Many schemes will provide secondary resilience benefit delivered through the asset core business plan; this will be tracked throughout the control period through the investment authority process (ref ORR Lever 10 – Funding and Risk).

Table 5.5 outlines the total primary benefit figure and sections 5.5.1 to 5.5.11 will discuss the investments the individual asset areas. The CP7 forecast that is shown in table 5.5 is predominantly condition driven investment and the primary benefit weather resilience has been calculated.

Table 5.5: Summary of CP7 expenditure across the asset areas and work types for the Wales & Western Region.

Asset Area & Work Type	CP7	Weather Resilience Primary Benefit
	£m Forecast	
Earthworks	£308	**£271.8**
Drainage	£77	**£63.7**
Electrification & Fixed Plant	£189	**£28**
Signalling	£422	**£13**
Structures	£340	**£8.7**
Track	£681	**£2.3**
Telecoms	£64	**£1.7**
Off Track	£96	**£1.5**
Level Crossings	£110	**-**
Buildings	£301	-
Other Renewals	£140	**£19.00****
TOTAL:	**£2726m**	**£409m**

**The £19m accounts for the pure resilience budget that the Wales and Western region have secured for development and delivery of schemes outside of the BAU work bank, these schemes are listed in Table 5.1 of Section 5.

5.5.1 Earthworks

Earthworks spend accounts for the most expenditure in the Wales and Western region with most CP7 work items having a primary benefit resilience output at £271.82m. The works across a portfolio level will include refurbishment, renewal and monitoring of soil slopes, rock cutting and embankments. Along with these works, there will be works that form part of the adaptation pathways program, at circa £3m that will look at increased assessment activity that will be looking at mitigating the effects of weather and climate change. Furthermore, we plan to spend £19m on pure resilience schemes in

CP7 which will have a significant proportion allocated to earthworks and long term mitigation and monitoring of earthwork assets as these are the most vulnerable to weather and climate change.

Most modern earthworks interventions provide resilience during high rainfall or flooding events. In addition, it will address the risks of earthwork failures, improving both safety, performance and operation reliability through preventing landslides obstructing the line or leading to loss of support in embankments, and reducing the requirement for increased maintenance and operation speed restrictions. Along some sections of the railway within the Wales & Western region it may be necessary to allow the railway to be inundated with flood waters and then recover the service after, work into determining where this can take place will form part of the adaptation pathways and resilience works.

Overall, the spend is highest on earthworks as these are the most vulnerable to the failure mechanisms associated with increased intensity in weather events induced by climate change.

5.5.2 Drainage

The Drainage work bank plays a pivotal role in enhancing Network Rail's climate change resilience. By increasing the capacity of drainage systems, increase the maintenance of drainage assets, it mitigates the impact of extreme weather events associated with climate change, such as heavy rainfall and flooding. An expected £64m of primary benefit is forecast for CP7.

Making drainage systems more resilient to climate change minimizes the risk of service disruptions and infrastructure damage, ensuring the reliability and safety of the rail network. As the frequency and intensity of extreme weather events increase, effective drainage becomes paramount in mitigating flood risks and ensuring the resilience of the rail network. Upgrading drainage infrastructure enhances the capacity to manage heavy rainfall, reducing the likelihood of water-related disruptions and track instability. This not only safeguards the operational efficiency of the railway but also contributes to the overall climate resilience of the transportation system. By investing in robust drainage solutions, the railway sector takes a proactive stance in adapting to the changing climate, promoting reliability and sustainability in the face of environmental challenges.

5.5.3 Electrification and Fixed Plant

The majority of the £28m primary benefit costs for E&P budget is for the replacement of OLE for the first 12miles outside of Paddington. This marks a significant stride toward enhancing the resilience of the railway network. The new OLE systems bring modern technology and design, increasing the reliability and efficiency of the electrification infrastructure. This upgrade not only reduces the risk of equipment failures and service disruptions but also ensures better adaptability to the challenges posed by climate change. The improved OLE systems contribute to a more robust and weather-resistant railway, capable of withstanding adverse weather conditions and providing a more reliable service to passengers. Additionally, the replacement aligns with sustainability goals by incorporating energy-efficient technologies, further positioning the railway for long-term resilience and environmental responsibility.

5.5.4 Signalling

A forecast £13m in primary benefit is expected across the CP7 signalling work bank. Upgraded signalling infrastructure often includes weather-resistant components, reducing the vulnerability of critical systems to extreme conditions such as heavy rainfall or temperature fluctuations. This not only ensures the reliability of train operations but also contributes to the overall climate resilience of the railway, aligning with sustainable and forward-looking practices in the face of evolving environmental challenges.

5.5.5 Structures

Structures as they age become increasingly more vulnerable to the impacts of weather. £9m of the investment is being spent on protecting bridges and retaining structures from scour due to rivers being at higher flows in storm conditions. The rest of the investment is in strengthening structures to be more resilient and reliable.

5.5.6 Track, Telecoms & Off Track

Upgrading Track (2.32m), Telecoms (£1.7), and Off-Track (£1.5) infrastructure on the railway is paramount in enhancing its resilience to climate change. By integrating resilient materials, improved systems, and advanced monitoring technologies, the upgraded track infrastructure becomes better equipped to withstand extreme weather events such as heavy rainfall, flooding, and temperature fluctuations.

Enhanced telecoms systems facilitate real-time communication and data exchange, enabling swift responses to weather-related disruptions. Off-track components, including bridges and embankments, benefit from reinforced designs and proactive maintenance, reducing the risk of structural damage during severe weather events. Collectively, these upgrades not only ensure the reliability and safety of train operations but also bolster the railway's overall resilience to the challenges posed by a changing climate, contributing to a more sustainable and future-proof transportation network.

5.5.7 Other Renewals

In W&W we have £19m in the resilience budget these schemes are highlighted in table 5.1 and the £19m is highlighted in table 5.5 as ‘Other Renewals’. We plan to spend £1m on the development of 14 schemes in the first year of CP7, the region is setting an exemplary standard for proactivity in tackling climate-related challenges. Furthermore, we plan to spend the remaining of the £18m on the implementation of the top 6 schemes underscores the region's commitment to transforming plans into impactful, on-the-ground solutions. Notably, the flexibility to request additional funds should the business case prioritise this, reflects the region's approach and dedication to building a railway network that is not only robust in the face of climate change but also serves as a example of innovation and adaptability within Network Rail.

5.6 Adaptation Actions and Progress

During CP6, the region has managed the impact of weather through the implementation of Wales and Western WRCCA plans. The WRCCA plans included specific work items that improve resilience to assets at risk of weather-related failures. The work streams included many different asset types from the different engineering disciplines, and the progress of work items was reported bi-annually. The WRCCA plan included business-as-usual activities and stand-alone resilience work streams to ensure items associated with weather resilience were focused upon. Work items within the plan were predominantly on Geotech, Lineside and Drainage assets, as well as Structures susceptible to flooding, adverse rainfall, scour and coastal erosion. Additional items encompassed within the WRCCA plan included stakeholder engagement, academic engagement, and carbon reduction initiatives. In Wales, particular attention was placed on embankment resilience by delivering three accelerated rock armour resilience schemes. In Western considerable investment was sought to deliver the South West Rail Resilience Programme (SWRRP) scheme (in excess of £170 million) to prevent damage from wave action, storm surge and cliff instability. Interventions with a design life of 120 years and enhanced resilience to climate change have been developed and delivered in a phased approach.

At the time of reporting at the end of CP6, most actions were completed or on track for completion in line with the forecast, with nine actions being completed early due to early opportunity for delivery. Six actions are completed (delivered late), and these items have been completed later than proposed in the action plan, this is due to a range of factors including delivery, access constrains and change in priorities. Eighteen are reported as completed (work not required) due to risk assessment of structures passing over watercourses from pier and abutment scour. The assessments determined that no further interventions were required, closing the actions. The five actions reported as “not started” are scheduled later within the control period. One item categorised as “data unavailable” duplicates another action. In total, seven items are delayed. Four are on track for completion by the end of the control period with delays being related to challenges in programme delivery and obtaining agreement with third party licencing bodies. Two within the Wales Route are delayed due to the issues with delivering coastal defence interventions, and one in Western due to a change in delivery approach using contractors.

5.7 CP6 Asset Resilience

Throughout CP6 there have been a number of opportunities following storm events where failure of existing asset has led to a business decision to renew the asset with resilience at the core of the works. A number of schemes were quickly developed between the asset owners, resilience sponsor and NRDD. The schemes utilised emergency access and were turned around in a matter of months, such as the rock armour works along the Conwy Valley and Welshpool. Further opportunities were taken at Vineyards Farm, where there were reoccurring washouts closing one of the most frequently used lines on the Wales Route. Utilizing the same team, the scheme was turned around to be delivered within a few months which has now made the stretch of railway between Newport and Hereford more resilient to future events.

Table 6.1-1: Table showing that CP6 Primary Resilience schemes across the Wales and Western Region

Resilience scheme	Investment	Description
South West Rail Resilience Scheme (SWRRP)	£170m (Across CP6 on first four phases,	• Phase 1: Dawlish sea wall to south west of station (350m total) • Phase 2: Dawlish sea wall to north east of station (415m total)

	remaining phases funded in CP7)	• Phase 3: Rockfall shelter and cliff nails and netting to north of Parson's Tunnel • Phase 4: works to cliffs between Dawlish and Holcombe
Severn Estuary Resilience Programme (SERP)	£56m (Across CP6 & CP7)	Passive netting and active netting to cliffs along a 3mile section of vulnerable railway that fails following big storm events.
Welshpool rock armour	£6m	Rock armour scheme installed along an 1mile long embankment following 27 washouts that occurred in 2021.
Conwy Valley rock armour	£5	Rock armour installed to various section along the Conwy Valley following some severe flooding in the area leading to overtopping of the railway resulting to embankment washouts.
Vineyards Farm	£5.6m	Rock armour installed to 880yards of embankment after the
Chipping Sodbury flood resilience	£5m	New lagoon and pumping system to reduce length of railway closure when in flood
Blackbridge deck raising	£8m	Raising of bridge deck to increase resilience of the railway to high river levels
TOTAL in CP6	**£255.6m***	*Some sites are being completed into CP7.

The COVID-19 pandemic also opened up a number of opportunities to deliver some resilience to sections of the railway that were able to be closed due to low passenger numbers traveling due to the pandemic. Access opportunities along the Conwy Valley to install rock armour and at Blackbridge to increase the height of the bridge deck were utilized.

Fluvial flooding has become a major issue for Wales and Borders Route in CP6 with multiple failures of embankments in floodplains caused by increased river levels, in some cases exacerbated by tidal influence and reduced upper catchment capacity. In response to the 5 washouts that occurred between 2019 and 2022 on Wales and Borders at Welshpool (as shown in Figure 18), Llanrwst, and Pandy, a project has been created to determine embankment flood risk. The purpose is to identify embankments at high-risk of washout failure during overtopping events and prioritise future flood resilience works.

The initial stages of the project involved completing a desk study, reviewing each line within the route using Geo-RINM. Sections of railway which had similar topographical features to the past washout sites and located within Natural Resources Wales TAN 15 Flood Zone 2 and 3 were flagged as sites of potential washout risk. There were 173 sites which were identified as at risk of washout.

A review of the 173 sites in Wales and Borders was then carried out to identify structural features of the embankments. The sites that did not have features like those of the past washout locations were disregarded as sites of potential washout risk. On completion of this exercise, 45 sites of potential washout risk remained in the dataset.

The final stage of the desk study section of the project involved determining the degree of washout risk at each of the 45 sites. This led us to identify the sites where further site reconnaissance, and/or modelling should be prioritised. Using the structural and topographical feature data of the past washout locations, 3 high risk thresholds were defined by technical experts. Those of the 45 sites that met more than 2 of the thresholds were confirmed as potentially high-risk. There are 15 potential

high risk washout sites in the Wales and Borders route. Visits to the potentially high-risk washout sites were carried out in Autumn 2022; the result of these field studies was that 13 sites were deemed likely high risk. Currently, a remit is being written to undertake the flood modelling to determine, at a higher degree of confidence, the risk of the 13 sites; the models will show the current and future flood risk (under IPCC's RCP scenarios) of the catchments in which the sites are located.

Further planning around future resilience has been embedded into the asset teams with the tide finally turning on 'like for like' rebuilding following failure but more towards resilience at the forefront when events occur. This has laid the foundations for more pure resilience schemes into CP7 and beyond.

As a region, throughout CP6 we have been reporting progress every quarter to the ORR and the actions from CP6 action plan with key dates and milestones which have been hit and any delay in projects or cancelations. Wales and Western route have achieved the majority of its CP6 targets and also with the addition of the reactive primary resilience works completed in Table 6.1-1, benefited from additional resilience above and beyond the CP6 plan. Some schemes such as the CERDs (Coastal, Estuarine and River Defences) programme have been held up due to the introduction of SMPs (Chapter 4.1-1).

5.8 Lessons Learnt from CP6 Delivery

The works completed in CP6 were undertaken in response to weather events occurring within the region and highlighting the assets that were not fit for purpose to deal with these events. In some cases multiple failures led to the implementation of a resilience based intervention in order to future proof the assets against more frequent events.

It is clear from the works completed in CP6 that the standard approach to intervention needed to be reviewed, and making an asset more resilient didn't have to mean that it was completely immune to the threats of weather related events, enhanced by the threats of climate change, but rather take the approach that the railway could withstand the events and once the weather event was over the railway could reopen to traffic safely.

An example of this approach where a lot was learnt was the rock armour resilience scheme at Vineyards Farm. The site was modelled for flooding events with climate change predictions included and a number of options were modelled, however, these options such as raising the height of the railway or installing culverts were not fit for purpose because they were unattainable for the railway. Instead a rock armour scheme was developed in order for the railway to withstand the failure mechanism expected. This approach is fundamental in our approach to making the railway more resilient.

5.9 Resources and Implementation

Throughout CP7, there will be a resource to undertake WRCCA reporting and development and to drive the completion of actions. The Engineering and Asset Management Function will provide this resource through the Head of Engineering, Asset Strategy and Planning team. Responsibility for WRCCA is linked to the Head of Engineering, Asset Strategy and Planning job description. Opportunities will be derived from joint business ventures with TFW, Welsh Government, GWR, NRW, NE and EA for additional delivery.

Support and assistance on projects and development of the strategies will be by new entrant programmes such as Graduate Engineers and Placement Students. At the same time, Network Rail Design Delivery will develop schemes with third-party modelling consultants.

NR will require additional resources and expertise to undertake the Adaptation Pathways work. This is likely to be in the form of consultants to help our regional teams produce this output through a workshop.

An appropriately resourced seasonal management team in both route businesses would support the increasing demand due to the developing risk of adverse and extreme weather events and allow the team to develop systems to deliver robust and consistent responses and learn from these events.

Delivery of asset volumes will be tracked through a report of authorised investment of activities providing resilience benefit. Unless identified as a standalone line item in Table XX (the actions table), individual projects will not be reported in favour of an overarching view of activity within different asset functions. This process will also enable us to demonstrate where asset volumes are providing secondary resilience benefit and it is expected that cumulative investment in resilience during CP7 will be higher than what is forecast in this plan.

The Director of Engineering and Asset Management is accountable for delivery of this plan. Progress on delivery will be reported every six months (April - September and October - March each financial year) through the Technical Authority to the Climate Change Adaptation Steering Group and to ORR

A photograph showing the extents of flooding at Hele level crossing in Western region.

Chapter 6: Control Period 8 (CP8) and beyond

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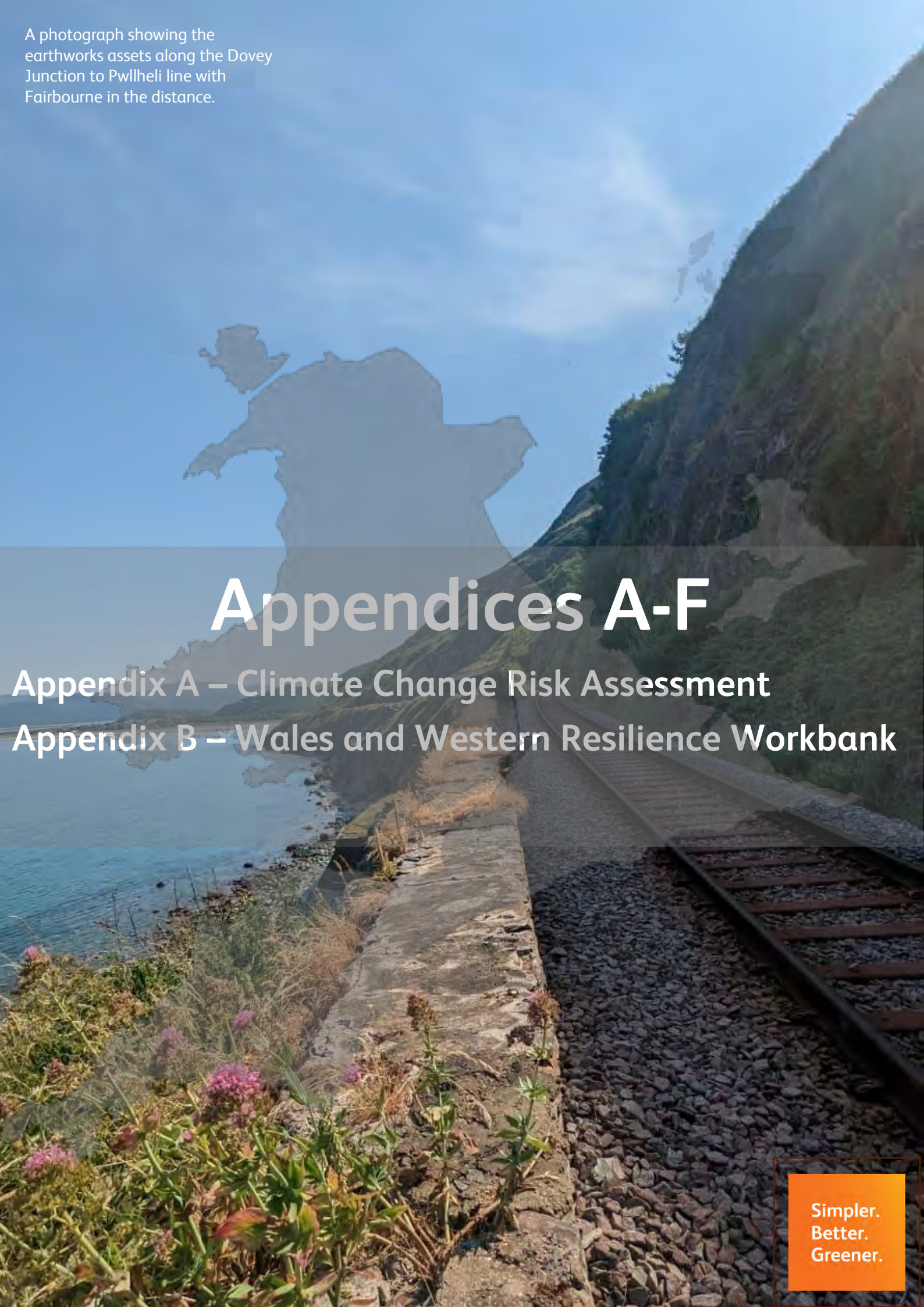
6. Control Period 8 (CP8) & Beyond

Regional business plans have been drafted for CP7, these business plans have been developed in line with existing processes such as asset condition led processes however, the approach to business planning needs some change in order to fully build resilience and climate change adaption into the business plans.

Throughout CP7 and into CP8 there needs to be a mindset shift into thinking ‘resilience’ and thinking ‘climate change adaption’. The railway, in certain areas is almost 200 years old, and although some of the assets are still safe and reliable, much of them are unable to withstand the changes that 200 years of climatic change has thrown at them.



A photograph showing the earthworks assets along the Dovey Junction to Pwllheli line with Fairbourne in the distance.

Appendices A-F

Appendix A – Climate Change Risk Assessment

Appendix B – Wales and Western Resilience Workbank

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NR Integrated Climate Risk Assessment for CP7 WRCCA Plans

Key

risks identified in asset risk register and route risk register

risks identified in asset risk register

risks identified in route risk register

2/minor	3/minor	4/moderate	6/moderate	8/moderate	10/major	12/major	16/major	20/severe	25/severe

Ref.	Function	Function type	Asset/activity/service description	Climate variable	Type of risk	Region	Route/Line	National risk owner	Region risk owner	Decision threshold, process or trigger point for action on the risk	Narrative
AP1	Asset	Access point	All access point types	Heavy rain/cloudburst	Interdependency (us on them)	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	Increased risk of trespass and closure of access point until maintenance or renewal undertaken.	There are links to earthwork failure/potential bank slip where an access point can be affected due to slippage e.g. steps/ handrail. Leads to performance and safety issues due to inability to access the railway/taking longer to attend an incident as staff may need to walk further to site/incident
AP2	Asset	Access point	All access point types	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Increased risk of trespass and closure of access point until maintenance or renewal undertaken.	Flooding may also be linked to the drainage asset due to blockages in the drainage system causing water to overflow and waterlogging which could affect the stability of the access point in particular access points on an embankment/cutting? Leads to performance and safety issues due to inability to access the railway/taking longer to attend an incident as staff may need to walk further to site/incident
BD1	Asset	Boundary	All fence types	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Increased risk of incursion both livestock and people Inspection resulting in maintenance or renewal required	Heavy rainfall resulting in flooding may also be linked to the drainage asset due to blockages in the drainage system causing water to overflow and waterlogging which could affect the stability of the boundary? Flooding may also be caused by third parties such as rivers bursting their banks or overflow of other water bodies
BD2	Asset	Boundary	Wall	Storms/high winds	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Increased risk of incursion both livestock and people Inspection resulting in maintenance or renewal required, increased risk to service capacity from obstruction on line (from trees)	A NR/3rd party Tree falling onto a boundary/dry stone wall, has the potential to create loss of boundary, there is also the risk of the wall falling onto a person and/or 3rd party property. Vegetation management may be required for NR trees and liaison with adjacent land owners for 3rd party trees. Boundary repair/renewal will be required
BD3	Asset	Boundary	All fence types	Storms/high winds	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Increased risk of incursion both livestock and people Inspection resulting in maintenance or renewal required	A NR/3rd party Tree falling onto a boundary/dry stone wall, has the potential to create loss of boundary, there is also the risk of the wall falling onto a person and/or 3rd party property. Vegetation management may be required for NR trees and liaison with adjacent land owners for 3rd party trees. Boundary repair/renewal will be required
BD4	Asset	Boundary	Wooden panel	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track	RAM GLD	Increased risk of incursion both livestock and people Maintenance, or renewal required. Upgrade of fence type may be required if in an area more susceptible to high winds	Maintenance or renewal will be required in the event of a loss of boundary incursion due to high winds. Temporary measures and/or increased inspection may be required until works are undertaken
BD5	Asset	Boundary	All fence types	Heavy snow	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track	RAM GLD	Increased risk of incursion both livestock and people. Maintenance or renewal required	Maintenance or renewal will be required in the event of a loss of boundary incursion due to heavy Snow. Temporary measures and/or increased inspection may be required until works are undertaken
BD6	Asset	Boundary	All fence types	Heavy rain/cloudburst	Interdependency (us on them)	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	Increased risk of incursion both livestock and people. Maintenance or renewal required	There are links to earthwork failure/potential bank slip where the boundary at the bottom or top of the embankment could be at risk
DR1	Asset	Drainage	Culvert	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track, Professional Head of Geotechnical and RAMs	RAM GLD	Linked to trigger level for investment which is asset condition or need to uprate culvert size/capacity	There is a risk across the country although there may be a higher risk in the North West and areas where rainfall levels are projected to increase further than in the south.
DR10	Asset	Drainage	Underground piped drainage	High soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track	RAM GLD	Linked to trigger level for investment which is asset condition/ drainage failing to function as designed for NR managed assets/ flood events for third party lineside neighbour assets	More extreme wetting of soils has the potential to increase movement resulting from swelling of soils. Open jointed or damaged pipes and culverts may be compromised in terms of their ability to manage flows
DR2	Asset	Drainage	Pump	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Linked to trigger level for investment which is asset condition/potential to compromise serviceability of track (submerged railhead/track circuit)	When pumping rates cannot keep pace with rising groundwater levels track circuit may fail/water over the rail head may prevent normal running of trains
DR3	Asset	Drainage	Pump	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Emergent flooding at locations not experiencing flooding before requiring pumped solutions in order to keep track serviceable	Increasing pressure on water resources (groundwater) resulting in increased regulatory pressure (e.g. new water abstraction licences depend on catchment demand) could result in limited ability to deploy pumped solutions at emergent flood locations. This could lead to the requirement for major capital works
DR4	Asset	Drainage	Track/earthwork drainage	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	When condition of parent asset is affected (Wetbeds, Track quality, Flooding & Earthwork stability)	Wetter winters could result in design capacity of both track and geotechnical drainage systems being exceeded compromising the integrity of parent assets. As drainage systems are likely to have been designed to local historical storm patterns this effect is likely to transpire across the whole country
DR5	Asset	Drainage	Track/earthwork drainage	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Linked to trigger level for investment which is asset condition/ drainage failing to function as designed for NR managed assets/flood events for third party lineside neighbouring assets	Hotter drier summers could lead to periods of drought. This could result in drainage systems achieving self cleansing velocity for less of the time causing greater amounts of solids to drop out. As drainage systems are likely to have been designed to local historical storm patterns this effect is likely to transpire across the whole country
DR6	Asset	Drainage	Sustainable Drainage Systems (SuDS) infrastructure	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Linked to trigger level for investment which is asset condition/ drainage failing to function as designed for NR managed assets/Flood events for third party lineside neighbouring assets	SuDS infrastructure will be designed to attenuate flows, primarily to reduce downstream flood risk. It is likely to have been designed with sufficient storage to accommodate a 'critical storm' (storm of a duration and intensity resulting in the largest storage requirement for a given discharge). Longer wetter winters and more intense summer storms could result in insufficient storage capacity leading to exceedance events and possible consequent flooding
DR7	Asset	Drainage	Non-return valves/river outfalls	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	When condition of parent asset is affected (Wetbeds, Track quality, Flooding & Earthwork stability)	Outfalls are likely to have been set at antecedent levels for all locations across the country and therefore all locations could be affected by increases in river flows. If non return valves and outfalls are prevented from allowing outflow by higher downstream water levels, flooding could result
DR7a	Asset	Drainage	Non-return valves/coastal outfalls	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track	RAM GLD	When condition of parent asset is affected (Wetbeds, Track quality, Flooding & Earthwork stability)	Outfalls are likely to have been set at antecedent levels for all locations across the country and therefore all locations could be affected by increases in sea level. If non return valves and outfalls are prevented from allowing outflow flooding could result
DR8	Asset	Drainage	Flood defences/revetments	Long wet winter/spring	Direct	Wales & Western	Wales & Western	professional Head of Drainage and Off Track/ Professional Head of Structures/ Professional Head of Geotechnical and RAMs	RAM GLD	When condition of parent asset is affected (Wetbeds, Track quality, Flooding & Earthwork stability)/ Flooding of third party land through failure to maintain assets as a flood defence 'structure'	Flood defence structures challenged and overwhelmed by rising river/estuarine water levels, leading to flooding which can compromise railway performance. Structures most structures deliberately designed to protect the railway from flooding will have been built in a time when climate change was not considered and freeboard/factor of safety where structures have been designed as a flood defence may not prove to be adequate. Railway structures such as bridges, earthworks or revetments can also act as flood defences whether or not this is their primary design purpose. In some cases the assets may be designated as statutory flood defence under Schedule 1 of the Flood & Water Management Act 2010
DR8a	Asset	Drainage	Flood defences/revetments	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	professional Head of Drainage and Off Track/ Professional Head of Structures/ Professional Head of Geotechnical and RAMs	RAM GLD	When condition of parent asset is affected (Wetbeds, Track quality, Flooding & Earthwork stability)/ Flooding of third party land through failure to maintain assets as a flood defence 'structure'	Flood defence structures challenged and overwhelmed by rising river/estuarine water levels, leading to flooding which can compromise railway performance. Structures most structures deliberately designed to protect the railway from flooding will have been built in a time when climate change was not considered and freeboard/factor of safety where structures have been designed as a flood defence may not prove to be adequate. Railway structures such as bridges, earthworks or revetments can also act as flood defences whether or not this is their primary design purpose. In some cases the assets may be designated as statutory flood defence under Schedule 1 of the Flood & Water Management Act 2010
DR8b	Asset	Drainage	Coastal defences/revetments	Flooding	Direct	Wales & Western	Wales & Western	professional Head of Drainage and Off Track/ Professional Head of Structures/ Professional Head of Geotechnical and RAMs	RAM GLD	When condition of parent asset is affected (Wetbeds, Track quality, Flooding & Earthwork stability)/ Flooding of third party land through failure to maintain assets as a flood defence 'structure'	Flood defence structures may become overwhelmed by rising coastal water levels, leading to flooding which could compromise railway performance. Most structures deliberately designed to protect the railway from flooding will have been built in a time when climate change was not considered and freeboard/factor of safety may not prove to be adequate. Railway structures such as bridges, earthworks or revetments can also act as flood defences whether or not this is their primary design purpose. In some cases the assets may be designated as statutory flood defence under Schedule 1 of the Flood & Water Management Act 2010
DR9	Asset	Drainage	Underground piped drainage	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Linked to trigger level for investment which is asset condition/ drainage failing to function as designed for NR managed assets/ flood events for third party lineside neighbour assets	6/moderate
Geo1	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	Earthwork Evaluation is the business process during which threats and consequences are considered holistically and management strategies including interventions and mitigations determined	Increased extremes of wetting and drying increase the rate of deterioration, demonstrated through academic research programmes. More extreme cyclical processes between the summer and winter will require greater levels of investment to maintain the levels of performance in predominantly clay areas (mostly the south-east)
Geo2	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	Earthwork Evaluation is the business process during which threats and consequences are considered holistically and management strategies including interventions and mitigations determined	Such events highlight the underlying lack of resistance in the earthwork portfolio. There is a balance needed to adequately invest in strengthening to make infrastructure more resistant and mitigating short-term increases in safety risk as short notice storms occur, then responding & recovering quickly should an asset failure occur
Geo3	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	High average rainfall over several days	Direct	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	Earthwork Evaluation is the business process during which threats and consequences are considered holistically and management strategies including interventions and mitigations determined	Increased extremes of wetting and drying increase the rate of deterioration, demonstrated through academic research programmes. A prolonged wet period (e.g. winter 2013/14) will cause problems that become immediately apparent and interrupt operations, but also create longer term problems with a large proportion of assets that have been extensively stressed but not quite to the point of failure
Geo4	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	Earthwork Evaluation is the business process during which threats and consequences are considered holistically and management strategies including interventions and mitigations determined	Increased extremes of wetting and drying increase the rate of deterioration, demonstrated through academic research programmes
Geo5	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	Earthwork Evaluation is the business process during which threats and consequences are considered holistically and management strategies including interventions and mitigations determined	Historical and ongoing extreme cold weather events and the associated thawing have long-term degradation effects on geotechnical assets
LX1	Asset	Level crossing	Level crossing	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Level Crossing and RAM	RAM GLD	At point of failure or advance weather warning	There is a risk across the country although the risk will be higher in the exposed areas where the wind speed will be higher
LX2	Asset	Level crossing	Level crossing	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Level Crossing	RAM GLD	At point of failure or advance weather warning	There is a risk across the country although the risk will be higher in the exposed areas where the wind speed will be higher
LX3	Asset	Level crossing	Level crossing	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Level Crossing	RAM GLD	At point of failure or advance weather warning	There is a risk across the country although the risk will be higher in areas prone to flooding
LX4	Asset	Level crossing	Level crossing	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Level Crossing and RAM	RAM GLD	At point of failure or advance weather warning	Greater risk for Northern areas
LX5	Asset	Level crossing	Level crossing	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Level Crossing and RAM	RAM GLD	At point of failure or advance weather warning	Equipment located in passive location cases at risk of overheating, particularly where sun hats are not used and orientation gives the worst solar gain
OLE 1	Asset	OLE	Wire run auto tension (single stack balance weights)	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Contact Systems and RAM	RAM Electricfication	Ambient temperatures reaches over 38 degrees C (design range limits)	Records show we have not had issues through high temperatures previously, only in isolated locations going back to hot spells in 1976
OLE 2	Asset	OLE	Wire run auto tension (single stack balance weights) stretch recovery repairs not completed	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Contact Systems and RAM	RAM Electricfication	Ambient temperatures reaches over 25 degrees C (Design range limits)	Records show we have a number of wire runs that have not had stretch recovery work completed
OLE 3	Asset	OLE	Wire run fixed termination	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Contact Systems and RAM	RAM Electricfication	Ambient temperatures reach over 38 degrees C (Design range limits)	Previous records through the 1976 heatwave no issues were recorded, 2019 was the first time this has been recorded, due to low tensioned wire runs
OLE 4	Asset	OLE	Wire run auto tension (spring tension device)	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Contact Systems and RAM	RAM Electricfication	Ambient temperatures reach over 40 degrees C (Design range limits)	No historic records for this type of failure on this device at these temperatures
OLE 5	Asset	OLE	Neutral section	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Contact Systems and RAM	RAM Electricfication	Ambient temperatures reach over 38/40 degrees C (design range limits)	No historic records for this type of failure on this device, but blank speeds will reduce the risk
OLE 6	Asset	OLE	Section insulators	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Contact Systems and RAM	RAM Electricfication	Ambient temperatures reach over 38 / 40deg C (Design range limits)	No historic records for this type of device, but blank speeds will reduce the risk
PD02	Asset	Power Distribution	HV power system protection	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electricfication	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms
PD03	Asset	Power Distribution	Changeover Panels	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electricfication	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms
PD04	Asset	Power Distribution	Distribution network operator supplies	Flooding	Interdependency (us on them)	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electricfication	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher
PD05	Asset	Power Distribution	Distribution network operator supplies	Lightning	Interdependency (us on them)	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electricfication	Linked to trigger level for investment which is asset condition	This is a risk across the country
PD06	Asset	Power Distribution	Distribution network operator supplies	Storms	Interdependency (us on them)	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electricfication	Linked to trigger level for investment which is asset condition	This is a risk across the country
PD07	Asset	Power Distribution	Functional supply points	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electricfication	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher
PD08	Asset	Power Distribution	Functional supply points	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electricfication	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher
PD09	Asset	Power Distribution	Functional supply points	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electricfication	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks
PD1	Asset	Power Distribution	AC power supply conditioning	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electricfication	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher
PD10	Asset	Power Distribution	Functional supply points	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electricfication	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher

Ref.	ARP 3 risk current national score (2019)	National confidence	CP7 Region WRCCA Plan risk current score (2022)	Regional confidence	CP7 Wales and Borders Route Score	CP7 Western Route Score	Narrative	Future risk - no additional adaptation: 2050s - National	2080s - National	National confidence	2050s - Regional	2080s - Regional	Regional confidence	Assumptions (including on data, operational, regulatory changes, etc)	Regional narrative for variations from the national risk	Linked CCRA3 Risks (not within the DEFRA template but included in the NR RA)			
AP1	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Heavy rainfall could destabilise the earthwork causing the land to slip. If this is near an access facility (e.g. a set of steps leading to the track a landslip could cause the whole access facility to slip	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	Assuming earthworks standards remain as current, the risk impact should remain the same but the likelihood will increase	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to transport networks from slope and embankment failure		
AP2	1/minor	Medium	2/minor	Medium	8/moderate	2/minor	The risk of an incident occurring at an access point due to heavy rainfall is minimal, however failure of an access point can have an affect on safety and performance	2/minor	2/minor	Low	2/minor	2/minor	Low	The future climate projections suggests storm events will be more frequent, this could mean that it will be more likely for heavy rain and flooding events, better drainage at access points will be beneficial	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
BD1	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Wet ground conditions are known to have an effect on the stability of fence posts. This may be dependent on the depth of the footings, materials used and age of fence. Although this would be classed as an unlikely event, this type of issue has been known to occur on the infrastructure	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	The future climate suggests storm events will be more frequent, this could mean that poor ground conditions will be more likely in some locations with sloping ground resulting in a higher level of maintenance/increased inspections	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to transport networks from slope and embankment failure		
BD2	6/moderate	Medium	16/major	Medium	10/major	6/moderate	Although this would be classed as an unlikely event the loss of boundary in particular where there is livestock could result in a train derailment	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	The future climate suggests storm events will be more frequent, this could mean that it will be more likely for trees to fall over, however with vegetation management, identification of problem trees and continued inspection this will reduce the increase in risk	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
BD3	6/moderate	Medium	8/moderate	Medium	16/major	6/moderate	Although this would be classed as an unlikely event the loss of boundary in particular where there is livestock could result in a train derailment	10/major	10/major	Low	10/major	10/major	Low	The future climate suggests storm events will be more frequent, this could mean that it will be more likely for trees to fall over, however with vegetation management, identification of problem trees and continued inspection this will reduce the increase in risk	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
BD4	6/moderate	Medium	10/major	Medium	6/moderate	4/moderate	Wooden panel fencing is usually in residential areas, therefore the risk of livestock incursion is reduced/minimal. Which reduces the impact	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	The future climate suggests that high winds will be more prevalent. Assumption that current management practices will continue	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
BD5	6/moderate	Medium	6/moderate	Medium	8/moderate	6/moderate	Heavy snow and drifting is more likely in certain areas such as higher ground, so this may not be a high risk everywhere	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	The future climate suggests that occurrences of heavy snow will reduce in the future. Therefore reducing the risk of boundary failure due to snow	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
BD6	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Heavy rainfall could destabilise the earthwork causing the land to slip, this in turn could bring fencing down, causing a failure of the boundary measure and result in livestock incursion/trespass	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	Dependent on future earthworks programme and development of more resilient embankments or cuttings this risk impact should remain the same but the likelihood will increase	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to transport networks from slope and embankment failure		
DR1	9/moderate	Medium	10/major	Medium	10/major	10/major	Current asset condition and location knowledge is limited. Work over next three years focusses on providing better data	12/major	16/major	Low	12/major	16/major	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
DR10	3/minor	Low	6/moderate	Low	4/moderate	3/minor	Up to date condition data on an asset that is buried is difficult to ascertain. Damage may not be apparent until flooding results	3/minor	3/minor	Low	3/minor	3/minor	Low	Current asset condition and inventory not well understood. Potential to impact assets not easy to understand	No Variation	Risks to subterranean and surface infrastructure from subsidence			
DR2	12/major	Medium	16/major	Medium	16/major	16/major	Although general asset inventory for drainage is only partially known/pumps are fairly well documented	12/major	12/major	Low	12/major	12/major	Low	Confidence around specific pump assets ability to cope difficult to assess as multiple location specific factors (e.g. hydrology) will contribute That current funding for existing management practices will remain available	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to bridges and pipelines from flooding and erosion		
DR3	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Future flood locations difficult to predict without comprehensive hydrological data	12/major	12/major	Low	12/major	12/major	Low	Assumption that the regulators continue to consent pumped abstraction in the current way in the light of hotter, drier summers. Projected increased average rainfall levels and wettest day resulting in emergent and increased flooding at new and existing locations respectively	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
DR4	12/major	Medium	16/major	Medium	16/major	16/major	Difficult to assess as the drainage inventory is incomplete and asset design information is not available or is incomplete (as-built drawings etc). However reasonable assumption that older drainage will degrade and is unlikely to have been designed with climate change needs in mind	12/major	12/major	Low	12/major	12/major	Low	That maintenance and construction will follow current standards. That older drainage will degrade and is unlikely to have been designed with climate change needs in mind	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
DR5	3/minor	Low	4/moderate	Low	4/moderate	4/moderate	Difficult to assess as drainage inventory incomplete and asset design information not available or incomplete (As-built drawings etc)	12/major	12/major	Low	12/major	12/major	Low	Presumption that installed drainage systems are designed to local historical rainfall patterns and don't account for climate change	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
DR6	3/minor	Low	6/moderate	Low	6/moderate	4/moderate	Most SuDS will have been designed with a factor of safety for climate change. Some residual risk remains because of lack of maintenance and SuDS from third party lineside development	3/minor	3/minor	Low	3/minor	3/minor	Low	Presumption that Suds systems may not have been designed to accommodate projected climate change to 2050/80	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
DR7	12/major	Low	6/moderate	Low	8/moderate	16/major	Asset inventory and its criticality unlikely to be fully understood. Interaction/ interdependence/phase of operation of disparate flood defence infrastructure on and off the railway is not necessarily understood, resulting in a potential increase in flood risk to railway and lineside neighbours	16/major	16/major	Low	16/major	16/major	Low	Very poor understanding of how catchment wide hydrology interacts with railway drainage systems and is exacerbated by increasing lineside development. More modern drainage systems and flood defence schemes are likely to have been designed with climate change isostatic rebound and consequent raised water levels in mind but older systems are vulnerable	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to infrastructure services from coastal flooding and erosion		
DR7a	12/major	Low	16/major	Low	6/moderate	16/major	Asset inventory and its criticality unlikely to be fully understood. Interaction/ interdependence/phase of operation of disparate flood defence infrastructure on and off the railway is not necessarily understood, resulting in a potential increase in flood risk to railway and lineside neighbours	16/major	16/major	Low	16/major	16/major	Low	Very poor understanding of how catchment wide hydrology interacts with railway drainage systems and is exacerbated by increasing lineside development. More modern drainage systems and flood defence schemes are likely to have been designed with climate change isostatic rebound and consequent raised water levels in mind but older systems are vulnerable	No Variation	Risks to infrastructure services from coastal flooding and erosion			
DR8	12/major	Low	4/moderate	Low	6/moderate	16/major	Current asset inventory and condition not necessarily known/ understood. Effect on flooding and flood management not necessarily understood particularly on a catchment wide basis and or multi agency management basis	12/major	16/major	Low	12/major	16/major	Low	Asset inventory and condition likely not to be understood especially in the context of catchment wide flood management. As flood defences tend to be high profile and are likely to be monitored to an enhanced frequency based on condition, the risk is not likely to get worse over the medium term but will worsen over the longer period. Flood defence is constantly updated/reviewed to deal with rising water levels but not in relation to climate change projections.	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
DR8a	12/major	Low	16/major	Low	16/major	16/major	Current asset inventory and condition not necessarily known/ understood. Effect on flooding and flood management not necessarily understood particularly on a catchment wide basis and or multi agency management basis	12/major	16/major	Low	12/major	16/major	Low	Asset inventory and condition likely not to be understood especially in the context of catchment wide flood management. As flood defences tend to be high profile and are likely to be monitored to an enhanced frequency based on condition, the risk is not likely to get worse over the medium term but will worsen over the longer period. Flood defence is constantly updated/reviewed to deal with rising water levels but not in relation to climate change projections.	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
DR8b	12/major	Low	16/major	Low	4/moderate	16/major	Current asset inventory and condition not necessarily known/ understood. Effect on flooding and flood management not necessarily understood particularly on a catchment wide basis and or multi agency management basis	12/major	16/major	Low	12/major	16/major	Low	Asset inventory and condition likely not to be understood especially in the context of catchment wide flood management. As flood defences tend to be high profile and are likely to be monitored to an enhanced frequency based on condition, the risk is not likely to get worse over the medium term but will worsen over the longer period. Flood defence is constantly updated/reviewed to deal with rising water levels but not in relation to climate change projections	No Variation	Risks to infrastructure services from coastal flooding and erosion			
DR9	3/minor	Low	6/moderate	Low	4/moderate	4/moderate	Up to date condition data on an asset that is buried is difficult to ascertain. Damage may not be apparent until flooding results	3/minor	3/minor	Low	3/minor	3/minor	Low	Current asset condition and inventory not well understood. Potential to impact assets not easy to understand	No Variation	Risks to subterranean and surface infrastructure from subsidence			
Geo1	12/major	High	6/moderate	High	6/moderate	16/major	Potentially high consequence events in 2019/20 with potential for 2-10 fatalities, c.£200m/yr. geotechnical spend, 10 lines closed simultaneously at one point in February due to earthworks failures	25/severe	25/severe	Medium	25/severe	25/severe	Medium	Assumes current levels of intervention/mitigation activity, which in the long run are unsustainably low without factoring in climate change adaptation	No Variation	Risks to transport networks from slope and embankment failure	Risk to transport from high and low temperatures, high winds, lightning		
Geo2	12/major	High	16/major	High	16/major	16/major	Potentially high consequence events in 2019/20 with potential for 2-10 fatalities, c.£200m/yr. geotechnical spend, 10 lines closed simultaneously at one point in February due to earthworks	25/severe	25/severe	Medium	25/severe	25/severe	Medium	Assumes current levels of intervention/mitigation activity, which in the long run are unsustainably low without factoring in climate change adaptation	No Variation	Risks to transport networks from slope and embankment failure	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to infrastructure services from coastal flooding and erosion	Risks to subterranean and surface infrastructure from subsidence
Geo3	12/major	High	16/major	High	16/major	16/major	Potentially high consequence events in 2019/20 with potential for 2-10 fatalities, c.£200m/yr. geotechnical spend, 10 lines closed simultaneously at one point in February due to earthworks	25/severe	25/severe	Medium	25/severe	25/severe	Medium	Assumes current levels of intervention/mitigation activity, which in the long run are unsustainably low without factoring in climate change adaptation	No Variation	Risks to transport networks from slope and embankment failure	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to infrastructure services from coastal flooding and erosion	Risks to subterranean and surface infrastructure from subsidence
Geo4	12/major	High	6/moderate	High	6/moderate	16/major	Potentially high consequence events in 2019/20 with potential for 2-10 fatalities, c.£200m/yr. geotechnical spend, 10 lines closed simultaneously at one point in February due to earthworks	25/severe	25/severe	Medium	25/severe	25/severe	Medium	Assumes current levels of intervention/mitigation activity, which in the long run are unsustainably low without factoring in climate change adaptation	No Variation	Risks to transport networks from slope and embankment failure	Risks to subterranean and surface infrastructure from subsidence	Risks to digital from high and low temperatures, high winds and lightning	
Geo5	12/major	High	6/moderate	High	10/major	12/major	Potentially high consequence events in 2019/20 with potential for 2-10 fatalities, c.£200m/yr. geotechnical spend, 10 lines closed simultaneously at one point in February due to earthworks	25/severe	25/severe	Medium	25/severe	25/severe	Medium	Assumes current levels of intervention/mitigation activity, which in the long run are unsustainably low without factoring in climate change adaptation	No Variation	Risks to transport networks from slope and embankment failure	Risks to subterranean and surface infrastructure from subsidence	Risks to digital from high and low temperatures, high winds and lightning	
LX1	9/Moderate	Medium	4/moderate	Medium	9/Moderate	6/moderate	Historic evidence from Level Crossing barrier failures provides sufficient knowledge of potential failure risks	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Assumptions based on current asset location and knowledge of surrounding environmental conditions	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
LX2	9/Moderate	Medium	10/major	Medium	10/major	10/major	Historic evidence from Level Crossing barrier failures provides sufficient knowledge of potential failure risks	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Assumptions based on current asset location and knowledge of surrounding environmental conditions.	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning		
LX3	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Historic evidence from Level Crossing barrier machine and location case failures provides sufficient knowledge of potential failure risks	6/moderate	12/major	Medium	6/moderate	12/major	Medium	Precipitation predictions from UKCP09	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
LX4	4/moderate	Medium	4/moderate	Medium	4/moderate	4/moderate	Dense snowfall could affect visibility of RTLs but this is not currently an issue. Circular cross section of boom means snow is unable to build up on the boom. Historically snow has effected OD equipment but mitigations are effective	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	Assumptions based on current asset location and knowledge of surrounding environmental conditions	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
LX5	4/moderate	Medium	6/moderate	Medium	3/minor	6/moderate	Historic information shows that there is a small increase in failures on hot days but it is not significant	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	This analysis assumes that treadles are considered as a separate asset	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
OLE 1	4/moderate	Medium	4/moderate	Medium	3/minor	6/moderate	If the wire run is maintenance free, with no heat related defects with sufficient play on the balance weights the risk is low to medium	8/moderate	12/major	Medium	8/moderate	12/major	Medium	Latest OLE designs have used spring tensioners, which have the capacity to work up to a higher temperature range. Current systems are to be maintained and adjusted to meet the higher temperature ranges, including work on the wire interface areas (crossovers/overlaps)	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
OLE 2	6/moderate	High	6/moderate	High	4/moderate	8/moderate	The mitigations are through carrying out patrols to identify the risk and carry out mitigation work to allow for more downward movement on the stack of weights	8/moderate	12/major	Medium	8/moderate	12/major	Medium	Latest OLE designs have used spring tensioners, which have the capacity to work up to a higher temperature range, or to adjust the anchor to a single wheel twin stack arrangement: key factors to address * Longer track access, to adjust and maintain * Improve the skills fade	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
OLE 3	12/major	High	6/moderate	High	10/major	16/major	When temperatures reach above 38 degrees C, creates sag in the wire. Greater risk at sites where there are converging and diverging wires. Risk also increased where projects have been working in the area and making basic adjustments that will interfere with the tensions. Track access at such sites is also limited and this is essential to carry out the work. (below specification) Understand and manage areas where we have low wire heights	8/moderate	12/major	High	8/moderate	12/major	High	Current plans are to check tensions on fixed terminations and make adjustments when required: Key factors to address * Longer track access, to adjust and maintain * Improve the skills fade into knowledge of fixed terminations equipment This type of equipment is not mainline affecting but exists in mainline terminal stations	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
OLE 4	3/minor	Medium	4/moderate	Medium	2/minor	4/moderate	When temperatures reach above 40 degrees C, there is enough tolerance to take it slightly higher. Work with the manufacturer to understand the risk at higher temperatures then specified	9/moderate	12/major	Low	9/moderate	12/major	Low	The current plans is to monitor the tensioners in extreme temperature conditions & work with Pfisterer to understand the full risk	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
OLE 5	3/minor	Medium	6/moderate	Medium	2/minor	4/moderate	Through high temperatures the risk is when the weights have reached its lower limits or extent of travel on the tensorex, causing loss of tension	8/moderate	12/major	Medium	8/moderate	12/major	Medium	The current plans is to monitor the balance weights in extreme temperature conditions, and apply blanket speed to limit the risk. Also making sure the profile set-up is in order	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
OLE 6	3/minor	Medium	6/moderate	Medium	2/minor	4/moderate	Through high temperatures the risk is when the weights have bottomed out, causing failure	8/moderate	12/major	Medium	8/moderate	12/major	Medium	The current plans is to monitor the balance weights in extreme temperature conditions, and apply blanket speed to limit the risk. Also making sure the profile set-up is in order	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PD02	6/moderate	High	8/moderate	High	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PD03	4/moderate	High	8/moderate	High	4/moderate	6/moderate	More likely than a direct strike, but far easier to repair	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PD04	9/moderate	Medium	10/major	Medium	10/major	10/major	Current typical flood levels are known and accounted for	9/moderate	12/major	Low	9/moderate	12/major	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure networks (water, energy, transport, ITC) from cascading failures			
PD05	6/moderate	Medium	8/moderate	Medium	6/moderate	6/moderate	Unlikely but can have devastating effects	9/moderate	12/major	Low	9/moderate	12/major	Low	Assuming general increase in storm frequency and severity	No Variation	Risks to energy from high and low temperatures, high wind, lightning			
PD06	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Unlikely. Mitigations generally effective, where applied	9/moderate	12/major	Low	9/moderate	12/major	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to energy from high and low temperatures, high wind, lightning	Risks to infrastructure services from river, surface water and groundwater flooding		
PD07	4/moderate	Medium	6/moderate	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PD08	4/moderate	Medium	6/moderate	Medium	4/moderate	4/moderate	Asset is generally capable of withstanding current range of temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PD09	3/minor	Low	6/moderate	Low	3/minor	4/moderate	This issue often goes undetected	3/minor	6/moderate	Low	3/minor	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PD1	4/moderate	Medium	6/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	8/moderate	Low	6/moderate	8/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PD10	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			

P0100	Asset	Power distribution	Lighting support structure	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is exposed	2/minor	Medium	6/moderate	Medium	2/minor	2/minor	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0101	Asset	Power distribution	Lighting support structure	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	6/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning		
P0102	Asset	Power distribution	Signal box: power supply >120V	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	9/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0103	Asset	Power distribution	Signal box: power supply >120V	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0104	Asset	Power distribution	Signal box: power supply >120V	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	6/moderate	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0105	Asset	Power distribution	Signal box: power supply >120V	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	6/moderate	Medium	6/moderate	Medium	6/moderate	8/moderate	Current typical flood levels are known and accounted for	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0106	Asset	Power distribution	Signal box: power supply >120V	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	6/moderate	Medium	6/moderate	Medium	9/moderate	9/moderate	Current asset condition known, mitigations generally effective	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0107	Asset	Power distribution	Signal box: power supply >120V	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	10/major	Low	6/moderate	6/moderate	Unlikely but can have devastating effects	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0108	Asset	Power distribution	Signal box: power supply >120V	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0109	Asset	Power distribution	1500V DC/1500V HV cables	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	6/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P011	Asset	Power Distribution	Functional supply points	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current asset condition known, mitigations generally effective	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0110	Asset	Power distribution	AC power supply conditioning	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	6/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0111	Asset	Power distribution	Battery & charger	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0112	Asset	Power distribution	1500V DC cables	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	6/moderate	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0113	Asset	Power distribution	1500V DC cables	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	4/moderate	Low	8/moderate	Low	4/moderate	6/moderate	Unlikely but can have devastating effects	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0114	Asset	Power distribution	1500V DC cables	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	4/moderate	Medium	10/major	Medium	4/moderate	6/moderate	More likely than a direct strike, but far easier to repair	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0115	Asset	Power distribution	1500V DC/1500V HV switchgear	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	6/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0116	Asset	Power distribution	1500V DC/1500V HV switchgear	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	10/major	Medium	4/moderate	8/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0117	Asset	Power distribution	1500V DC switchgear	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	3/minor	Medium	10/major	Medium	3/minor	3/minor	Asset is generally capable of withstanding current range of temperatures	3/minor	6/moderate	Low	3/minor	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0118	Asset	Power distribution	1500V DC/1500V HV switchgear	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0119	Asset	Power distribution	Insulation monitoring devices	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	6/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P012	Asset	Power distribution	Auxiliary transformer	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0120	Asset	Power distribution	1500V DC switchgear	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	12/major	Low	4/moderate	6/moderate	Unlikely but can have devastating effects	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0121	Asset	Power distribution	1500V DC switchgear	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	4/moderate	Medium	12/major	Medium	4/moderate	6/moderate	More likely than a direct strike, but far easier to repair	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0122	Asset	Power distribution	1500V HV cables	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	8/moderate	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0123	Asset	Power distribution	1500V HV cables	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	4/moderate	Low	12/major	Low	4/moderate	6/moderate	Unlikely but can have devastating effects	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0124	Asset	Power distribution	1500V HV cables	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	4/moderate	Medium	12/major	Medium	4/moderate	6/moderate	More likely than a direct strike, but far easier to repair	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0125	Asset	Power distribution	Insulation monitoring devices	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	8/moderate	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0126	Asset	Power distribution	1500V HV switchgear	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	3/minor	Medium	6/moderate	Medium	3/minor	3/minor	Asset is generally capable of withstanding current range of temperatures	3/minor	6/moderate	Low	3/minor	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0127	Asset	Power distribution	1500V HV switchgear	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	8/moderate	Low	10/major	Low	8/moderate	8/moderate	Unlikely but can have devastating effects	8/moderate	8/moderate	Low	8/moderate	8/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0128	Asset	Power distribution	1500V HV switchgear	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	Medium	12/major	Medium	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0129	Asset	Power distribution	1500V HV transformer/ rectifier	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	10/major	Medium	2/minor	9/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P013	Asset	Power Distribution	Functional supply points	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	10/major	Low	6/moderate	6/moderate	Unlikely but can have devastating effects	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0130	Asset	Power distribution	1500V HV transformer/ rectifier	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0131	Asset	Power distribution	1500V HV transformer/ rectifier	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0132	Asset	Power distribution	1500V HV transformer/ rectifier	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0133	Asset	Power distribution	1500V HV transformer/ rectifier	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	8/moderate	Low	10/major	Low	8/moderate	8/moderate	Unlikely but can have devastating effects	8/moderate	8/moderate	Low	8/moderate	8/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0134	Asset	Power distribution	Insulation monitoring devices	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0135	Asset	Power distribution	1500V HV transformer/ rectifier	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0136	Asset	Power distribution	Metering	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0137	Asset	Power distribution	Metering	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0138	Asset	Power distribution	Metering	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0139	Asset	Power distribution	Metering	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P014	Asset	Power Distribution	Functional supply points	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	8/moderate	High	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0140	Asset	Power distribution	Metering	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	6/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0141	Asset	Power distribution	Points heater monitor	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0142	Asset	Power distribution	Points heater monitor	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0143	Asset	Power distribution	Points heater monitor	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0144	Asset	Power distribution	Insulation monitoring devices	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0145	Asset	Power distribution	Points heater monitor	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0146	Asset	Power distribution	Points heater monitor	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0147	Asset	Power distribution	Points heater monitor	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0148	Asset	Power distribution	Power supply monitor	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0149	Asset	Power distribution	Power supply monitor (including signal power)	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P015	Asset	Power Distribution	Functional supply points	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is exposed	4/moderate	Medium	4/moderate	Medium	4/moderate	2/minor	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0150	Asset	Power distribution	Power supply monitor	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			

PD151	Asset	Power distribution	Power supply monitor (including signal power)	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD152	Asset	Power distribution	Power supply monitor	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD153	Asset	Power distribution	Power supply monitor	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD154	Asset	Power distribution	Signal power supply monitor	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD155	Asset	Power distribution	Insulation monitoring devices	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD156	Asset	Power distribution	Signal power supply monitor	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD157	Asset	Power distribution	Signal power supply monitor	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD158	Asset	Power distribution	Signal power supply monitor	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD159	Asset	Power distribution	UPS management	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD16	Asset	Power distribution	Functional supply points	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning	Risks to infrastructure services from river, surface water and groundwater flooding			
PD160	Asset	Power distribution	UPS management	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	3/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD161	Asset	Power distribution	UPS management	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	3/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD162	Asset	Power distribution	UPS management	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD163	Asset	Power distribution	UPS management	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD164	Asset	Power distribution	Insulation monitoring devices	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD165	Asset	Power distribution	UPS management	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD166	Asset	Power distribution	TPCMS equipment (all)	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD167	Asset	Power distribution	TPCMS equipment (all)	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD168	Asset	Power distribution	TPCMS equipment (all)	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD169	Asset	Power distribution	TPCMS equipment (all)	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD17	Asset	Power distribution	LV autorecloser	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD170	Asset	Power distribution	TPCMS equipment (all)	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	4/moderate	Low	4/moderate	Low	4/moderate	6/moderate	Unlikely but can have devastating effects	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD171	Asset	Power distribution	TPCMS equipment (all)	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	4/moderate	High	4/moderate	High	4/moderate	6/moderate	More likely than a direct strike, but far easier to repair	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD172	Asset	Power distribution	Points heating	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Low	3/minor	Low	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD173	Asset	Power distribution	Points heating	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD174	Asset	Power distribution	Points heating	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD175	Asset	Power distribution	Integrated protection and control	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	6/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD176	Asset	Power distribution	Points heating	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD177	Asset	Power distribution	Asset walkway lighting	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	4/moderate	2/minor	Structures are designed to withstand current weather extremes	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD178	Asset	Power distribution	Asset walkway lighting	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Structures are designed to withstand current weather extremes	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD179	Asset	Power distribution	Asset walkway lighting	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	1/minor	Medium	1/minor	Medium	1/minor	1/minor	Asset is generally capable of withstanding current range of temperatures	1/minor	2/minor	Low	1/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD18	Asset	Power distribution	LV autorecloser	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD180	Asset	Power distribution	Asset walkway lighting	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	3/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	4/moderate	Low	2/minor	4/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD181	Asset	Power distribution	Asset walkway lighting	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD182	Asset	Power distribution	Asset walkway lighting	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD183	Asset	Power distribution	Asset walkway lighting	High soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Structures are designed to withstand current conditions	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD184	Asset	Power distribution	Asset walkway lighting	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD185	Asset	Power distribution	Asset walkway lighting	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD186	Asset	Power distribution	Integrated protection and control	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD187	Asset	Power distribution	Asset walkway lighting	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	3/minor	Medium	3/minor	3/minor	Current asset condition known, mitigations generally effective	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD188	Asset	Power distribution	Asset walkway lighting	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD189	Asset	Power distribution	Asset walkway lighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD19	Asset	Power distribution	LV autorecloser	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	4/moderate	4/moderate	Asset is generally capable of withstanding current range of temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD190	Asset	Power distribution	Asset walkway lighting	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is exposed	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD191	Asset	Power distribution	Asset walkway lighting	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning			
PD192	Asset	Power distribution	CCTV crossing lighting	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	4/moderate	Medium	6/moderate	2/minor	Structures are designed to withstand current weather extremes	4/moderate	2/minor	Low	4/moderate	2/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD193	Asset	Power distribution	CCTV crossing lighting	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	4/moderate	Medium	6/moderate	4/moderate	Structures are designed to withstand current weather extremes	4/moderate	2/minor	Low	4/moderate	2/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD194	Asset	Power distribution	CCTV crossing lighting	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	4/moderate	4/moderate	Asset is generally capable of withstanding current range of temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD195	Asset	Power distribution	CCTV crossing lighting	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action.	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD196	Asset	Power distribution	CCTV crossing lighting	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD197	Asset	Power distribution	CCTV crossing lighting	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	3/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD198	Asset	Power distribution	CCTV crossing lighting	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD199	Asset	Power distribution	CCTV crossing lighting	High soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current conditions	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD20	Asset	Power distribution	LV autorecloser	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
PD200	Asset	Power distribution	CCTV crossing lighting	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	4/moderate	Medium	4/moderate	Medium	4/moderate	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
PD201	Asset	Power distribution	CCTV crossing lighting	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				

P0202	Asset	Power distribution	CCTV crossing lighting	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current asset condition known, mitigations generally effective	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0203	Asset	Power distribution	CCTV crossing lighting	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	4/moderate	Low	6/moderate	Low	4/moderate	6/moderate	Unlikely but can have devastating effects	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0204	Asset	Power distribution	CCTV crossing lighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	4/moderate	High	6/moderate	High	4/moderate	6/moderate	More likely than a direct strike, but far easier to repair	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0205	Asset	Power distribution	CCTV crossing lighting	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is exposed	4/moderate	Medium	4/moderate	Medium	4/moderate	2/minor	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0206	Asset	Power distribution	CCTV crossing lighting	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning	Risks to infrastructure services from river, surface water and groundwater flooding		
P0207	Asset	Power distribution	Crossing, escape, junction & siding lighting	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	3/minor	Medium	4/moderate	2/minor	Structures are designed to withstand current weather extremes	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0208	Asset	Power distribution	AC power supply conditioning	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0209	Asset	Power distribution	Integrated protection and control	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0211	Asset	Power distribution	LV autorecloser	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	6/moderate	Low	6/moderate	6/moderate	Unlikely but can have devastating effects	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity.	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0210	Asset	Power distribution	Crossing, escape, junction & siding lighting	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Structures are designed to withstand current weather extremes	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0211	Asset	Power distribution	Crossing, escape, junction & siding lighting	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	1/minor	Medium	1/minor	Medium	1/minor	1/minor	Asset is generally capable of withstanding current range of temperatures	1/minor	2/minor	Low	1/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0212	Asset	Power distribution	Crossing, escape, junction & siding lighting	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	4/moderate	Low	2/minor	4/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0213	Asset	Power distribution	Crossing, escape, junction & siding lighting	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0214	Asset	Power distribution	Crossing, escape, junction & siding lighting	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0215	Asset	Power distribution	Crossing, escape, junction & siding lighting	High soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	3/minor	Medium	2/minor	2/minor	Structures are designed to withstand current conditions	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0216	Asset	Power distribution	Crossing, escape, junction & siding lighting	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0217	Asset	Power distribution	Crossing, escape, junction & siding lighting	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition.	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0218	Asset	Power distribution	Crossing, electrification and Junction lighting/ floodlights and signage	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition.	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	3/minor	Medium	3/minor	3/minor	Current asset condition known, mitigations generally effective	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0219	Asset	Power distribution	Crossing lighting	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition.	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P022	Asset	Power distribution	LV autorecloser	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	8/moderate	High	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0220	Asset	Power distribution	Integrated protection and control	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition.	This is a risk across the country although the risk will be higher in areas with more thunderstorms	8/moderate	Low	8/moderate	Low	8/moderate	8/moderate	Unlikely but can have devastating effects	8/moderate	8/moderate	Low	8/moderate	8/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0221	Asset	Power distribution	Crossing lighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition.	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0222	Asset	Power distribution	Crossing, escape, junction & siding lighting	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition.	This is a risk across the country, particularly in areas where the asset is exposed	2/minor	Medium	2/minor	Medium	4/moderate	2/minor	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0223	Asset	Power distribution	Crossing, escape, junction & siding lighting	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition.	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning		
P0224	Asset	Power distribution	Electrification signage lighting	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition.	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	4/moderate	2/minor	Structures are designed to withstand current weather extremes	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0225	Asset	Power distribution	Electrification signage lighting	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Structures are designed to withstand current weather extremes	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0226	Asset	Power distribution	Electrification signage lighting	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	1/minor	Medium	1/minor	Medium	1/minor	1/minor	Asset is generally capable of withstanding current range of temperatures	1/minor	2/minor	Low	1/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0227	Asset	Power distribution	Electrification signage lighting	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	4/moderate	Low	2/minor	4/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0228	Asset	Power distribution	Electrification signage lighting	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0229	Asset	Power distribution	Electrification signage lighting	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P023	Asset	Power Distribution	Auxiliary transformer	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	6/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0230	Asset	Power distribution	Electrification signage lighting	High soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Structures are designed to withstand current conditions	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0231	Asset	Power distribution	Integrated protection and control	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	8/moderate	High	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0232	Asset	Power distribution	Electrification signage lighting	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0233	Asset	Power distribution	Electrification signage lighting	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0234	Asset	Power distribution	Electrification signage lighting	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0235	Asset	Power distribution	Electrification signage lighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0236	Asset	Power distribution	Electrification signage lighting	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is exposed	2/minor	Medium	2/minor	Medium	4/moderate	2/minor	Structures are designed to withstand current weather extremes	2/minor	3/minor	Medium	2/minor	3/minor	Medium	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0237	Asset	Power distribution	Electrification signage lighting	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from coastal flooding and erosion	Risk to transport from high and low temperatures, high winds, lightning		
P0238	Asset	Power distribution	LVAC changeover panel	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0239	Asset	Power distribution	Escape lighting	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P024	Asset	Power distribution	LV cables/ switchgear	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0240	Asset	Power distribution	Escape lighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0241	Asset	Power distribution	LVAC changeover panel	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0242	Asset	Power distribution	LVAC changeover panel	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	low	2/minor	2/minor	low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0243	Asset	Power distribution	Junction lighting	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0244	Asset	Power distribution	Junction lighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0245	Asset	Power distribution	Navigation lighting	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	4/moderate	Medium	6/moderate	2/minor	Structures are designed to withstand current weather extremes	4/moderate	2/minor	Low	4/moderate	2/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0246	Asset	Power distribution	Navigation lighting	Snow/Ice	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	4/moderate	2/minor	Low	4/moderate	2/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0247	Asset	Power distribution	Navigation lighting	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	1/minor	2/minor	Low	1/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0248	Asset	Power distribution	Navigation lighting	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	4/moderate	Low	2/minor	4/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0249	Asset	Power distribution	Navigation lighting	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P025	Asset	Power distribution	LV cables	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0250	Asset	Power distribution	LVAC changeover panel	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	8/moderate	High	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0251	Asset	Power distribution	Navigation lighting	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	4/moderate	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0252	Asset	Power distribution	Navigation lighting	High soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current conditions	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			

P0253	Asset	Power distribution	Navigation lighting	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	4/moderate	Medium	6/moderate	Medium	4/moderate	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0254	Asset	Power distribution	Navigation lighting	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	4/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0255	Asset	Power distribution	Navigation lighting	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	4/moderate	Medium	6/moderate	Medium	4/moderate	6/moderate	Current asset condition known, mitigations generally effective	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0256	Asset	Power distribution	Navigation lighting	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	4/moderate	Low	6/moderate	Low	4/moderate	6/moderate	Unlikely but can have devastating effects	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0257	Asset	Power distribution	Navigation lighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	4/moderate	High	6/moderate	High	4/moderate	6/moderate	More likely than a direct strike, but far easier to repair	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0258	Asset	Power distribution	Navigation lighting	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is exposed	4/moderate	Medium	6/moderate	Medium	6/moderate	2/minor	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0259	Asset	Power distribution	Navigation lighting	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Structures are designed to withstand current weather extremes	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning		
P026	Asset	Power distribution	LV cables	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0260	Asset	Power distribution	Route floodlighting	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	4/moderate	2/minor	Structures are designed to withstand current weather extremes	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0261	Asset	Power distribution	HV cable route	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0262	Asset	Power distribution	Route floodlighting	Snow/Ice	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Structures are designed to withstand current weather extremes	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0263	Asset	Power distribution	Route floodlighting	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	1/minor	Medium	1/minor	Medium	1/minor	1/minor	Asset is generally capable of withstanding current range of temperatures	1/minor	1/minor	Low	1/minor	1/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0264	Asset	Power distribution	Route floodlighting	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	4/moderate	Low	2/minor	4/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0265	Asset	Power distribution	Route floodlighting	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0266	Asset	Power distribution	Route floodlighting	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0267	Asset	Power distribution	Route floodlighting	High soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Structures are designed to withstand current conditions	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0268	Asset	Power distribution	Route floodlighting	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0269	Asset	Power distribution	Route floodlighting	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	6/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P027	Asset	Power distribution	LV cables	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	4/moderate	4/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0270	Asset	Power distribution	Route floodlighting	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0271	Asset	Power distribution	HV cable route	Long hot, dry summer	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Low	4/moderate	Low	2/minor	6/moderate	Mitigations designed into overall electrical system	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0272	Asset	Power distribution	Route floodlighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0273	Asset	Power distribution	Route floodlighting	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is exposed	2/minor	Medium	2/minor	Medium	4/moderate	2/minor	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0274	Asset	Power distribution	Route floodlighting	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning		
P0275	Asset	Power distribution	HV cable route	Long wet winter/spring	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	3/minor	Low	6/moderate	Low	4/moderate	4/moderate	Mitigations designed into overall electrical system	3/minor	6/moderate	Low	3/minor	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0276	Asset	Power distribution	Siding lighting	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	6/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0277	Asset	Power distribution	Siding lighting	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	6/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0278	Asset	Power distribution	Siding lighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0279	Asset	Power distribution	Tunnel heating equipment	High average rainfall over several days	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Low	4/moderate	Low	4/moderate	4/moderate	Event unlikely, current controls mostly effective	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P028	Asset	Power distribution	LV cables	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is incorporated into earthworks	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current mitigations generally effective	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0280	Asset	Power distribution	Tunnel heating equipment	High average rainfall over season	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Low	***3/minor***	Low	***3/minor***	***2/minor***	Event unlikely, current controls mostly effective	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0281	Asset	Power distribution	Tunnel heating equipment	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0282	Asset	Power distribution	AC power supply conditioning	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the severity will be location specific depending on rainfall patterns	4/moderate	High	6/moderate	High	4/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0283	Asset	Power distribution	HV cable route	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Event unlikely, current controls mostly effective	3/minor	4/moderate	Low	3/minor	4/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0284	Asset	Power distribution	Tunnel heating equipment	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0285	Asset	Power distribution	Tunnel lighting	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	4/moderate	2/minor	Current controls are mostly effective	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0286	Asset	Power distribution	Tunnel lighting	High average rainfall over several days	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Low	4/moderate	Low	4/moderate	4/moderate	Event unlikely, current controls mostly effective	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0287	Asset	Power distribution	Tunnel lighting	High average rainfall over season	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Low	***3/minor***	Low	***2/minor***	***2/minor***	Event unlikely, current controls mostly effective	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0288	Asset	Power distribution	Tunnel lighting	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0289	Asset	Power distribution	Tunnel lighting	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	2/minor	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P029	Asset	Power distribution	LV cables	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	4/moderate	Low	6/moderate	Low	4/moderate	6/moderate	Unlikely but can have devastating effects	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0290	Asset	Power distribution	Train shore supplies - 3 phase 400V AC and single phase 850V AC (Excl. 750 V DC supplies)	Snow	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	2/minor	Shore supplies generally used in non-operational times and places	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0291	Asset	Power distribution	Train shore supplies - 3 phase 400V AC and single phase 850V AC (Excl. 750 V DC supplies)	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	4/moderate	2/minor	Shore supplies generally used in non-operational times and places	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0292	Asset	Power distribution	Train shore supplies - 3 phase 400V AC and single phase 850V AC (Excl. 750 V DC supplies)	Snow/Ice	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Shore supplies generally used in non-operational times and places	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0293	Asset	Power distribution	Train shore supplies - 3 phase 400V AC and single phase 850V AC (Excl. 750 V DC supplies)	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0294	Asset	Power distribution	HV cable route	High average rainfall over several days	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current controls mostly effective	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0295	Asset	Power distribution	Train shore supplies - 3 phase 400V AC and single phase 850V AC (Excl. 750 V DC supplies)	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Shore supplies generally used in non-operational times and places	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0296	Asset	Power distribution	Train shore supplies - 3 phase 400V AC and single phase 850V AC (Excl. 750 V DC supplies)	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0297	Asset	Power distribution	Train shore supplies - 3 phase 400V AC and single phase 850V AC (Excl. 750 V DC supplies)	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0298	Asset	Power distribution	Train shore supplies - 3 phase 400V AC and single phase 850V AC (Excl. 750 V DC supplies)	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	Medium	4/moderate	Medium	2/minor	2/minor	Shore supplies generally used in non-operational times and places	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0299	Asset	Power distribution	Shore supplies (line side)	Snow	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	2/minor	Shore supplies generally used in non-operational times and places	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P030	Asset	Power distribution	LV cables	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	4/moderate	High	6/moderate	High	4/moderate	6/moderate	More likely than a direct strike, but far easier to repair	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0300	Asset	Power distribution	Shore supplies (line side)	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	4/moderate	2/minor	Shore supplies generally used in non-operational times and places	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0301	Asset	Power distribution	Shore supplies (line side)	Snow/Ice	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition.	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Shore supplies generally used in non-operational times and places	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0302	Asset	Power distribution	Shore supplies (line side)	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition.	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0303	Asset	Power distribution	Shore supplies (line side)	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Shore supplies generally used in non-operational times and places	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			

P0304	Asset	Power distribution	Shore supplies (line side)	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0305	Asset	Power distribution	HV cable route	High average rainfall over season	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	***3/minor***	Medium	***2/minor***	***2/minor***	Current controls mostly effective	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0306	Asset	Power distribution	Shore supplies (line side)	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0307	Asset	Power distribution	Shore supplies (line side)	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	Medium	4/moderate	Medium	2/minor	2/minor	Shore supplies generally used in non-operational times and places	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0308	Asset	Power distribution	HV cable route/ HV URX/UTX	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0309	Asset	Power distribution	HV/LV and 3rd rail cables and earth bonds	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is incorporated into earthworks	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Mitigations designed into overall electrical system	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P031	Asset	Power distribution	LV switchgear	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	6/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0310	Asset	Power distribution	HV URX/UTX	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0311	Asset	Power distribution	HV URX/UTX	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	1/minor	Medium	6/moderate	Medium	4/moderate	4/moderate	Event unlikely, current controls mostly effective	1/minor	2/minor	Low	1/minor	2/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0312	Asset	Power distribution	HV URX/UTX	High average rainfall over several days	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current controls mostly effective	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0313	Asset	Power distribution	HV URX/UTX	High average rainfall over season	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	***3/minor***	Medium	***2/minor***	***2/minor***	Current controls mostly effective	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0314	Asset	Power distribution	AC power supply conditioning	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	6/moderate	Low	6/moderate	6/moderate	Unlikely but can have devastating effects	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0315	Asset	Power distribution	SCADA (all)	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	9/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0316	Asset	Power distribution	SCADA (all)	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0317	Asset	Power distribution	SCADA (all)	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0318	Asset	Power distribution	SCADA (all)	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	6/moderate	Low	2/minor	2/minor	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0319	Asset	Power distribution	SCADA (all)	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	6/moderate	High	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P032	Asset	Power distribution	LV switchgear	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	4/moderate	4/moderate	Asset is generally capable of withstanding current range of temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0320	Asset	Power distribution	DC grid supply point/Functional Supply Point	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current National Grid trends continue	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0321	Asset	Power distribution	DC grid supply point	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0322	Asset	Power distribution	DC grid supply point	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0323	Asset	Power distribution	DC grid supply point	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0324	Asset	Power distribution	DC grid supply point	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	8/moderate	Low	10/major	Low	8/moderate	10/major	Unlikely but can have devastating effects	8/moderate	8/moderate	Low	8/moderate	8/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0325	Asset	Power distribution	AC power supply conditioning	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	High	6/moderate	High	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0326	Asset	Power distribution	DC grid supply point	Lightning	Interdependency (as on them)	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a National Grid dependency across the country	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Unlikely. Mitigations generally effective, where applied	9/moderate	12/major	Low	9/moderate	12/major	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0327	Asset	Power distribution	3rd Rail DC switchgear & disconnectors	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	9/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0328	Asset	Power distribution	3rd Rail DC/ HV switchgear	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0329	Asset	Power distribution	3rd Rail DC switchgear & disconnectors	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P033	Asset	Power distribution	Auxiliary transformer	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0330	Asset	Power distribution	3rd rail DC switchgear & disconnectors	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	8/moderate	Low	10/major	Low	8/moderate	10/major	Unlikely but can have devastating effects	8/moderate	8/moderate	low	8/moderate	8/moderate	low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0331	Asset	Power distribution	3rd rail DC switchgear & disconnectors	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	6/moderate	High	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0332	Asset	Power distribution	3rd rail DC switchgear & disconnectors	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0333	Asset	Power distribution	3rd rail HV cables, transformer/ rectifier	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	9/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0334	Asset	Power distribution	HV power system protection	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0335	Asset	Power distribution	3rd rail HV cables, transformer/ rectifier	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0336	Asset	Power distribution	3rd rail HV cables	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0337	Asset	Power distribution	3rd rail HV cables	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0338	Asset	Power distribution	3rd rail HV cables	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	8/moderate	Low	10/major	Low	8/moderate	10/major	Unlikely but can have devastating effects	8/moderate	8/moderate	low	8/moderate	8/moderate	low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0339	Asset	Power distribution	3rd rail HV cables	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	8/moderate	High	6/moderate	8/moderate	More likely than a direct strike, but far easier to repair	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P034	Asset	Power distribution	LV switchgear	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0340	Asset	Power distribution	3rd rail DC switchgear & disconnectors	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	9/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	6/moderate	low	6/moderate	6/moderate	low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0341	Asset	Power distribution	3rd rail HV switchgear	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	9/moderate	low	6/moderate	9/moderate	low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0342	Asset	Power distribution	3rd rail HV switchgear	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	low	2/minor	4/moderate	low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0343	Asset	Power distribution	3rd rail HV switchgear & transformer/ rectifier	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0344	Asset	Power distribution	HV power system protection	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0345	Asset	Power distribution	3rd rail HV switchgear	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	8/moderate	Low	10/major	Low	8/moderate	10/major	Unlikely but can have devastating effects	8/moderate	8/moderate	Low	8/moderate	8/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0346	Asset	Power distribution	3rd rail HV switchgear	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	6/moderate	High	6/moderate	8/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0347	Asset	Power distribution	3rd rail HV cables, transformer/ rectifier	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0348	Asset	Power distribution	3rd rail transformer/ rectifier	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0349	Asset	Power distribution	3rd rail transformer/ rectifier	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	8/moderate	Low	10/major	Low	8/moderate	10/major	Unlikely but can have devastating effects	8/moderate	8/moderate	Low	8/moderate	8/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P035	Asset	Power distribution	LV switchgear	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	8/moderate	Low	6/moderate	8/moderate	Unlikely but can have devastating effects	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0350	Asset	Power distribution	3rd rail transformer/ rectifier	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	6/moderate	High	6/moderate	8/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0351	Asset	Power distribution	Conductor rail heating	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Low	2/minor	Low	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0352	Asset	Power distribution	Conductor rail heating	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	High	4/moderate	High	4/moderate	4/moderate	Current typical flood levels are known and accounted for	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
P0353	Asset	Power distribution	HV power system protection	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	8/moderate	Low	6/moderate	8/moderate	Unlikely but can have devastating effects	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				
P0354	Asset	Power distribution	Conductor rail heating	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	4/moderate	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning				

P0355	Asset	Power distribution	Conductor rail heating	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	3/minor	High	6/moderate	High	3/minor	6/moderate	More likely than a direct strike, but far easier to repair	3/minor	6/moderate	Medium	3/minor	6/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0356	Asset	Power distribution	Earthing/bonding	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	3/minor	Medium	3/minor	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	3/minor	3/minor	Low	3/minor	3/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0357	Asset	Power distribution	Earthing/bonding	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	3/minor	Medium	3/minor	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	3/minor	3/minor	Low	3/minor	3/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0358	Asset	Power distribution	Earthing/bonding	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0359	Asset	Power distribution	Earthing/bonding	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	3/minor	Low	3/minor	Low	3/minor	4/moderate	This issue often goes undetected	3/minor	6/moderate	Low	3/minor	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0036	Asset	Power distribution	LV switchgear	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	6/moderate	High	6/moderate	8/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0360	Asset	Power distribution	Changeover panels	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0361	Asset	Power distribution	Changeover panels	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0362	Asset	Power distribution	Changeover panels	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	4/moderate	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0037	Asset	Power distribution	Non-traction HV switchgear	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0038	Asset	Power distribution	Non traction HV switchgear	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0039	Asset	Power distribution	Non traction HV switchgear	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	3/minor	Low	3/minor	Low	3/minor	3/minor	Asset is generally capable of withstanding current range of temperatures	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0040	Asset	Power distribution	Non traction HV switchgear	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0041	Asset	Power distribution	Non traction HV switchgear	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	8/moderate	Low	4/moderate	8/moderate	Unlikely but can have devastating effects	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming general increase in storm frequency and severity.	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0042	Asset	Power distribution	Non traction HV switchgear	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	Medium	8/moderate	Medium	6/moderate	8/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0043	Asset	Power distribution	Principal supply points	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0044	Asset	Power distribution	Auxiliary transformer	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0045	Asset	Power distribution	Principal supply points	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0046	Asset	Power distribution	Principal supply points	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	3/minor	Medium	3/minor	Medium	3/minor	3/minor	Asset is generally capable of withstanding current range of temperatures	3/minor	6/moderate	Low	3/minor	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0047	Asset	Power distribution	Principal supply points	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	3/minor	Low	3/minor	Low	3/minor	4/moderate	This issue often goes undetected	3/minor	6/moderate	Low	3/minor	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0048	Asset	Power distribution	Principal supply points	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0049	Asset	Power distribution	Principal supply points	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	3/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Current asset condition known, mitigations generally effective	3/minor	6/moderate	Low	3/minor	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0050	Asset	Power distribution	Principal supply points	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	8/moderate	Low	6/moderate	8/moderate	Unlikely but can have devastating effects	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0051	Asset	Power distribution	Principal supply points	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	8/moderate	High	6/moderate	8/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0052	Asset	Power distribution	Principal supply points	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is exposed	6/moderate	Medium	6/moderate	Medium	8/moderate	4/moderate	Structures are designed to withstand current weather extremes	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0053	Asset	Power distribution	Principal supply points	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Structures are designed to withstand current weather extremes	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning	Risks to infrastructure services from river, surface water and groundwater flooding		
P0054	Asset	Power distribution	Remote monitoring interfaces (plant)	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0055	Asset	Power distribution	Auxiliary transformer	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	6/moderate	Low	8/moderate	Low	6/moderate	8/moderate	Unlikely but can have devastating effects	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0056	Asset	Power distribution	Remote monitoring interfaces (plant)	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0057	Asset	Power distribution	Remote monitoring interfaces (plant)	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0058	Asset	Power distribution	Remote monitoring interfaces (plant)	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	4/moderate	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0059	Asset	Power distribution	Remote monitoring interfaces (plant)	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	4/moderate	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0060	Asset	Power distribution	Solar and wind trackside power supply	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0061	Asset	Power distribution	Solar and wind trackside power supply	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0062	Asset	Power distribution	Solar and wind trackside power supply	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0063	Asset	Power distribution	Solar and wind trackside power supply	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current asset condition known, mitigations generally effective	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action.	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0064	Asset	Power distribution	Solar and wind trackside power supply	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	4/moderate	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0065	Asset	Power distribution	Solar and wind trackside power supply	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	4/moderate	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0066	Asset	Power distribution	Auxiliary transformer	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	6/moderate	High	6/moderate	High	6/moderate	6/moderate	More likely than a direct strike, but far easier to repair	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0067	Asset	Power distribution	Solar and wind trackside power supply	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning		
P0068	Asset	Power distribution	Standby generators (fixed position)	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0069	Asset	Power distribution	Standby generators (fixed position)	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0070	Asset	Power distribution	Standby generators (fixed position)	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0071	Asset	Power distribution	Standby generators (fixed position)	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0072	Asset	Power distribution	UPS integrated into distribution system	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Low	6/moderate	Low	4/moderate	8/moderate	Current controls mostly effective, further controls in development	8/moderate	10/major	Low	8/moderate	10/major	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0073	Asset	Power distribution	UPS integrated into distribution system	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current controls mostly effective, further controls in development	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0074	Asset	Power distribution	UPS integrated into distribution system	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	3/minor	Medium	3/minor	Medium	3/minor	3/minor	Current controls are mostly effective, new controls in development	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0075	Asset	Power distribution	UPS integrated into distribution system	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	High	6/moderate	High	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0076	Asset	Power distribution	UPS integrated into distribution system	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	4/moderate	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0077	Asset	Power distribution	Battery & charger	Extreme hot temperatures	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Low	6/moderate	Low	4/moderate	8/moderate	Current controls mostly effective, further controls in development	8/moderate	10/major	Low	8/moderate	10/major	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0078	Asset	Power distribution	UPS integrated into distribution system	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	High	4/moderate	High	2/minor	4/moderate	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Medium	2/minor	3/minor	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0079	Asset	Power distribution	Cable: signalling cable >120V	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	3/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0080	Asset	Power distribution	Cables: signalling cable >120V; 1500V DC and HV cables	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	2/minor	6/moderate	Current asset condition is known and generally capable of withstanding current range of high temperatures	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0081	Asset	Power distribution	Cable: signalling cable >120V	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Asset is generally capable of withstanding current range of temperatures	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
P0082	Asset	Power distribution	Cables: signalling cable >120V; 1500V DC and HV cables	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
P0083	Asset	Power distribution	Cables: signalling cable >120V; 1500V DC and HV cables	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is incorporated into earthworks	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current mitigations generally effective	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			

PD84	Asset	Power distribution	Cable: signalling cable >120V	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	4/moderate	Low	6/moderate	Low	4/moderate	6/moderate	Unlikely but can have devastating effects	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PD85	Asset	Power distribution	Cable: signalling cable >120V	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	4/moderate	High	6/moderate	High	4/moderate	6/moderate	More likely than a direct strike, but far easier to repair	4/moderate	6/moderate	Medium	4/moderate	6/moderate	Medium	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PD86	Asset	Power distribution	Lighting support structure	Ice/Hail	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	4/moderate	Medium	6/moderate	2/minor	Structures are designed to withstand current weather extremes	4/moderate	2/minor	Low	4/moderate	2/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PD87	Asset	Power distribution	Lighting support structure	Snow/Ice	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Structures are designed to withstand current weather extremes	2/minor	1/minor	Low	2/minor	1/minor	Low	Assuming current extreme lows persist	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PD88	Asset	Power distribution	Battery & charger	Heat wave	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	6/moderate	Medium	6/moderate	Medium	8/moderate	8/moderate	Current controls mostly effective, further controls in development	8/moderate	10/major	Medium	8/moderate	10/major	Medium	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PD89	Asset	Power distribution	Lighting support structure	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	3/minor	Medium	2/minor	2/minor	Structures are designed to withstand current weather extremes	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PD90	Asset	Power distribution	Lighting support structure	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	4/moderate	Low	2/minor	4/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to transport networks from slope and embankment failure	Risk to transport from high and low temperatures, high winds, lightning				
PD91	Asset	Power distribution	Lighting support structure	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	3/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	3/minor	6/moderate	Low	3/minor	6/moderate	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding					
PD92	Asset	Power distribution	Lighting support structure	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding					
PD93	Asset	Power distribution	Lighting support structure	High soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding					
PD94	Asset	Power distribution	Lighting support structure	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV and RAM	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	3/minor	Medium	2/minor	4/moderate	Structures are designed to withstand current weather extremes	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PD95	Asset	Power distribution	Lighting support structure	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the North West and areas where rainfall levels will be higher	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current typical flood levels are known and accounted for	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current drainage strategies persist	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding					
PD96	Asset	Power distribution	Lighting support structure	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country, particularly in areas where the asset is on earthworks	2/minor	Medium	3/minor	Medium	3/minor	3/minor	Current asset condition known, mitigations generally effective	2/minor	3/minor	Low	2/minor	3/minor	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding					
PD97	Asset	Power distribution	Lighting support structure	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country although the risk will be higher in areas with more thunderstorms	2/minor	Low	4/moderate	Low	2/minor	4/moderate	Unlikely but can have devastating effects	2/minor	2/minor	Low	2/minor	2/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PD98	Asset	Power distribution	Lighting support structure	Lightning	Indirect	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	This is a risk across the country	2/minor	Medium	4/moderate	Medium	2/minor	4/moderate	More likely than a direct strike, but far easier to repair	2/minor	3/minor	Low	2/minor	3/minor	Low	Assuming general increase in storm frequency and severity	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PD99	Asset	Power distribution	Battery & charger	Large diurnal temperature range	Cumulative	Wales & Western	Wales & Western	Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	There is a risk across the country although the risk will be higher in the South East and areas where the temperature will be higher	4/moderate	Medium	6/moderate	Medium	4/moderate	4/moderate	Current controls are mostly effective, new controls in development	4/moderate	6/moderate	Low	4/moderate	6/moderate	Low	Assuming current manufacturing techniques and materials	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT1 -26	N/A	Plant - other	Plant weather and climate change risks have been referenced from a wider risk assessment from this Asset Function. Risks PTL1 - 26 have not been included in this table as they refer to non-asset related risks			Wales & Western	Wales & Western		RAM Plant																	No Variation							
PLT27	Asset	Plant - other	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Long wet winter/spring	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	N/A	Selection of risk do not affect plant because they are either built to cope or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Selection of risk does not affect plant because they are either built to cope, or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Plant fit for purpose and able to work in selected conditions if supported activity goes ahead	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding					
PLT28	Asset	Plant - other	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Light rain/drizzle	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	N/A	Selection of risk do not affect plant because they are either built to cope or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Selection of risk does not affect plant because they are either built to cope, or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Plant fit for purpose and able to work in selected conditions if supported activity goes ahead	No Variation						
PLT29	Asset	Plant - other	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	High average rainfall over several days	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	N/A	Selection of risk do not affect plant because they are either built to cope or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Selection of risk does not affect plant because they are either built to cope, or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Plant fit for purpose and able to work in selected conditions if supported activity goes ahead	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding					
PLT30	Asset	Plant - other	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	High average rainfall over season	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	N/A	Selection of risk do not affect plant because they are either built to cope or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Selection of risk does not affect plant because they are either built to cope, or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Plant fit for purpose and able to work in selected conditions if supported activity goes ahead	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding					
PLT31	Asset	Plant - other	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Low average rainfall	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	N/A	Selection of risk do not affect plant because they are either built to cope or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Selection of risk does not affect plant because they are either built to cope, or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Plant fit for purpose and able to work in selected conditions if supported activity goes ahead	No Variation						
PLT32	Asset	Plant - other	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Low soil moisture	Indirect	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	N/A	Selection of risk do not affect plant because they are either built to cope or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Selection of risk does not affect plant because they are either built to cope, or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Plant fit for purpose and able to work in selected conditions if supported activity goes ahead	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT33	Asset	Plant - other	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Erosion	Indirect	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	N/A	Selection of risk do not affect plant because they are either built to cope or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Selection of risk does not affect plant because they are either built to cope, or the activity which they support would be cancelled independent of plant fitness for purpose (plant assumed to be fit)	N/A	N/A	N/A	N/A	N/A	N/A	Plant fit for purpose and able to work in selected conditions if supported activity goes ahead	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding					
PLT34	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Engine overheat limit specific to engine type; fire prevention requirements set in standard	- Hazard is specifically mentioned in clause 1.5.6 Fire of Machinery Directive 2006/42/EC - Clause 5.30 Fire prevention in RIS-1530-PLT issue 6 - Rail Industry Standard for Technical Requirements for On-Track Plant and their associated Equipment and Trolleys - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery - Fire prevention specifically covered in: (1) BS EN 15746-2:2010+A1:2011 - Railway applications - Track - Road rail machines and their associated equipment - Part 2: General Safety requirements (2) BS EN 15954-2:2013 - Railway applications - Track - Trailers and associated equipment. General safety requirements (3) BS EN 15955-2:2013 - Railway applications. Tracks Demountable machines and associated equipment. General safety requirements	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Hazard is specifically covered in standards	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Track more likely to be affected before machine breakdown occurs	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT35	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Engine overheat limit specific to engine type; fire prevention requirements set in standard	- Hazard is specifically mentioned in clause 1.5.6 Fire of Machinery Directive 2006/42/EC - Clause 5.30 Fire prevention in RIS-1530-PLT issue 6 - Rail Industry Standard for Technical Requirements for On-Track Plant and their associated Equipment and Trolleys - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery - Fire prevention specifically covered in: (1) BS EN 15746-2:2010+A1:2011 - Railway applications - Track - Road rail machines and their associated equipment - Part 2: General Safety requirements (2) BS EN 15954-2:2013 - Railway applications - Track - Trailers and associated equipment. General safety requirements (3) BS EN 15955-2:2013 - Railway applications. Tracks Demountable machines and associated equipment. General safety requirements	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Hazard is specifically covered in standards	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Track more likely to be affected before machine breakdown occurs	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT36	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Engine overheat limit specific to engine type; fire prevention requirements set in standard	- Hazard is specifically mentioned in clause 1.5.6 Fire of Machinery Directive 2006/42/EC - Clause 5.30 Fire prevention in RIS-1530-PLT issue 6 - Rail Industry Standard for Technical Requirements for On-Track Plant and their associated Equipment and Trolleys. - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery. - Fire prevention specifically covered in: (1) BS EN 15746-2:2010+A1:2011 - Railway applications - Track - Road rail machines and their associated equipment - Part 2: General Safety requirements. (2) BS EN 15954-2:2013 - Railway applications - Track - Trailers and associated equipment. General safety requirements. (3) BS EN 15955-2:2013 - Railway applications. Tracks. Demountable machines and associated equipment. General safety requirements	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Hazard is specifically covered in standards	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Track more likely to be affected before machine breakdown occurs	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT37	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Engine overheat limit specific to engine type; fire prevention requirements set in standard	- Hazard is specifically mentioned in clause 1.5.6 Fire of Machinery Directive 2006/42/EC - Clause 5.30 Fire prevention in RIS-1530-PLT issue 6 - Rail Industry Standard for Technical Requirements for On-Track Plant and their associated Equipment and Trolleys. - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery. - Fire prevention specifically covered in: (1) BS EN 15746-2:2010+A1:2011 - Railway applications - Track - Road rail machines and their associated equipment - Part 2: General Safety requirements. (2) BS EN 15954-2:2013 - Railway applications - Track - Trailers and associated equipment. General safety requirements. (3) BS EN 15955-2:2013 - Railway applications. Tracks. Demountable machines and associated equipment. General safety requirements	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Hazard is specifically covered in standards	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Track more likely to be affected before machine breakdown occurs	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT38	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		None	Decision threshold criteria does not apply, diurnal temperature range is already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes	2/minor	Medium	3/minor	Medium	2/minor	4/moderate	Operational & Storage thermal duty cycle already forms part of specification writing process	2/minor	2/minor	Medium	2/minor	2/minor	Medium	1) Plant Asset Manager monitors component failure trends and increase in volume of consumables 2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate 3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs.	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT39	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		None	Decision threshold criteria does not apply, diurnal temperature range is already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Operational & Storage thermal duty cycle already forms part of specification writing process	2/minor	2/minor	Medium	2/minor	2/minor	Medium	1) Plant Asset Manager monitors component failure trends and increase in volume of consumables 2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate 3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs.	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT40	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		None	Decision threshold criteria does not apply, diurnal temperature range is already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Operational & Storage thermal duty cycle already forms part of specification writing process	2/minor	2/minor	Medium	2/minor	2/minor	Medium	1) Plant Asset Manager monitors component failure trends and increase in volume of consumables 2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate 3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs.	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT41	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		None	Decision threshold criteria does not apply, diurnal temperature range is already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Operational & Storage thermal duty cycle already forms part of specification writing process	2/minor	2/minor	Medium	2/minor	2/minor	Medium	1) Plant Asset Manager monitors component failure trends and increase in volume of consumables 2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate 3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs.	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT42	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		None	Decision threshold criteria does not apply, diurnal temperature range is already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Operational & Storage thermal duty cycle already forms part of specification writing process	2/minor	2/minor	Medium	2/minor	2/minor	Medium	1) Plant Asset Manager monitors component failure trends and increase in volume of consumables 2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate 3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs.	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT43	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Lightning warning	- Hazard is specifically mentioned in clause 1.5.16 Lightning of Machinery Directive 2006/42/EC - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery. - Hazard not covered in: (1) BS EN 15746-2:2010+A1:2011 - Railway applications - Track - Road rail machines and their associated equipment - Part 2: General Safety requirements (2) BS EN 15954-2:2013 - Railway applications - Track - Trailers and associated equipment. General safety requirements. (3) BS EN 15955-2:2013 - Railway applications. Tracks Demountable machines and associated equipment. General safety requirements (4) BS EN 13977:2011 - Railway applications. Track. Safety requirements for portable machines and trolleys for construction and maintenance	3/minor	Medium	4/moderate	Medium	3/minor	4/moderate	Reliance on plant converter/ manufacturer and supplier to have devised an engineering means to address lightning	3/minor	3/minor	Low	3/minor	3/minor	Low	1)The frequency of this risk changes based on regions and season 2) Network Rail Shift planning process includes consideration of extreme weather condition. Therefore mobile plant is unlikely to be working because safety concern for operators should lead to shift cancellation (3) If discovered and deemed practical, means of making plant lightning proof will lead to amendment of NR shift planning process	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT44	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Wind speed	Hazard is specifically covered for MEWPs in BS EN 280: 2013+A1:2015 (Mobile Elevated working platforms, design calculations, stability criteria, construction, safety, examinations and tests) 28mph (12.5m/s) - BS 7121(Code of practice for safe use of cranes) Manbaskets windspeed exceeding 25mph (11.5m/s) - Mobile Cranes normally 31mph (13.5m/s) - Duty charts should specify from each manufacturer	4/moderate	Medium	6/moderate	Medium	4/moderate	2/minor	There is an existing stablished process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure Mobile or On-Track Plant MEWPs normally work alone and are more susceptible to wind loading unlike OTMs which are normally permanently couple to other non-MEWP in working mode	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Modest wind speed increase does not require increase in current working wind speed limit	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT45	Asset	On-track - plant & mobile plant	Road rail vehicle, demountable machines, trailers, trolleys, attachments with 2 or more rail wheels non-rail mobile plant	Storms	Interdependency (them on us)	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Storm warning	On track plant can work in storms but may not be able to because of risk of railway furniture striking the workfore(a track issue). It is especially unsafe when lifting or transporting assets	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	There is an existing stablished process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Track WRCCA has addressed the risk of storms	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning				
PLT46	Asset	On-track - machines - all	Tampers & regulators, mobile maintenance train, stone blowers, rail grinders, overhead condition renewal fleet, HOPS, breakdown cranes, high output fleet, snow fleet, rail head treatment train, snow & ice treatment train	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Engine overheat limit specific to engine type; fire prevention requirements set in standard	- Hazard is specifically mentioned in clause 1.5.6 Fire of Machinery Directive 2006/42/EC - Hazard is not covered in RIS-1702-PLT Issue 2 (Rail Industry Standard for the Design of On-Track Machines in Travelling and Working Mode.) but is covered in referenced BS EN 14033 -2-2017 (Railway application - Track - Railbound construction and maintenance machine Part 2.) - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Hazard is specifically covered in standards	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Based on current machine designs that are international, machinery is assumed to cope with the projected changes in UK.	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT47	Asset	On-track - machines - all	Tampers & regulators, mobile maintenance train, stone blowers, rail grinders, overhead condition renewal fleet, HOPS, breakdown cranes, high output fleet, snow fleet, rail head treatment train, snow & ice treatment train	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Engine overheat limit specific to engine type; fire prevention requirements set in standard	- Hazard is specifically mentioned in clause 1.5.6 Fire of Machinery Directive 2006/42/EC - Hazard is not covered in RIS-1702-PLT Issue 2 (Rail Industry Standard for the Design of On-Track Machines in Travelling and Working Mode.) but is covered in referenced BS EN 14033 -2-2017 (Railway application - Track - Railbound construction and maintenance machine Part 2.) - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Hazard is specifically covered in standards	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Based on current machine designs that are international, machinery is assumed to cope with the projected changes in UK.	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT48	Asset	On-track - machines - all	Tampers & regulators, mobile maintenance train, stone blowers, rail grinders, overhead condition renewal fleet, HOPS, breakdown cranes, high output fleet, snow fleet, rail head treatment train, snow & ice treatment train	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Engine overheat limit specific to engine type; fire prevention requirements set in standard	- Hazard is specifically mentioned in clause 1.5.6 Fire of Machinery Directive 2006/42/EC - Hazard is not covered in RIS-1702-PLT Issue 2 (Rail Industry Standard for the Design of On-Track Machines in Travelling and Working Mode.) but is covered in referenced BS EN 14033 -2-2017 (Railway application - Track - Railbound construction and maintenance machine Part 2.) - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Hazard is specifically covered in standards	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Based on current machine designs that are international, machinery is assumed to cope with the projected changes in UK.	No Variation	Risk to transport from high and low temperatures, high winds, lightning					
PLT49	Asset	On-track - machines - all	Tampers & regulators, mobile maintenance train, stone blowers, rail grinders, overhead condition renewal fleet, HOPS, breakdown cranes, high output fleet, snow fleet, rail head treatment train, snow & ice treatment train	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Engine overheat limit specific to engine type; fire prevention requirements set in standard	- Hazard is specifically mentioned in clause 1.5.6 Fire of Machinery Directive 2006/42/EC - Hazard is not covered in RIS-1702-PLT Issue 2 (Rail Industry Standard for the Design of On-Track Machines in Travelling and Working Mode.) but is covered in referenced BS EN 14033 -2-2017 (Railway application - Track - Railbound construction and maintenance machine Part 2.) - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Hazard is specifically covered in standards	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Based on current machine designs that are international, machinery is assumed to cope with the projected changes in UK.	No Variation	Risk to transport from high and low temperatures, high winds, lightning					

PLT50	Asset	On-track - machines - all	Tampers & regulators, mobile maintenance train, stone blowers, rail grinders, overhead condition renewal fleet, HOPS, breakdown cranes, high output fleet, snow fleet, rail head treatment train, snow & ice treatment train	Storms	Interdependency (them on us)	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Storm Warning	On-track machinery can not work in storms because of risk of railway furniture striking the workforce. It is especially unsafe when lifting or transporting assets	1/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	There is an existing stablished process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure	1/minor	1/minor	Medium	1/minor	1/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Track WRCCA has addressed the risk of storms	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning		
PLT51	Asset	On-track - machines - all	Tampers & regulators, mobile maintenance train, stone blowers, rail grinders, overhead condition renewal fleet, HOPS, breakdown cranes, high output fleet, snow fleet, rail head treatment train, snow & ice treatment train	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Lightning warning	- Hazard is specifically mentioned in clause 1.5.16 Lightning of Machinery Directive 2006/42/EC - Hazard is not covered in BS EN ISO 474-1-2006+A6-2019. Earth moving machinery - Hazard not covered in RIS-1702-PLT Issue 2(Rail Industry Standard for the Design of On-Track Machines in Travelling and Working Mode.) or referenced BS EN 14033-2-2017 - Railway application - Track - Railbound construction and maintenance machine Part 2	3/minor	Low	4/moderate	Low	3/minor	4/moderate	Reliance on plant converter/manufacturer and supplier to have devised an engineering means to address lightning	3/minor	3/minor	Low	3/minor	3/minor	Low	(1)The frequency of this risk changes based on regions and season (2) Network Rail Shift planning process includes consideration of extreme weather condition. Therefore mobile plant is unlikely to be working because safety concern for operators should lead to shift cancellation (3) If discovered and deemed practical, means of making plant lightening proof will lead to amendment of NR shift planning process	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT52	Asset	On-track - machines - track treatment	Stone blowers	Flooding	Interdependency (them on us)	Wales & Western	Wales & Western	Professional Head of Track & Region		Flood Warning	Not a machine specific hazard	1/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	There is an established process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Track WRCCA has addressed the risk of flooding in order to allow Stone blowers to work	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
PLT53	Asset	On-track - machines - track treatment	Rail grinders	Extreme hot temperatures	Interdependency (us on them)	Wales & Western	Wales & Western	Plant Asset Manager & Asset Operator		None	Risk of ignition depends on state of vegetation and level of pollution on the infrastructure within the vicinity of grind spark generated	2/minor	Medium		Medium	2/minor	4/moderate	This is an existing risk and mitigation has proven to be adequate. Creation of hot by product is inherent to this process and the grinder fleet are all already heavily guarded to prevent sparks igniting lineside vegetation and assets	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Plant Asset Manager keeps fire suppression system fit for purpose	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT54	Asset	On-track - machines - track treatment	Rail grinders	Heat wave	Interdependency (us on them)	Wales & Western	Wales & Western	Plant Asset Manager & Asset Operator		None	Risk of ignition depends on state of vegetation and level of pollution on the infrastructure within the vicinity of grind spark generated	2/minor	Medium		Medium	2/minor	4/moderate	This is an existing risk and mitigation has proven to be adequate. Creation of hot by product is inherent to this process and the grinder fleet are all already heavily guarded to prevent sparks igniting lineside vegetation and assets	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Plant Asset Manager keeps fire suppression system fit for purpose	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT55	Asset	On-track - machines - track treatment	Rail grinders	Long hot, dry summer	Interdependency (us on them)	Wales & Western	Wales & Western	Plant Asset Manager & Asset Operator		None	Risk of ignition depends on state of vegetation and level of pollution on the infrastructure within the vicinity of grind spark generated	2/minor	Medium		Medium	2/minor	4/moderate	This is an existing risk and mitigation has proven to be adequate. Creation of hot by product is inherent to this process and the grinder fleet are all already heavily guarded to prevent sparks igniting lineside vegetation and assets	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Plant Asset Manager keeps fire suppression system fit for purpose	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT56	Asset	On-track - machines - track treatment	Rail grinders	Higher average temperature	Interdependency (us on them)	Wales & Western	Wales & Western	Plant Asset Manager & Asset Operator		None	Risk of ignition depends on state of vegetation and level of pollution on the infrastructure within the vicinity of grind spark generated	2/minor	Medium		Medium	2/minor	4/moderate	This is an existing risk and mitigation has proven to be adequate. Creation of hot by product is inherent to this process and the grinder fleet are all already heavily guarded to prevent sparks igniting lineside vegetation and assets	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Plant Asset Manager keeps fire suppression system fit for purpose	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT57	Asset	On-track - machines - renewals	Overhead Condition Renewal Fleet	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Plant and RAM		Wind speed	Hazard is specifically covered for MEWPs in BS EN 280: 2013+A1:2015 (Mobile Elevated working platforms, design calculations. stability criteria. construction. safety. examinations and tests). 28mph (12.5m/s) - BS 7121(Code of practice for safe use of cranes) Manbaskets windspeed exceeding 25mph (11.5m/s) - Mobile Cranes normally 31mph (13.5m/s) - Duty charts should specify from each manufacturer	1/minor	Medium		Medium	2/minor	1/minor	There is an existing stablished process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure OTMs are less susceptible to effects of wind because they are normally permanently coupled with another vehicle in working mode. This is unlike Mobile or On-Track Plant MEWPs which normally alone	1/minor	1/minor	Medium	1/minor	1/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Modest wind speed increase does not required increase in current working wind speed limit unless specifically requested by NR frontline of Principal Contractors	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT58	Asset	On-track - machines - renewals	HOPS	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Plant and RAM		Wind speed	Hazard is specifically covered for MEWPs in BS EN 280: 2013+A1:2015 (Mobile Elevated working platforms, design calculations. stability criteria. construction. safety. examinations and tests). 28mph (12.5m/s) - BS 7121(Code of practice for safe use of cranes) Manbaskets windspeed exceeding 25mph (11.5m/s) - Mobile Cranes normally 31mph (13.5m/s) - Duty charts should specify from each manufacturer	1/minor	Medium		Medium	2/minor	1/minor	There is an existing stablished process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure OTMs are less susceptible to effects of wind because they are normally permanently coupled with another vehicle in working mode. This is unlike Mobile or On-Track Plant MEWPs which normally alone	1/minor	1/minor	Medium	1/minor	1/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Modest wind speed increase does not required increase in current working wind speed limit unless specifically requested by NR frontline of Principal Contractors	No Variation	Risks to subterranean and surface infrastructure from subsidence			
PLT59	Asset	On-track - machines - seasonal & incident	Breakdown cranes	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Plant and RAM		Wind speed	Hazard is specifically covered for MEWPs in BS EN 280: 2013+A1:2015 (Mobile Elevated working platforms, design calculations. stability criteria. construction. safety. examinations and tests). 28mph (12.5m/s) - BS 7121(Code of practice for safe use of cranes) Manbaskets windspeed exceeding 25mph (11.5m/s) - Mobile Cranes normally 31mph (13.5m/s) - Duty charts should specify from each manufacturer	1/minor	Medium		Medium	2/minor	1/minor	There is an existing stablished process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure OTMs are less susceptible to effects of wind because they are normally permanently coupled with another vehicle in working mode. This is unlike Mobile or On-Track Plant MEWPs which normally alone	1/minor	1/minor	Medium	1/minor	1/minor	Medium	Network Rail procedure adhered to and improved as part of overall climate change and sustainability programmes Modest wind speed increase does not required increase in current working wind speed limit unless specifically requested by NR frontline of Principal Contractors	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT60	Asset	On-track - machines - seasonal & incident	Snow fleet	Snow	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Predicted Snow fall rate	Snow Fleet have a minimum and maximum working limit. Risk is operational	2/minor	Medium		Medium	4/moderate	2/minor	There is an established process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Network Rail Shift planning process includes consideration of extreme weather condition. Therefore plant is likely to be working because fleet will be strategically distributed and tactically operated during times of heavy snowfall	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT61	Asset	On-track - machines - seasonal & incident	Snow & ice treatment train	Snow/ice	Indirect	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Predicted Snow fall rate and ice formation	Snow Fleet have a minimum and maximum working limit. Risk is operational	2/minor	Medium		Medium	2/minor	2/minor	There is an established process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Network Rail Shift planning process includes consideration of extreme weather condition. Therefore plant is likely to be working because fleet will be strategically distributed and tactically operated during times of heavy snowfall	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT62	Asset	Plant - portable/transportable	Generators, powered hand tools, lighting rigs, track jacks	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager		Engine overheat limit specific to engine type; fire prevention requirements set in standard	- Hazard is specifically mentioned in clause 1.5.6 Fire of Machinery Directive 2006/42/EC - Hazard is not covered in RIS-1701-PLT Issue 2 - Rail Industry Standard for the Design of On-Track Machines in Travelling and Working Mode - Hazard is not covered in BS EN 13977:2011 - Railway applications. Track. Safety requirements for portable machines and trolleys for construction and maintenance	1/minor	Medium		Medium	1/minor	2/minor	Hazard is specifically covered in legislation only	1/minor	1/minor	Medium	1/minor	1/minor	Medium	Machine Operator stores plant equipment correctly and refuels engine driven equipment correctly	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT63	Asset	Plant - portable/transportable	Generators, powered hand tools, lighting rigs, track jacks	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	None	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium		Medium	1/minor	4/moderate	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables. (2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT64	Asset	Plant - portable/transportable	Generators, powered hand tools, lighting rigs, track jacks	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	None	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium		Medium	1/minor	2/minor	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables. (2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT65	Asset	Plant - portable/transportable	Generators, powered hand tools, lighting rigs, track jacks	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	None	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium		Medium	1/minor	4/moderate	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables. (2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT66	Asset	Plant - portable/transportable	Generators, powered hand tools, lighting rigs, track jacks	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	None	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium		Medium	1/minor	1/minor	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables. (2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT67	Asset	Plant - depot	Anti-freeze systems, carriage washing machines, cranes, fuelling system, jacks, turntables, bogie/wheel drop, underframe cleaning system, depot protection, interceptors, shore supplies, wheel lathe and shunter	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	None	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium		Medium	1/minor	2/minor	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables. (2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT68	Asset	Plant - depot	Anti-freeze systems, carriage washing machines, cranes, fuelling system, jacks, turntables, bogie/wheel drop, underframe cleaning system, depot protection, interceptors, shore supplies, wheel lathe and shunter	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	None	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium		Medium	1/minor	2/minor	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables (2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT69	Asset	Plant - depot	Anti-freeze systems, carriage washing machines, cranes, fuelling system, jacks, turntables, bogie/wheel drop, underframe cleaning system, depot protection, interceptors, shore supplies, wheel lathe and shunter	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	None	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium		Medium	1/minor	4/moderate	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables (2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT70	Asset	Plant - depot	Anti-freeze systems, carriage washing machines, cranes, fuelling system, jacks, turntables, bogie/wheel drop, underframe cleaning system, depot protection, interceptors, shore supplies, wheel lathe and shunter	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	None	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium		Medium	1/minor	1/minor	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables (2) Plant Supplier hires machine that is fit for purpose and reflects increased cost in hire rate (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT71	Asset	Plant - depot	Anti-freeze systems	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	Weather Warning	Hazard is not specifically mentioned in Machinery Directive 2006/42/EC	2/Minor	Medium		Medium	2/Minor	2/Minor	Reliance on plant converter/manufacturer and supplier to have devised an engineering means to address hazard	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Operational parameters enables effective operation and would therefore would be able to cope with future reduced snowfall and ice build-up	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT72	Asset	Plant - depot	Carriage washing machines	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	Min -20 degrees C	Hazard is not specifically mentioned in Machinery Directive 2006/42/EC Hazard is specifically covered in Section 4.7 Water Storage and supply of NR/L2/RVE/0130, Design and Installation of Carriage Washing Machines	1/Minor	Medium		Medium	1/Minor	1/Minor	Reliance on plant converter/manufacturer and supplier to have devised an engineering means to address hazard	1/minor	1/minor	Medium	1/minor	1/minor	Medium	That plant suppliers will provide machines that address the hazard That incidences of snow/ice are projected to reduce	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT73	Asset	Plant - depot	Carriage washing machines	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	Weather Warning	- Hazard is specifically mentioned in clause 1.5.16 Lightning of Machinery Directive 2006/42/EC	2/minor	Medium		Medium	2/minor	4/moderate	Reliance on plant converter/manufacturer and supplier to have devised an engineering means to address lightning	2/minor	2/minor	Medium	2/minor	2/minor	Medium	Carriage Washer adequately earthed	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT74	Asset	Plant - depot	Underframe cleaning system, shore supplies; wheel lathes and shunters	Flooding	Interdependency (them on us)	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	Weather Warning	Building integrity compromised	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	There is an established process for avoiding this scenario also used for shift planning. Increase chance of implementation because of broader coverage of procedure	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	That current process is able to cope with the projected changes in rainfall	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
PLT75	Asset	Plant - depot	Gas storage	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	Weather Warning	- Hazard is specifically mentioned in clause 1.5.16 Lightning of Machinery Directive 2006/42/EC	3/minor	Low	4/moderate	Low	3/minor	4/moderate	Reliance on plant converter/manufacturer and supplier to have devised an engineering means to address lightning	3/minor	3/minor	Low	3/minor	3/minor	Low	Gas storage installed in facility which is lighting proof	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT76	Asset	Plant - fixed	Moving bridges	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	Weather Warning	Hazard is specifically mentioned in clause 1.5.16 Lightning of Machinery Directive 2006/42/EC	3/minor	Low	4/moderate	Low	3/minor	4/moderate	Reliance on plant converter/manufacturer and supplier to have devised an engineering means to address lightning	3/minor	3/minor	Low	3/minor	3/minor	Low	Gas storage installed in facility which is lighting proof	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT77	Asset	Plant - fixed	Gas point Heaters, hydraulic buffers, moving bridge	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	Weather Warning	Hazard is not specifically mentioned in Machinery Directive 2006/42/EC	3/minor	Low	2/minor	Low	3/minor	3/minor	Reliance on plant converter/manufacturer and supplier to have devised an engineering means to address hazard	3/minor	3/minor	Medium	3/minor	3/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables. (2) Project Manager and Project Engineer procure machine that is fit for purpose (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT78	Asset	Plant - fixed	Gas point Heaters, hydraulic buffers, moving bridge	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Asset Manager	RAM Plant	Weather Warning	Hazard is not specifically mentioned in Machinery Directive 2006/42/EC	3/minor	Low	2/minor	Low	3/minor	3/minor	Reliance on plant converter/manufacturer and supplier to have devised an engineering means to address hazard	3/minor	3/minor	Medium	3/minor	3/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables. (2) Project Manager and Project Engineer procure machine that is fit for purpose (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT79	Asset	Plant - fixed	Gas point heaters, gas storage, pumps, hydraulic buffers, tunnel ventilation fans, moving bridge	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Buildings/ Structural Asset Manager	RAM Plant	Weather Warning	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium	1/minor	Medium	1/minor	2/minor	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables (2) Project Manager and Project Engineer procure machine that is fit for purpose (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT80	Asset	Plant - fixed	Gas point heaters, gas storage, pumps, hydraulic buffers, tunnel ventilation fans, moving bridge	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Buildings/ Structural Asset Manager	RAM Plant	Weather Warning	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium	1/minor	Medium	1/minor	2/minor	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables. (2) Project Manager and Project Engineer procure machine that is fit for purpose (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT81	Asset	Plant - fixed	Gas point heaters, gas storage, pumps, hydraulic buffers, tunnel ventilation fans, moving bridge	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Buildings/ Structural Asset Manager	RAM Plant	Weather Warning	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium	1/minor	Medium	1/minor	4/moderate	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables (2) Project Manager and Project Engineer procure machine that is fit for purpose (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
PLT82	Asset	Plant - fixed	Gas point heaters, gas storage, pumps, hydraulic buffers, tunnel ventilation fans, moving bridge	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Plant & Buildings/ Structural Asset Manager	RAM Plant	Weather Warning	Decision threshold criteria does not apply, these factors are already considered as part of the design, A larger range will simply shorten plant asset lifespan and require more frequent replacement unless asset management strategy changes. In addition these machines are not made only for the UK but also for countries with higher temperature such as Italy, North America and North Africa	1/minor	Medium	2/minor	Medium	1/minor	1/minor	Operational & storage thermal duty cycle already forms part of specification writing process	1/minor	1/minor	Medium	1/minor	1/minor	Medium	(1) Plant Asset Manager monitors component failure trends and increase in volume of consumables. (2) Project Manager and Project Engineer procure machine that is fit for purpose (3) Plant Asset Manager and Supplier has set up availability, reliability and early warning indicator KPIs	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG1	Asset	Signalling	Interlocking	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired interlocking or component failure	Equipment located in passive location cases at risk of overheating, particularly where sun hats are not used and orientation gives the worst solar gain	6/moderate	Medium	2/minor	Medium	4/moderate	8/moderate	Historic evidence has shown SSI and PSU failures are higher during hot days	6/moderate	N/A	Medium	6/moderate	N/A	Medium	Assuming NR follow the current long term deployment plan	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG10	Asset	Signalling	Signals	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	Signals should fail right side however LED signals are more susceptible to failure wrong side if hit by lightning	2/minor	Medium	4/moderate	Medium	2/minor	4/moderate	Random failure and somewhat infrequent. LED signals more prone to failure Previous signal and route knowledge mitigate against a major event. If a signal is put back to danger (out of sequence signal) then there is potential for a major event however extremely unlikely (incredible)	4/moderate	N/A	Medium	4/moderate	N/A	Medium	Assuming NR follow the current long term deployment plan. IP rating of product is specified to meet IP67 (submerged) so not envisaged to be a big problem. This is assuming our SICA assessments pick up any degrading/degraded ground mounted units	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG11	Asset	Signalling	Signals	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	As the population ages the frequency of signal post failure increases	6/moderate	Medium	1/minor	Medium	8/moderate	4/moderate	Aging signal posts are difficult to assess and predict how much life remains. Potential WSF exists if the signal falls over maintaining its proving (Driver misses a yellow and arrives at a red at line speed)	6/moderate	N/A	Medium	6/moderate	N/A	Medium	Assuming NR follow the current long term deployment plan	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG12	Asset	Signalling	Location case	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	This phenomena is generally seen around Spring and Autumn	4/moderate	Medium	1/minor	Medium	4/moderate	4/moderate	Some equipment housed within location case are not protected against dripping water. This is a bigger problem for enclosures with little heat dissipation inside	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Assuming NR follow the current long term deployment plan The environmental knowledge is not lost from the product acceptance teams	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG13	Asset	Signalling	Location case	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Signalling	RAM Signalling	Life expired or product failure	Equipment that was previously resilient may start to cause problems	4/moderate	Medium	1/minor	Medium	4/moderate	6/moderate	Dry soil = higher impedance resulting in less transients being dissipated to earth	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Local sources of EMI will not dramatically increase	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG14	Asset	Signalling	Location case	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	Equipment designed to BR 967 was designed for a maximum ambient of 60DegC. More modern equipment is designed to 70DegC. We have datalogger information showing temperatures up to 75DegC already on particularly hot days	9/moderate	High	1/minor	High	4/moderate	10/major	This could be our biggest problem and something we already suffer significant delay minutes from	12/major	12/major	High	12/major	12/major	High	Location cases do not have any form of active/passive cooling	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG15	Asset	Signalling	Location case	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	Equipment designed to BR 967 was designed for a maximum ambient of 60DegC. More modern equipment is designed to 70DegC. We have datalogger information showing temperatures up to 75DegC already on particularly hot days	9/moderate	High	1/minor	High	6/moderate	10/major	Equipment in use today is often being used at its limit on hot days	12/major	12/major	High	12/major	12/major	High	Location cases do not have any form of active/passive cooling	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG16	Asset	Signalling	Lineside signalling cable	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Signalling	RAM Signalling	Life expired or product failure	Ground movement often stretches cable leading to potential breakages	6/moderate	Medium	1/minor	Medium	9/moderate	9/moderate	Trains may not be running due to a track defect rather than signalling fault. Also not all landslides lead to a signalling cabling issue	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Assuming this is not made worse by local building/water runoff	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG17	Asset	Signalling	Lineside signalling cable	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	degraded cables can let in water leading to low impedance between cores and earth	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Generally not a problem with new cable however rodent impact cable or UV effected cable can give a problem	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	Assuming NR follow the current long term deployment plan we will have less cabling for rodents to attack	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG18	Asset	Signalling	AWS	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Local flooding of the track will prompt a limit of train movements (either a speed restriction or line closed)	This will be most prevalent in low lying areas, coastal areas or areas with poor drainage	3/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Saturation of cabling and components requires testing after flooding, replacement depends on damage and results of test	6/moderate	N/A	Low	6/moderate	N/A	Low	Risk scores and narrative based on 'no additional adaption' - long term plan is to replace AWS with ETCS ETCS fitment will reduce number of TCs significantly in 2050 and completely by 2080	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG19	Asset	Signalling	TPWS	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Speed restrictions are enforced during high temperatures	On extreme hot days speed reductions limits the risk caused by a failed TPWS system	6/moderate	Medium	2/Minor	Medium	4/moderate	8/moderate	Historic information shows TPWS is affected by high temperatures	6/moderate	N/A	Low	6/moderate	N/A	Low	Risk scores and narrative based on 'no additional adaption' - long term plan is to replace AWS with ETCS ETCS fitment will reduce number of TCs significantly in 2050 and completely by 2080	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG2	Asset	Signalling	Interlocking	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Signalling	RAM Signalling	Life expired interlocking or component failure	Equipment located in passive location cases at risk of overheating, particularly where sun hats are not used and orientation gives the worst solar gain	6/moderate	Medium	1/Minor	Medium	4/moderate	8/moderate	Historic evidence has shown SSI and PSU failures are higher during hot days	6/moderate	N/A	Medium	6/moderate	N/A	Medium	Assuming NR follow the current long term deployment plan	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG20	Asset	Signalling	TPWS	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Local flooding of the track will prompt a limit of train movements (either a speed restriction or line closed)	This will be most prevalent in low lying areas, coastal areas or areas with poor drainage	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Saturation of cabling and components requires testing after flooding, replacement depends on damage and results of test. Speed reduction limits the risk caused by a failed TPWS system	6/moderate	N/A	Low	6/moderate	N/A	Low	Risk scores and narrative based on 'no additional adaption' - long term plan is to replace AWS with ETCS ETCS fitment will reduce number of TCs significantly in 2050 and completely by 2080	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG21	Asset	Signalling	Track Circuit	Extreme hot temperatures	Indirect	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Speed restrictions are enforced during high temperatures Or in some cases the track circuit may fail before the track does. Subsequent repairs could necessitate a speed restriction until it is fixed	Risk across whole country although highest risk in area with the biggest temperature increase	6/moderate	Medium	8/moderate	Medium	4/moderate	8/moderate	This is a known issue	6/moderate	N/A	Low	6/moderate	N/A	Low	Risk scores and narrative based on 'no additional adaption' - long term plan is to replace AWS with ETCS ETCS fitment will reduce number of TCs significantly in 2050 and completely by 2080	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG22	Asset	Signalling	Track Circuit	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Speed restrictions are enforced during high temperatures. This statement is not true as the track circuit could fail before the track	Risk across whole country although highest risk in area with the biggest temperature increase	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Historic information shows electrical equipment associated from track circuits fails more during periods of hot weather	6/moderate	N/A	Low	6/moderate	N/A	Low	Risk scores and narrative based on 'no additional adaption' - long term plan is to replace AWS with ETCS ETCS fitment will reduce number of TCs significantly in 2050 and completely by 2080	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG23	Asset	Signalling	Track circuit	High average rainfall over several days	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Signaller may observe intermittent right-side failure i.e. Showing Occupied When Clear	Areas prone to wet ballast tend to be known	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Historic information shows wet ballast is any issue for track circuits	6/moderate	N/A	Low	6/moderate	N/A	Low	Long term plan to replace track circuits with axle counters or train based location systems ETCS fitment will reduce number of TCs significantly in 2050 and completely by 2080	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG24	Asset	Signalling	Track circuit	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Signaller may observe intermittent SOWC	This will be most prevalent in low lying areas, coastal areas or areas with poor or no drainage	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Saturation of cabling and components requires testing after flooding, replacement depends on damage and results of test	6/moderate	N/A	Low	6/moderate	N/A	Low	Long term plan to replace track circuits with axle counters or train based location systems ETCS fitment will reduce number of TCs significantly in 2050 and completely by 2080	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG25	Asset	Signalling	Track circuit	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Local flooding of the track will prompt a limit of train movements (either a speed restriction or line closed)	This will be most prevalent in low lying areas, coastal areas or areas with poor or no drainage	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Saturation of cabling and components requires testing after flooding, replacement depends on damage and results of test. Impedance bonds are labour intensive to replace If the track is flooded this will affect the operation of the track circuit anyway but it may take longer to recover	6/moderate	N/A	Low	6/moderate	N/A	Low	Long term plan to replace track circuits with axle counters or train based location systems ETCS fitment will reduce number of TCs significantly in 2050 and completely by 2080	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			

SIG26	Asset	Signalling	Track circuit	Storms	Indirect	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Leaf fall can provide an insulating layer between wheel and rail causing the track circuit to SCWO	Unable to map to climate variable. Leaf fall induced adhesion is a combination of weather events. The nearest category is storms as it includes rain, wind, however this only applies in Autumn	12/major	Medium	16/major	Medium	16/major	16/major	A well known problem with leaf fall caused by the combined effects of wind and rain	9/moderate	N/A	Low	9/moderate	N/A	Low	Assumed no change to current risk as effect of climate change on leaf fall is currently unknown ETCS fitment will reduce number of TCs significantly in 2050 and completely by 2080	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning		
SIG27	Asset	Signalling	Axle counter/treadle	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Local flooding of the track will prompt a limit of train movements (either a speed restriction or line closed)	This will be most prevalent in low lying areas, coastal areas or areas with poor drainage	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Saturation of cabling and components requires testing after flooding, replacement depends on damage and results of test	8/moderate	12/major	Low	8/moderate	12/major	Low	Aging of product does not disproportionately impact upon housing IP rating	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG28	Asset	Signalling	Axle counter/treadle	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Speed restrictions are enforced during high temperatures. This statement is not strictly true as the axle counter could fail before the track	Risk across whole country although highest risk in area with the biggest temperature increase	6/moderate	Medium	8/moderate	Medium	4/moderate	8/moderate	Historic information shows link between high temperatures and failure of axle counter/treadle equipment	8/moderate	12/major	Low	8/moderate	12/major	Low	Aging of product does not disproportionately impact upon housing IP rating	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG29	Asset	Signalling	Axle counter	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Local flooding of the track will prompt a limit of train movements (either a speed restriction or line closed)	This will be most prevalent in low lying areas, coastal areas or areas with poor drainage	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Saturation of cabling and components requires testing after flooding, replacement depends on damage and results of test. Sensitive electronic equipment is likely to be damaged by water ingress and require replacement	8/moderate	12/major	Low	8/moderate	12/major	Low	Aging of product does not disproportionately impact upon housing IP rating	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG3	Asset	Signalling	Interlocking	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired interlocking or component failure	Equipment housed within location cases and unprotected control rooms as risk	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Generally areas are known for flooding and location cases are elevated or moved elsewhere	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	Assuming we are unresponsive to the rising threat of flooding we are likely to see an increased risk due to an increase in frequency and severity of storms and rain	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG30	Asset	Signalling	ETCS-trackside	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired sub-systems or component failure	Equipment located in passive lineside equipment housings at risk of overheating, particularly where sun orientation gives the worst solar gain	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Excluding Cambrian this is relatively new technology. Failure considered likely in the event of failed aircon/cooling during extreme hot weather events	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	No overlay areas	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG31	Asset	Signalling	ETCS-trackside	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired equipment or component failure	Equipment housed within lineside cases and 4ft may be at risk	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Generally areas are known for flooding and lineside equipment cases are elevated or positioned elsewhere. Excluding Cambrian this is relatively new technology. Failure considered as likely in the event of extreme flood events	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	No overlay areas	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
SIG32	Asset	Signalling	ETCS-trackside	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired equipment or component failure	Equipment located in passive lineside equipment housings at risk. Very difficult and expensive to protect against a direct hit however local lightning strikes can be mitigated	6/moderate	Medium	8/moderate	Medium	6/moderate	8/moderate	Excluding Cambrian this is relatively new technology. Need to consider ETCS trackside sub systems may be centrally positioned in ROC centres	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	No overlay areas	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG4	Asset	Signalling	Interlocking	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired interlocking or component failure	Very difficult and expensive to protect against a direct hit however local lightning strikes can be mitigated	6/moderate	Medium	8/moderate	Medium	6/moderate	8/moderate	Lightning is currently infrequent in the UK however when a strike occurs near Signalling equipment we do see failures	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Electrical storms focused over key 'unprotected' areas statistically will increase causing asset failures. Equipment based within ROCs are unlikely to suffer due to the level of protection offered by the building and power supply	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG5	Asset	Signalling	Signals	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	Solar heating combined with an extreme ambient can lead to electronics being pushed beyond their operating parameters	4/moderate	High	4/moderate	High	3/minor	6/moderate	We do not see many signal failures due to heat, normally a weaker component in the chain fails before the signal. Aging LED signals will be more prone to this failure mode	4/moderate	N/A	High	4/moderate	N/A	High	Assuming NR follow the current long term deployment plan	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG6	Asset	Signalling	Signals	Snow	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	Greater risk for Northern areas and also LED signals do not heat the lens like a Halogen lamp	6/moderate	High	8/moderate	High	8/moderate	6/moderate	Occasionally we get signals covered in snow. This is more of a problem for alphanumeric than CLS	2/minor	N/A	Medium	2/minor	N/A	Medium	Assuming NR follow the current long term deployment plan	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
SIG7	Asset	Signalling	Signals	Light rain/drizzle	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	Route knowledge will act as a mitigation	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Short term event that the driver should be prepared for. Also the driver has route knowledge mitigating the risk	2/minor	N/A	Medium	2/minor	N/A	Medium	Assuming NR follow the current long term deployment plan	No Variation				
SIG8	Asset	Signalling	Signals	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Signalling	RAM Signalling	Life expired or product failure	Route knowledge will act as a mitigation	2/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	Short term event that the driver can prepare for. Also the driver has route knowledge mitigating the risk	2/minor	N/A	Medium	2/minor	N/A	Medium	Assuming NR follow the current long term deployment plan	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risk to transport from high and low temperatures, high winds, lightning		
SIG9	Asset	Signalling	Signals	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Signalling and RAM	RAM Signalling	Life expired or product failure	Trains are unlikely to be running if ground mounted signal are covered with water	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Trains are unlikely to be running if ground mounted signal are submerged	4/moderate	N/A	Medium	4/moderate	N/A	Medium	Assuming NR follow the current long term deployment plan. The environmental knowledge is not lost from the product acceptance teams	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
STR1	Asset	Structures	Coastal and estuarial protection	Storms	Direct	Wales & Western	Wales & Western	Professional Head of Structures and RAM	RAM Structures	Intervention based on Extreme Weather Plans determined by each route	Caused by storm surges, large waves and strong wind, they can elevate sea levels and cause large waves at the coastline. These large waves can overtop coastal defences and cause inundation, erosion, scour, loss of stability and structural damage	9/moderate	High	10/major	High	10/major	10/major	Based on past asset failures	16/major	20/severe	Medium	16/major	20/severe	Medium	Assume current funding remains for current management practices	No Variation	Risks to infrastructure services from coastal flooding and erosion			
STR2	Asset	Structures	Bridges, culverts and retaining walls	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Structures and RAM	RAM Structures	Intervention based on Extreme Weather Plans determined by each route	Bridge scour is the removal of sediment such as sand and gravel from round bridge abutments or piers. Scour, caused by swiftly moving water, can scoop out scour holes, compromising the integrity of a structure	9/moderate	High	10/major	High	10/major	10/major	Based on past asset failures	9/moderate	12/major	High	9/moderate	12/major	High	Assume current funding remains for current management practices	No Variation	Risks to bridges and pipelines from flooding and erosion			
STR3	Asset	Structures	Bridges, culverts and retaining walls	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Structures and RAM	RAM Structures	Intervention based on Extreme Weather Plans determined by each route	During a flood, a structure may be partially or entirely submerged by the flow and the subsequent loading of fluid and/or debris can cause structures to collapse. For existing structures, marker plates are installed and monitored during adverse weather events. For newer structures, the risks for uplift are considered in the design.	9/moderate	High	10/major	High	10/major	10/major	Based on past asset failures	12/major	12/major	Medium	12/major	12/major	Medium	That current management practices continue, but that Network Rail increase number of buoyancy assessments	No Variation	Risks to bridges and pipelines from flooding and erosion			
STR4	Asset	Structures	Bridges, culverts and retaining walls. Coastal and estuarial protection	Lightning	Direct	Wales & Western	Wales & Western	Professional Head of Structures and RAM	RAM Structures	No intervention threshold currently	There is currently no management system. One needs to be developed and either implemented by Professional Head of Structures or ownership by another Asset Function (e.g. E&P) must be agreed	6/moderate	Medium	8/moderate	Medium	6/moderate	8/moderate	The current risk is not significant with electrical insulation provided by other asset disciplines (Signalling and Electrification) to protect assets. No specific control however included in requirements for building/structures design documents. Risk for structures is low, but higher for other disciplines	6/moderate	8/moderate	Medium	6/moderate	8/moderate	Medium	The risk from metal structures is currently unmanaged within Structures discipline and may become worse under climate change projections	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
STR5	Asset	Structures	Bridges, culverts and retaining walls	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Structures and RAM	RAM Structures	Mainly through icicle formation in tunnels and weathering of material	On icicles, there is an established process of managing tunnel shafts and therefore risks are minimal. The rate of weathering is a function of exposure and material constituting the asset. This mainly impacts structures with concrete encasement of structures with soft bricks. The risks are managed as BAU through tapping surveys. There is no special requirement within policy to manage structures until such time they are rendered unserviceable. Bridges are most critical and routine structural assessments gauge the impact of weathering on the capability of assets. No further policy intervention is required	9/moderate	High	9/moderate	High	9/moderate	9/moderate	Based on past assets failures	9/moderate	6/moderate	High	9/moderate	6/moderate	High	No further action	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
STR6	Asset	Structures	Moving bridges	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Structures and RAM	RAM Structures	Intervention dictated by Structural Asset Management Plans	Most of the assets within this category are classed as 'major structures' for example swing bridges. Significant capital investment is required and in current control periods deemed unaffordable. A sustainable approach has been to identify routine maintenance activities to keep the asset functional. These do not meet all stakeholder requirements	6/moderate	Medium	6/moderate	Medium	4/moderate	6/moderate	Based on past asset failures	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	For major structures, these are covered in their own bespoke Asset Management Plans. For other structures, condition managed through route examination processes	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
STR7	Asset	Structures	Bridges, culverts and retaining walls	Erosion	Direct	Wales & Western	Wales & Western	Professional Head of Structures/ Professional Head of Geotechnical and RAM	RAM Structures	Risk consequence tools under development, triggers yet to be determined	Undermining of structure leading to loss of support and potentially fouling gauge. There is also the risk of loss of support of earthwork bearing track formation	9/moderate	Medium	10/major	Medium	10/major	10/major	Based on past assets failures	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Assume current funding remains for current management practices	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
T&RS1	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Erosion	Interdependency (them on us)	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	For operations of T&RS this will be based either on the trigger/threshold for the local civils teams based on the discovery of infrastructure that is at risk of slipping, or on the discovery of a landslip that has already occurred	There is a risk across the whole country of landslips following lengthy periods of rainfall	12/major	Medium	16/major	Medium	16/major	16/major	We have had past incidents relating to landslips (see Watford September 2016), but there is an expectation that this risk is already being managed by our Civils teams	12/major	16/major	Low	12/major	16/major	Low	We have low confidence in the risk rating but we have high confidence that the risk will increase in the absence of action	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
T&RS10	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of T&RS and RAM		Evidence of water damage to electrical systems	There is a risk across the country of this occurring	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Current asset is well known and there are maintenance procedures in place to replace seals, etc. to mitigate this hazard. As T&RS assets have a life of c.30 years, the effect on future assets in unknown	6/moderate	6/moderate	Low	6/moderate	6/moderate	Low	Assumption that current assets have been replaced by 2050, and that weather resilience has been considered as part of the procurement of new assets	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
T&RS11	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Series of failures of on board systems linked to clogging of filters	Greater risk of this occurring in Southern areas of the country where the temperatures historically are higher. Greatest risk in rural areas. Such failures have not been found on our fleets but have occurred on several diesel powered fleets	3/minor	Medium	3/minor	Medium	3/minor	4/moderate	Current asset is well known, as these failures have occurred on DMUs in recent years we are aware of the hazard and manage fleets accordingly	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	Assumption that current assets have been replaced by 2050, and that weather resilience has been considered as part of the procurement of new assets	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS12	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Series of vehicle shutdowns due to overheating	According to our fleet teams, the setting of temperature sensors in OTMs can be quite arbitrary (such as hottest day of year +10oC), with an increase in temperatures there will be a greater emphasis on cooling systems being able to cope with high temperatures. Greater risk of this occurring in Southern areas of the country where the temperatures historically are higher	3/minor	Low	3/minor	Low	2/minor	4/moderate	Point was raised as a risk with current fleet, no clear view on how this will be managed with future procurements. The current draft of the Key Trains Requirement (Rail Delivery Group owned, cross industry working group aiming to improve rail vehicle specifications) guidance document refers to the use of BS EN 50125-1:2014's temperature parameters as a general solution to setting operating temperature envelopes though it has been noted that just increasing the temperature envelope for equipment increases costs significantly	4/moderate	4/moderate	Low	4/moderate	4/moderate	Low	Increase of average temperatures and number of hot summer days offset by change in propulsion systems to meet decarbonisation targets & current work being done by the industry (see KTR) to set guidance for weather resilience	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS13	Asset	T&RS	On track machines	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Driver reports of reduced visibility whilst passing tamping activities	Hazard raised by SCO Fleet Engineering Management as a current hazard when tamping in hot, dry conditions	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Greatest risk perceived to be the lack of visibility of track workers involved in tamping operations of inability to read signals	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	No change in tamping methodology	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS14	Asset	T&RS	Rail vehicle - rolling stock	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Vehicle failures due to snow ingress into electrical equipment	Linked with Southern Scotland due it being at the greatest risk because of temperatures and number of operations, but credible for the entire country	2/minor	Medium	2/minor	Medium	2/minor	2/minor	Hazard is well known in vehicle design, so such a hazard is usually eliminated by design	3/minor	3/minor	High	3/minor	3/minor	High	No negative impact on resilience to snowfall in future rail vehicle designs for electrical equipment	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS15	Asset	T&RS	Rail vehicle - rolling stock	Flooding	Indirect	Wales & Western	Wales & Western	Professional Head of Geotechnical	RAM GLD	Evidence of localised flooding in stabling areas	Mainly linked to west coast areas or stabling areas on a flood plain due to either the amount of rain they see or due to the inherent risk of the stabling area flooding	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	We have had several flooding instances on the network flooding over the last few years so there is a perceivable risk of this occurring. The impact however would mainly be operational either the flooding would disable the vehicles (such as due to damage to the electrical systems) or operationally the vehicles will not be able to be moved if the water is above the rail head (see GE/RT 8000 - M3 iss.2)	6/moderate	8/moderate	High	6/moderate	8/moderate	High	No fundamental change in the operation of rail vehicles in flooded areas	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
T&RS16	Asset	T&RS	Rail vehicle - rolling stock	High winds	Direct	Wales & Western	Wales & Western	Professional Head of T&RS and RAM		Wind speeds reached that enforce reduced speed operation or stopping of services in extreme scenarios	Linked to areas that are exposed to high winds, so potentially more a risk for the West Coast of the country than the East Coast. Risk will be greatest where the area also has significant amounts of vegetation	4/moderate	Medium	4/moderate	Medium	8/moderate	2/minor	ARP risk selected due it best suiting the various potential scenarios. There is a possibility that a flying object could penetrate a part of the vehicle and cause fatalities but the greatest numbers of scenarios will cause minor damage to vehicles. Either way the ARP risk is consistent at the level in column M	6/moderate	8/moderate	Medium	6/moderate	8/moderate	Medium	Assumption that no further mitigation is put in place to mitigate these hazards	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS17	Asset	T&RS	Rail vehicle - rolling stock	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Reports of lineside fires due to grinding operations	Risk is prevalent in the South where temperatures are higher but hazard can be encountered across the country when there has been hot & dry weather	4/moderate	High	4/moderate	High	2/minor	6/moderate	Known hazard for grinding activities, common occurrence but generally limited damage to infrastructure	5/moderate	6/moderate	Medium	5/moderate	6/moderate	Medium	Assumption that no further mitigation is put in place to mitigate these hazards	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS18	Asset	T&RS	Rail vehicle - rolling stock	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Reports of frozen brakes on vehicles in winter months	Drier systems are not powerful enough on our MPV fleet to de-ice brake systems. Also a problem for Stone blowers. Risk prevalent in Scotland due to colder winters	3/minor	High	3/minor	High	3/minor	3/minor	Common issue, but consequences are very minor (i.e. no shifts have been lost due to it)	3/minor	2/minor	Medium	3/minor	2/minor	Medium	Assumption that no further mitigation is put in place to mitigate these hazards	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS19	Asset	T&RS	Rail vehicle - rolling stock	High winds	Indirect	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track, RAM and local maintenance teams	RAM GLD	Not really applicable to T&RS, the decision threshold here is more in relation to when lineside vegetation should be regarded as precarious and removed. The only T&RS element is the decision to run/not run trains based on recorded wind speeds	See 'decision threshold' column. For previous incidents involving Network Rail fleets, refer to RAIB report 01/2018 and Kingswood runaway from 2006	12/major	Medium	12/major	Medium	16/major	10/major	We have had two incidents in the last 13 years of MPVs running away due to brake releases, the Markinch episode being due to the train striking vegetation on the line. Unbraked, out of control vehicle could cause multiple fatalities (level crossings, track workers, etc)	12/major	12/major	Medium	12/major	12/major	Medium	Numbers of storms increases over the coming decades	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS2	Asset	T&RS	Rail vehicle - rolling stock	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Failure of unit due to build up of water in the pantograph well	History of this type of failure occurring in coastal locations, but possible to recreate a similar failure mode with high levels of rainfall	3/minor	High	4/moderate	High	4/moderate	4/moderate	Known hazard for some EMUs, no incidents of this type known to have occurred on 313121. Worth considering as this could be a hazard for fleets we bring in over the coming years	3/minor	6/moderate	High	3/minor	6/moderate	High	That rolling stock portfolio continues to contain units that carry the risk	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
T&RS20	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Series of failures linked to excessive operating temperature for traction motors	Greater risk of this occurring in Southern areas of the country where the temperatures historically are higher, increased risk for DC motors	2/minor	Medium	2/minor	Medium	2/minor	4/moderate	Expected to see a phasing out of vehicles with DC traction motors over the next few years, the level of reliability of AC motors of future vehicles in such conditions is unknown	2/minor	4/moderate	Low	2/minor	4/moderate	Low	Assumption based on current working practices not changing	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS3	Asset	T&RS	Rail vehicle - rolling stock	High winds	Direct	Wales & Western	Wales & Western	Professional Head of T&RS and RAM		Failure of unit due to build up of water in the pantograph well	History of this type of failure occurring in coastal locations with high waves	4/moderate	High	4/moderate	High	8/moderate	2/minor	Known hazard for some EMUs, no incidents of this type known to have occurred on 313121. Worth considering as this could be a hazard for fleets we bring in over the coming years	4/moderate	8/moderate	High	4/moderate	8/moderate	High	Current design does not change	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS4	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Extreme hot temperatures	Indirect	Wales & Western	Wales & Western	Professional Head of Track and RAM		Ambient temperature - decision to operate or operate with PSRs based on NR/L2/TRK/001 mod.14	There is a risk of track buckles over the entirety of the country above a certain ambient temperature	10/major	Medium	10/major	Medium	6/moderate	12/major	Consequence of such an event happening would be catastrophic, but the likelihood of the event happening at present is relatively low given the current risk mitigations in place. Risk increase in future due to ambient thresholds for track buckles being met more regularly	12/major	15/major	Medium	12/major	15/major	Medium	Assumption based on current working practices not changing	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS5	Asset	T&RS	Rail vehicle - rolling stock	Extreme hot temperatures	Indirect	Wales & Western	Wales & Western	Professional Head of Contact Systems		Ambient temperature above a defined threshold triggers the use of PSRs based on OLE standard	Increased risk of dewirements in high temperatures due to sag in contact wires	9/moderate	Medium	9/moderate	Medium	6/moderate	10/major	Current asset is known, but there is historic evidence of the hazard occurring in high temperatures	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Assumption based on current working practices not changing	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS6	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Series of failures linked to excessive operating temperature for traction motors	Greater risk of this occurring in Southern areas of the country where the temperatures historically are higher, increased risk for DC motors	4/moderate	Medium	4/moderate	Medium	2/minor	6/moderate	Expected to see a phasing out of vehicles with DC traction motors over the next few years, the level of reliability of AC motors of future vehicles in such conditions is unknown	1/minor	1/minor	Medium	1/minor	1/minor	Medium	Assumption based on current working practices not changing	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS7	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Series of failures linked to excessive operating temperature for diesel motors. Overheating alarm on vehicles	Greater risk of this occurring in Southern areas of the country where the temperatures historically are higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current asset is well known and capable of withstanding a large variety of temperatures	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Assumption that different operating parameters for operation are not selected for equipment (refer to BS EN 50125-1:2014 for the environmental condition classes for rolling stock)	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
T&RS8	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of T&RS and RAM		Series of failures linked to operation of electrical equipment in excessive operating temperatures	Greater risk of this occurring in Southern areas of the country where the temperatures historically are higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current asset is well known and capable of withstanding a large variety of temperatures	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Assumption that current assets have been replaced by 2050, and that weather resilience has been considered as part of the procurement of new assets	No Variation	Risks to subterranean and surface infrastructure from subsidence			
T&RS9	Asset	T&RS	Mobile plant, rail vehicle - rolling stock	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of T&RS		Series of hydraulic failures linked to operation in excessive operating temperatures	Greater risk of this occurring in Southern areas of the country where the temperatures historically are higher	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current asset is well known and capable of withstanding a large variety of temperatures	6/moderate	6/moderate	High	6/moderate	6/moderate	High	Assumption that current assets have been replaced by 2050, and that weather resilience has been considered as part of the procurement of new assets	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR1	Asset	Track	Track and S&C (jointed)	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rail temps exceeding 54 degrees C will require speed restrictions to control risk	Historic evidence of buckle trends shows that jointed track is more likely to buckle than CWR	9/moderate	High	9/moderate	High	6/moderate	8/moderate	Increase in track buckles as temperatures rise with a greater likelihood of buckling	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Jointed track is less resilient to heat beyond 38 degrees C air temp. Assuming that Routes have managed all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk for 2050 and 2080 will increase further	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR10	Asset	Track	CWR	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rail Temps exceed 56 resulting in speed restrictions to control risk	Deterioration of track quality as a result of inability to undertake routine maintenance activities. Also increased risk of staff fatigue and risk of being struck by trains whilst undertaking hot weather patrolling duties	9/moderate	High	9/moderate	High	6/moderate	10/major	Failures will increase due to impact of not being able to deliver work during this period	9/moderate	12/major	High	9/moderate	12/major	High	Maintenance work routinely undertaken during summer is restricted above 32 degrees C. Extended periods of hot and dry weather will affect ability to carry out maintenance resulting in track quality deterioration	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR11	Asset	Track	S&C	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	S&C on timber layouts and of weaker constructions (such as switch diamonds) unable to withstand rail temps above 54 degrees C	Increased risk of misalignments and buckling due to rapid thermal expansion stresses	6/moderate	High	6/moderate	High	6/moderate	6/moderate	Large changes in temperature variation causing imbalance in rail stress with variation exceeding 30 degrees C in hot and cold temps	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Currently 15% of S&C is modern variant, but future projections results in less than 1/3rd of assets being modernised, thereby unable to withstand large increases in temp. Assuming that Routes have managed all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk for 2050 and 2080 will increase further	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR12	Asset	Track	Track and S&C	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	S&C on timber layouts and of weaker constructions (such as switch diamonds) unable to withstand rail temps above 54 degrees C	Increased risk of misalignments and buckling due to rapid thermal expansion stresses	6/moderate	High	6/moderate	High	4/moderate	8/moderate	Increase in track buckles as temperatures rise with a greater likelihood of buckling especially in legacy S&C construction	9/moderate	12/major	High	9/moderate	12/major	High	Future S&C renewal projections means less than 1/3rd of assets will be modernised by 2050 and around 45% by 2080 creating differential expansion between S&C and adjacent plain line and weaknesses in S&C. Assuming that Routes have managed all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk for 2050 and 2080 will increase further	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR13	Asset	Track	Track and S&C	Heavy rain/cloudburst	Indirect	Wales & Western	Wales & Western	Professional Head of Track/ Professional Head of Drainage and Off Track and RAMs	RAM Track	Water exceeds rail head level causing trains to stop or travel at caution	Historic failures where track has flooded due to inability for drainage (natural or drainage system) to cope with rain or blocked/broken drains. Water exceeds rail level and stops or slows trains down	6/moderate	High	8/moderate	High	8/moderate	8/moderate	Flooded track caused by weaknesses in drainage systems or lack of drainage system	9/moderate	12/major	High	9/moderate	12/major	High	Excess rain exceeds drainage capacity resulting in weakened track assets and exposure to increased risk	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
TR14	Asset	Track	Track and S&C	High average rainfall over several days	Indirect	Wales & Western	Wales & Western	Professional Head of Track/ Professional Head of Drainage and Off Track and RAMs	RAM Track	Water exceeds rail head level causing trains to stop or travel at caution	Historic failures where track has flooded due to inability for drainage (natural or drainage system) to cope with rain or blocked/broken drains. Water exceeds rail level and stops or slows trains down	6/moderate	High	8/moderate	High	8/moderate	8/moderate	Flooded track caused by weaknesses in drainage systems or lack of drainage system	9/moderate	12/major	High	9/moderate	12/major	High	Excess rain exceeds drainage capacity resulting in weakened track assets and exposure to increased risk	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
TR15	Asset	Track	Track and S&C	High soil moisture	Interdependency (us on them)	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM Track	Track misaligned or very rough top causing a rapid reduction in ride quality	Historic failures especially on clay or peat areas in South or East of England resulting in destabilised embankments and cuttings	9/moderate	High	10/major	High	10/major	10/major	High Soil moisture causes weaknesses in embankment stability	9/moderate	12/major	High	9/moderate	12/major	High	Effect on earthworks saturated by water resulting in weakening track causing damage to track and deteriorating track quality conditions	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to transport networks from slope and embankment failure	Risks to subterranean and surface infrastructure from subsidence	
TR16	Asset	Track	Track and S&C	Low soil moisture	Interdependency (us on them)	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM Track	Track misaligned or very rough top causing a rapid reduction in ride quality	Historic failures especially on clay or peat areas in South or East of England resulting in destabilised embankments and cuttings	9/moderate	High	9/moderate	High	9/moderate	10/major	Low Soil moisture causes prolonged instability in embankments especially if followed by heavy and sustained rainfall	9/moderate	12/major	High	9/moderate	12/major	High	Effect on earthworks due to dryness will cause shrinkage and deterioration in track quality and condition	No Variation	Risk to transport from high and low temperatures, high winds, lightning	Risks to transport networks from slope and embankment failure	Risks to subterranean and surface infrastructure from subsidence	
TR17	Asset	Track	Track and S&C	Flooding	Interdependency (us on them)	Wales & Western	Wales & Western	Professional Head of Geotechnical/ Professional Head of Drainage and Off Track and RAMs	RAM Track	Water undermines track support system (e.g. embankment/cutting)	Historic failures in earthwork due to flooding which undermines the track condition resulting in speed restrictions or line closures	6/moderate	High	8/moderate	High	8/moderate	8/moderate	Detrimental impact on embankment stability causing deterioration of track geometry	9/moderate	12/major	High	9/moderate	12/major	High	Flooding near rivers, coastal areas or low lying land resulting in weakening track formation and causing wash-out increasing future risk due to rise in river and sea levels. Likely to cause extensive damage to track	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
TR18	Asset	Track	Track and S&C	Erosion	Interdependency (us on them)	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM Track	Track misaligned or very rough top from eroded embankment or cutting causing a rapid reduction in ride quality	Historic failures especially on embankments resulting in track becoming uneven from embankment subsidence	9/moderate	High	10/major	High	10/major	10/major	This could either be from standard river or flood flows (could result in rapid or slow deterioration)	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Effect on track stability expected to increase especially in Southern half of country (cuttings and embankments)	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
TR19	Asset	Track	Track and S&C	Storms	Indirect	Wales & Western	Wales & Western	Professional Head of Geotechnical/ Professional Head of Drainage and Off Track and RAMs	RAM Track	Storm water caused from rainfall exceeds rail head level causing trains to stop or travel at caution	Historic failures where track has flooded during stormy weather due to inability for drainage to cope with rain or blocked/broken drains. Water exceeds rail level and stops or slows trains down	9/moderate	High	10/major	High	10/major	10/major	Flooded track causes weaknesses in drainage systems to arise and also affects embankment stability. A key risk in coastal areas and near rivers	9/moderate	12/major	Medium	9/moderate	12/major	Medium	weaker embankments will make track formation less stable and degrade its condition	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to energy from high and low temperatures, high winds and lightning	Risks to transport networks from slope and embankment failure	Risks to subterranean and surface infrastructure from subsidence
TR2	Asset	Track	Track and S&C	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rail temps exceeding 54 degrees C will require speed restrictions to control risk	Historic evidence of buckle trends shows that jointed track is more likely to buckle than CWR	9/moderate	High	9/moderate	High	6/moderate	10/major	Increase in track buckles as temperatures rise with a greater likelihood of buckling	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Jointed track is less resilient to heat beyond 38 degrees C air temp. Assuming that Routes have managed all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk for 2050 and 2080 will increase further	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR20	Asset	S&C	S&C	Snow	Direct	Wales & Western	Wales & Western	Professional Head of T&RS and RAM	RAM Track	Switches overwhelmed by snow build up preventing operation of points	Historic failures from severe snow storms (2010 and 2018) causing points with or without points heating to freeze or to become compacted with snow or ice	6/moderate	Medium	8/moderate	Medium	8/moderate	6/moderate	Snow levels have reduced hence frequency of events likely to drop	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	Impact will worsen although frequency of events will reduce	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR21	Asset	S&C	S&C	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of T&RS and RAM	RAM Track	Switches overwhelmed by snow build up preventing operation of points	Historic failures from severe snow storms (2010 and 2018) causing points with or without points heating to freeze or to become compacted with snow or ice	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Snow levels have reduced hence frequency of events likely to drop	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	Impact will worsen although frequency of events will reduce	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR22	Asset	S&C	Points operating equipment	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of S&C	RAM Track	Electronic components fail due to early life failures or exceeding design threshold	Excessive heat causes components in lineside cabinets or equipment cases to heat up reducing life expectancy of electronic components through thermal stressing	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Failures will increase due to negative effect of thermal stressing on electronic components increasing degradation	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Effect increases by 2080 due to projected temp increases and current design parameters	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR23	Asset	S&C	Points operating equipment	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of T&RS and RAM	RAM Track	Electronic components fail due to early life failures or exceeding design threshold	Rapid rise and drop in temperatures causing electronic components in lineside cabinets or equipment cases to experience thermal stressing and reducing life expectancy of electronic components	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Failures will increase due to negative effect of thermal stressing on electronic components increasing degradation	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	Effect increases by 2080 due to projected temp increases and current design parameters	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR24	Asset	S&C	Points operating equipment	Flooding	Indirect	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track	RAM Track	Deterioration of sealed components or long period of immersion in flood water causing water ingress and affecting electrical/mechanical components	This is a low risk currently as assets are sealed and generally not affected by floods, however due to the position of equipment next to track protection by raising is not always feasible and persistent flooding would inevitably result in component degradation and failure	2/minor	Low	4/moderate	Low	4/moderate	4/moderate	Limited number of failures due to water ingress however deterioration in sealed material could affect electrical and mechanical components within points operating equipment	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Expected increase in flooding on coastal areas, rivers and on level land or cuttings that is more prone to effects of flooding	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
TR25	Asset	Track	Track and S&C	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Track	RAM Track	Associated with S&C, curvature in track and connections between different sleeper/bearer types	Current controls with ballast and lateral end restraints are effective	2/minor	High	2/minor	High	2/minor	4/moderate	Current failures associated with deficiencies and not poor design	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Increased temperature especially in southern half of the network will be impacted where sleepers/bearers are of an older design or made from timber	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR3	Asset	Track	Track and S&C	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rail temps exceeding 54 degrees C will require speed restrictions to control risk	Historic evidence of buckle trends shows that jointed track is more likely to buckle than CWR	9/moderate	High	9/moderate	High	6/moderate	10/major	Increase in track buckles as temperatures rise with a greater likelihood of buckling	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Jointed track is less resilient to heat beyond 38 degrees C air temp. Assuming that Routes have managed all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk for 2050 and 2080 will increase further	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR4	Asset	Track	Track and S&C	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rapid rises in Rail temps due to diurnal change resulting in poor condition assets being exposed through expansion	Historic failures causing rapid expansion and contraction of metal rails causing destabilisation in rail stress if not adequately stressed	9/moderate	High	9/moderate	High	9/moderate	9/moderate	Failures will increase due to change in temperature variation due to rail temps exceeding 53 degrees C	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Jointed track is less resilient to heat beyond 38 degrees C air temp. Assuming that Routes have managed all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk for 2050 and 2080 will increase further	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR5	Asset	Track	Track and S&C	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rail temps exceeding 54 degrees C will require speed restrictions to control risk	Historic failures from previous hot summers where we have experienced double figures in track buckles or high number of speed restrictions that have resulted in cancellations and severe train delays to passengers and freight	9/moderate	High	9/moderate	High	6/moderate	10/major	Failures will increase due to impact of not being able to deliver work during this period	9/moderate	12/major	High	9/moderate	12/major	High	Jointed track is less resilient to heat beyond 38 degrees C air temp. Assuming that Routes have managed all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk for 2050 and 2080 will increase further	No Variation	Risk to transport from high and low temperatures, high winds, lightning			

TR6	Asset	Track	Track and S&C (CWR)	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rail Temps exceed 56 resulting in speed restrictions to control risk	Fully stressed and undisturbed track is resilient to between 54 and 59 degrees C, but more modern variants can withstand up to 64 degrees C. Current network coverage of modern CWR is just over 30%. Risk of excessive heat causing more track buckles increasing derailment risk	6/moderate	High	6/moderate	High	4/moderate	8/moderate	Increase in track buckles as temperatures rise with a greater likelihood of buckling especially in legacy CWR construction	9/moderate	12/major	High	9/moderate	12/major	High	Legacy CWR track is resilient to 41 degrees C air temp. Projected increases in modern CWR over next 30-50yrs means greater coverage over network. Assumes that Routes manage all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk will increase	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR7	Asset	Track	Track and S&C	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rail Temps exceed 56 resulting in speed restrictions to control risk	Fully stressed and undisturbed track is resilient to between 54 and 59 degrees C, but more modern variants can withstand up to 64 degrees C. Current network coverage of modern CWR is just over 30%. Higher than normal heat increases track buckles leading to derailment	6/moderate	High	6/moderate	High	4/moderate	8/moderate	Increase in track buckles as temperatures rise with a greater likelihood of buckling especially in legacy CWR construction	9/moderate	12/major	High	9/moderate	12/major	High	Legacy CWR track is resilient to 41 degrees C air temp. Projected increases in modern CWR over next 30-50yrs means greater coverage over network. Assumes that Routes manage all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk will increase	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR8	Asset	Track	Track and S&C	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rail Temps exceed 56 resulting in speed restrictions to control risk	Fully stressed and undisturbed track is resilient to between 54 and 59 degrees C, but more modern variants can withstand up to 64 degrees C. Current network coverage of modern CWR is just over 30%. Persistent heat over long periods increases risk of track quality deterioration and buckling	9/moderate	High	9/moderate	High	6/moderate	10/major	Increase in track buckles as temperatures rise with a greater likelihood of buckling especially in legacy CWR construction	9/moderate	12/major	High	9/moderate	12/major	High	Legacy CWR track is resilient to 41 degrees C air temp. Projected increases in modern CWR over next 30-50yrs means greater coverage over network. Assumes that Routes manage all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk will increase	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
TR9	Asset	Track	Track and S&C	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Track and RAM	RAM Track	Rail Temps exceed 56 resulting in speed restrictions to control risk	Increased risk of rail breaks due to compressive stresses or track buckling as a result of disturbance or deficiencies	6/moderate	High	6/moderate	High	6/moderate	6/moderate	Failures will increase due to change in temperature variation as a result of rail temps exceeding 56 degrees C	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Legacy CWR track is resilient to 41 degrees C air temp. Projected increases in modern CWR over next 30-50yrs means greater coverage over network. Assumes that Routes manage all deficiencies to meet compliant design limits. However if this assumption proves to be incorrect then the risk will increase	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
Tun1	Asset	Tunnels	Tunnels	Heat wave	Direct	Wales & Western	Wales & Western	Professional Head of Mining and Tunnels	RAM Structures	Intervention based on deteriorating condition against predetermined baseline requirements	More defects (loss of confinement of the arch/arch collapse), higher costs to repair, deterioration may lead to speed restrictions through tunnels Predominantly a risk to Tunnels through clay soils	3/minor	Low	3/minor	Low	2/minor	4/moderate	Limited information about soil/tunnel interaction. Minimal occurrences previously	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assumptions based on how soils behave when saturated with water and how this would impact the tunnel lining	No Variation	Risks to subterranean and surface infrastructure from subsidence			
Tun2	Asset	Tunnels	Tunnels	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Mining and Tunnels and RAM	RAM Structures	Intervention based on Extreme Weather Plans determined by each route	Risk of tunnel closures to remove ice, thawing ice may fall and damage assets (OLE, Track), risk to safety of workforce Risk only to Tunnels with construction shafts	12/major	High	12/major	High	12/major	12/major	Current issue for Tunnel operation. Likely to become less frequent but worse	12/major	10/major	Medium	12/major	10/major	Medium	Assumptions based on recurrent issue within tunnels which will occur more often with extended periods of low temperatures	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
Tun3	Asset	Tunnels	Tunnels	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Mining and Tunnels and RAM	RAM Structures	Intervention based on Extreme Weather Plans determined by each route	Risk of tunnel closures to remove ice, teams required to enter tunnel more frequently to unblock tunnels, delays to morning trains while ice is removed	12/major	High	12/major	High	12/major	12/major	Current issue for Tunnel operation. Likely to become less frequent but worse	12/major	12/major	Medium	12/major	12/major	Medium	Assumptions based on recurrent issue within tunnels which will occur more often with extended periods of low temperatures	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
Tun4	Asset	Tunnels	Tunnels	High average rainfall over season	Direct	Wales & Western	Wales & Western	Professional Head of Mining and Tunnels	RAM Structures	Intervention based on deteriorating condition against predetermined baseline requirements	More defects, higher costs to repair, deterioration may lead to speed restrictions through tunnels. Drainage systems need improving to cope with additional flow Increase of Winter rainfall may destabilise hidden shafts and could lead to collapse in extreme cases	12/major	Medium	16/major	Medium	16/major	16/major	Tunnel defects currently managed. Increase could make the level of defects unmanageable	16/major	20/severe	Medium	16/major	20/severe	Medium	Assumptions based on water ingress being a major cause of defects within tunnels. Assumed that increase Winter rainfall will increase water ingress in tunnels	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
Tun5	Asset	Tunnels	Tunnels	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Mining and Tunnels and RAM	RAM Structures	Intervention based on increase in flood incidents in Tunnels	Tunnels could be closed due to flooding, TSRs in place in case of scour damage, closures could be lengthy if track bed is damaged by the flooding	9/moderate	Medium	10/major	Medium	10/major	10/major	Few instances of flooding currently due to water levels therefore uncertain on total extent of damage	12/major	16/major	Medium	12/major	16/major	Medium	Assumption based on increasing sea level resulting in tunnels being below tide levels and therefore flooding	No Variation	Risks to infrastructure services from coastal flooding and erosion	Risk to offshore infrastructure from storms and high waves		
Tun5A	Asset	Tunnels	Tunnels	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Mining and Tunnels	RAM Structures	Intervention based on increase in flood incidents in Tunnels	Tunnels could be closed due to flooding, TSRs in place in case of scour damage, closures could be lengthy if track bed is damaged by flooding	9/moderate	Medium	10/major	Medium	10/major	10/major	Few instances of flooding currently due to water levels therefore uncertain on total extent of damage	12/major	16/major	Medium	12/major	16/major	Medium	Assumption based on increasing river flows result in Tunnels being below water levels and therefore flooding	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
Tun6	Asset	Tunnels	Tunnels	High winds	Direct	Wales & Western	Wales & Western	Professional Head of Mining and Tunnels and RAM	RAM Structures	Intervention based on increase in occurrences reported	Increased specification for fixings and signage to cope with higher windspeeds. Potential restriction of access during high winds to carry out remedial work	3/minor	High	3/minor	High	4/moderate	2/minor	Current risk low, would expect increase in risk only for significant wind speed increase	6/moderate	8/moderate	Low	6/moderate	8/moderate	Low	Assumption based on increase in wind speed increasing pressure on signage and causing it to dislodge	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
Tun7	Asset	Tunnels	Tunnels	High soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Mining and Tunnels	RAM Structures	Intervention based on deteriorating condition against predetermined baseline requirements	Tunnel closure could be required to repair defects below the track and within the drainage. Risk to train operations Predominantly a risk to Tunnels through clay soils	6/moderate	Low	8/moderate	Low	8/moderate	8/moderate	Minimal occurrences currently therefore unclear the impact this may have long term	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assumptions based on how soils behave when saturated with water and how this would impact the tunnel lining	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
Tun8	Asset	Tunnels	Tunnels	Large diurnal temperature range	Direct	Wales & Western	Wales & Western	Professional Head of Mining and Tunnels	RAM Structures	Intervention based on deteriorating condition against predetermined baseline requirements	More defects, higher costs to repair	12/major	Medium	12/major	Medium	12/major	12/major	Tunnel defects currently managed. Increase could make the level of defects unmanageable	16/major	20/severe	Low	16/major	20/severe	Low	Assumptions based on this being a cause of defects within tunnels. Assumed that increase in humidity and temperature range will increase defects in tunnels	No Variation				
VN1	Asset	Vegetation	Trees	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Trigger points dependant on condition measures applied to tree risk	Changes in climate more favourable to the spread of pathogens that have no known predation could lead to increased failure modes. The indicators would be captured during tree risk assessment. Potential for interventions to be increased to assess risk	9/moderate	Medium	9/moderate	Medium	6/moderate	10/major	Infestations are likely to happen there will be uncertainty on the impact to the railway	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	With increased asset knowledge and further development of technologies to assist with location and condition data management, processes will be improved to apply proactive control. However, significant and rapid pest and disease outbreak may be unmanageable in view of the future climate projection	No Variation				
VN2	Asset	Vegetation	Trees	Low soil moisture	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track	RAM GLD	Trigger point can be related to long periods of drought during spring extending to early summer	Trees can be susceptible to pests and diseases following long periods of drought. In severe cases trees can die within 1 season. This increases tree risk failure	9/moderate	Medium	9/moderate	Medium	9/moderate	10/major	Uncertainty whether this risk will have a noticeable affect on tree health within a short period of time or if this will be a contributing factor to changes in growth patterns over longer periods of time as tree adapt to local conditions	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	There is no current data to assess trends and possible predictions	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
VN3	Asset	Vegetation	Trees/Bush	Long hot, dry summer	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Trigger point can be related to long periods of drought during spring extending to early summer	Lineside fires are likely to increase this can have an affect on performance and put operators at risk	8/moderate	High	8/moderate	High	6/moderate	10/major	Likely to happen but impact would be minor where performance will be affected more than safety	10/major	10/major	High	10/major	10/major	High	There is no current data to assess trends and possible predictions, there are design features that can be adopted within new and existing woodlands and lineside habitats	No Variation	Risk to transport from high and low temperatures, high winds, lightning			
VN4	Asset	Vegetation	Plants	Extended growth season (combination of weather parameters)	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Trigger points dependant on encroachments that require action and immediate action	Extended growth seasons and warmer wetter climates are likely to result in more rapid woody stem, leaf and bud development with conditions more favourable to exotic species	3/minor	Medium	4/moderate	Medium	4/moderate	4/moderate	High confidence that growth seasons will increase but low confidence that this will result in growth rate increase and resulting encroachment increase	5/moderate	5/moderate	Medium	5/moderate	5/moderate	Medium	There is no current data that suggests growth rate and subsequent encroachment rates are increasing, normalised or decreasing. If seasonal changes are expected vegetation and growth would be expected to adapt. Difficult to predict if this will be positive or negative to the railway	No Variation				
VN5	Asset	Vegetation	Invasive plants	Extended growth season (combination of weather parameters)	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Increase in financial penalties and claims, reputational damage and drain on resources to control spread	Extended growth season could increase the spread of invasive plants for established sites and new colonies to develop	5/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	There is no specific data that suggests that invasive plants are adapting to current conditions more aggressively than native plants	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	Likely that transport networks and corporate bodies will be a legislative and regulatory focus and vulnerable to claims	No Variation				
VN6	Asset	Vegetation	Trees/leaf fall	Extended growth season (combination of weather parameters)	Indirect	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track and RAM	RAM GLD	Adhesion performance indicators	Seasonal changes could lead to the effects of leaf fall being irregular leading to unexpected operational issues	2/minor	Low	3/minor	Low	3/minor	3/minor	low confidence on the effects of seasonal changes and its level of change	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	Seasonal performance will continue to be an industry focus, changes in vegetation composition, growth characteristics will require some understanding over the next 50 years	No Variation				
VN7	Asset	Vegetation	Trees	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	Increased incident/fault/condition indicators	This has links to earthwork and potential bank slip but also in locations next to the railway where substrates are washed out that were providing root anchorage	9/moderate	Medium	10/major	Medium	10/major	10/major	Increase in storms would suggest that conditions that have the potential to cause soil washout will be more frequent	10/major	12/major	Low	10/major	12/major	Low	Future climate suggests storm events to be more frequent, if this continues the negative effects of washout are also likely to increase	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to transport networks from slope and embankment failure		
VN8	Asset	Vegetation	Trees	Heavy rain/cloudburst	Direct	Wales & Western	Wales & Western	Professional Head of Drainage and Off Track	RAM GLD	Increased incident/fault/condition indicators	This has links to drainage where trapped water or where areas are left to develop into wetland causes water log effect on trees and their roots	9/moderate	Medium	10/major	Medium	10/major	10/major	Water logging around trees is known to result in tree death there is no current data or modelling in place for this type of defect	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	Without current modelling it is difficult to provide a high degree of confidence of the effects in the near future	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX01	Asset	Drainage	Station buildings	Flooding	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM GLD	Flooding poses risk to safety/wellbeing of staff and/or passengers and damages buildings	Flooding could disrupt access to services, risk the safety of passengers and staff through slips, trips and falls and require repairs	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Past incidences? Flooding within buildings would be unlikely (existing controls for extreme weather would be in place) but moderate impact	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	N/A	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX02	Asset	Drainage	Platforms	Flooding	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM GLD	Flooding poses risk to safety/wellbeing of staff and/or passengers and damages platforms	Flooding could disrupt access to services, risk the safety of passengers and staff through slips, trips and falls and require repairs	9/moderate	Medium	10/major	Medium	10/major	10/major	Past incidences? Flooding of platforms possible likelihood and moderate impact	12/major	12/major	Medium	12/major	12/major	Medium	N/A	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX03	Asset	Drainage	Subways	Flooding	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM GLD	Flooding poses risk to safety/wellbeing of staff and/or passengers and could damage the structure	Flooding could render subways impassable, causing disruption to railway users and require repairs	9/moderate	Medium	10/major	Medium	10/major	10/major	Past incidences? Flooding of subways possible likelihood and moderate impact	12/major	12/major	Medium	12/major	12/major	Medium	N/A	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX04	Asset	Drainage	Car parks	Flooding	Direct	Wales & Western	Wales & Western	RAM	RAM GLD	Flooding poses disruption to car park access, poses a safety risk to passengers and staff and/or damages the structure	Disruption accessing vehicles or entering/existing car parks. Risk to staff and passengers. Repairs may be required	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Past incidences? Flooding of car parks possible with a minor impact	8/moderate	8/moderate	Medium	8/moderate	8/moderate	Medium	N/A	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX05	Asset	Structures	Coastal and estuarial protection	High winds	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Structures	RAM Structures	Safety speed restrictions considered and imposed	Risk to rolling stock, passengers, staff and assets	10/major	Medium	10/major	Medium	12/major	8/moderate	Risk to safety and operations	12/major	16/major	Medium	12/major	16/major	Medium	N/A	No Variation	Risks to infrastructure services from coastal flooding and erosion			
XX06	Asset	All	Maintenance activities	Long hot, dry summer	Direct	Wales & Western	Wales & Western	RAMs and local maintenance teams	All RAMs	Advanced weather warning	Certain works for example on track can not be undertaken in high temperatures	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Disruption to maintenance regime	8/moderate	8/moderate	Medium	8/moderate	8/moderate	Medium	Little but some contingency in place for rearranging maintenance works	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX07	Asset	Buildings	Staff and passengers	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	RAM/ Professional Head of Buildings and Architecture and station manager	RAM Buildings	Weather warning for hot days, risk to safety/wellbeing of staff/passengers	Risks to the health, wellbeing and comfort of passengers and staff. Could lead to less passengers choosing to travel or an increase in health incidents, increase in irritancy and antisocial behaviour	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Unlikely that this will happen currently due to the small number of very hot days currently experienced	9/moderate	12/major	Medium	9/moderate	12/major	Medium	Assuming that stations have existing air conditioning/ventilation but overheating may still occur	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX08	Asset	Buildings	Platforms	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Reports of deformed surfacing	Deformed surfacing could lead to risk to safety of staff/passengers and quicker deterioration of further materials if not treated	4/moderate	Medium	4/moderate	Medium	4/moderate	6/moderate	Minor impact should it be detected and localised	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Regular maintenance inspections to surfacing	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX09	Asset	Buildings	Station buildings	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Advanced weather warning for heavy snow	Large snow accumulations can increase weight loading on the roof/structures, increasing rate of deterioration	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Heavy snow events are possible albeit generally limited to a few times per year at most	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	Structures have been built with wind loading taken into account	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX10	Asset	Buildings	Station buildings	High winds	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Storm warning. Linked to trigger level for investment which is asset condition	Risk to safety of human receptors and surrounding environment	4/moderate	Low	4/moderate	Low	6/moderate	6/moderate	While it is likely that an event could occur the likelihood of a person being hit or injured or damage to the surrounding buildings or environment is low	8/moderate	8/moderate	Low	8/moderate	8/moderate	Low	Infrastructure has been built with wind loading taken into account	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX11	Asset	Buildings	Station buildings	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Advanced weather warning for snow. Linked to trigger level for investment which is asset condition	Potential for disruption to operations and deterioration of materials from water ingress	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Unlikely for leaks to occur as a result of snow given building composition and frequency of snowfall	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	Structures have been built to a high degree of protection from leaks	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX12	Asset	Buildings	Staff and passengers	Snow/ice/Rainfall	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Risk to safety of staff/passengers	Increased water on surfaces from footfall encouraging slip risk to spread	8/moderate	Medium	10/major	Medium	10/major	10/major	Likely that this already occurs however would be of minor impact	9/moderate	10/Major	Medium	9/moderate	10/Major	Medium	Response/maintenance teams and processes within buildings for clear up of water	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX13	Asset	Buildings	Station buildings	Intense rainfall	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Weather warning for heavy rainfall, risks to safety of passengers/staff. Asset deterioration and repairs inked to trigger level for investment which is asset condition	Potential for disruption to operations, risk to safety and deterioration of materials from water ingress	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Unlikely for leaks to occur given building composition	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	Regular maintenance inspections on building conditions	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX14	Asset	Buildings	Station buildings	Intense rainfall	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Linked to trigger level for investment which is asset condition	Potential for disruption to operations, risk to safety and deterioration of materials from water ingress	4/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Increases in the water table high enough to cause water ingress are unlikely	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Regular maintenance inspections on building conditions	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX15	Asset	Buildings	Station buildings	Extreme cold temperatures	Interdependency (us on them)	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Linked to trigger level for investment which is asset condition	Increase in fuel cost associated with heating	6/moderate	Medium	6/moderate	Medium	9/moderate	4/moderate	Possible though minor impact	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX16	Asset	Buildings	Station buildings	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Advanced weather warning for snow, risks to safety of passengers/staff	Closure may be due to difficulty accessing station buildings due to snow or risk to health and safety	4/moderate	Medium	4/moderate	Medium	4/moderate	4/moderate	Highly unlikely for stations to close - procedures would be in place to ensure they remain open	8/moderate	12/major	Medium	8/moderate	12/major	Medium	Emergency response/extreme weather response plans to ensure stations remain open in extreme weather	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX17	Asset	Buildings	Station buildings	Intense rainfall	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Linked to trigger level for investment which is asset condition	Disruption to operation, increased deterioration of materials	9/moderate	Medium	10/major	Medium	10/major	10/major	Heavy precipitation events and flash flooding is increasingly likely	12/major	12/major	Medium	12/major	12/major	Medium	Drainage design has not been updated to cope with increased flows	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX18	Asset	Buildings	Station buildings	High winds	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Linked to trigger level for investment which is asset condition	Risk to safety of human receptors and surrounding environment and asset damage	4/moderate	Medium	4/moderate	Medium	6/moderate	6/moderate	Highly unlikely that roof tiles would be dislocated but would be a major event	8/moderate	8/moderate	Medium	8/moderate	8/moderate	Medium	Roof tiles would be firmly secured and routine maintenance would be undertaken, identifying any loose components. Western - this is something that would easily be picked up under current maintenance	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX19	Asset	Buildings	Station buildings	Lightning	Direct	Wales & Western	Wales & Western	RAM, Professional Head of Buildings and Architecture and Professional Head of Power Distribution HV/LV	RAM Buildings	Advanced weather warning and investment after events	Risk to safety of human receptors and surrounding environment, disruption to operation and asset damage	6/moderate	Medium	8/moderate	Medium	6/moderate	8/moderate	Unlikely however a moderate impact	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	Provision of backup power supplies and fire response plans	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX20	Asset	Drainage	Interconnected track drainage systems	Flooding	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM GLD	Local flooding of the track will prompt a limit of train movements (either a speed restriction or line closed) and trigger level for investment based on asset condition after damage	Risk to operation and track quality	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Moderate impacts as a result of speed restriction delays	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	Track drainage provisions are designed to cope with increased flows and regularly inspected - This risk needs to be reassessed in the next review without the assumption of adaptation	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX21	Asset	Drainage	Rock cuttings, soil cuttings, embankments	Flooding	Direct	Wales & Western	Wales & Western	RAM and Professional head of Drainage and Off Track	RAM GLD	Linked to trigger level for investment which is asset condition	Risk to operation, materials condition	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Unlikely however a moderate impact	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	Assumption that cess ditches and catchpits would be routinely monitored	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding			
XX22	Asset	Drainage	Third party drainage systems	Flooding	Interdependency (them on us)	Wales & Western	Wales & Western	RAMs, Professional Head of Buildings and Architecture and Professional Head of Drainage and Off Track		Local flooding of the track will prompt a limit of train movements (either a speed restriction or line closed) and trigger level for investment based on asset condition after damage	Disruption to operation and to surrounding environment, increased deterioration of materials	9/moderate	Medium	10/major	Medium	10/major	10/major	Heavy precipitation events and flash flooding is increasingly likely	12/major	12/major	Medium	12/major	12/major	Medium	Drainage had not been designed to cope with increased flows	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to infrastructure networks (water, energy, transport, ICT) from cascading failures		
XX23	Asset	Drainage	Rock cuttings, soil cuttings, embankments	Snow/ice	Direct	Wales & Western	Wales & Western	RAMs, Professional Head of Geotechnical and Professional head of Drainage and Off Track	RAM GLD	Linked to trigger level for investment which is asset condition	Disruption to operation, increased deterioration of materials	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Unlikely that snow will result in flooding. Heavy snow events are possible albeit generally limited to a few times per year at most	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	Drainage is designed to cope with increased flows	No Variation	Risks to transport networks from slope and embankment failure			
XX24	Asset	Drainage	Coastal and estuarial protection	Sea level rise/Storms	Direct	Wales & Western	Wales & Western	RAMs , Professional Head of Structures and Professional Head of Drainage and Off Track	RAM GLD	Signs of flooding or deterioration of assets situated by the coast	Risk to rolling stock, passengers, staff and assets	9/moderate	Medium	10/major	Medium	10/major	10/major	Risk to safety and operations	10/major	12/major	Medium	10/major	12/major	Medium	Western: We are already seeing this happening in multiple locations which is triggering interventions.	No Variation	Risks to infrastructure services from coastal flooding and erosion			
XX25	Asset	Drainage	Drainage system	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM GLD	Advanced weather warning for snow/ice	Blocking of drainage leading to risk of flooding	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Possible that ice may block drainage	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX26	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Flooding	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Geotechnical	RAM GLD	Signs of deterioration of ground conditions	Risk to operation, safety, surrounding environment and damage to assets	8/moderate	Medium	10/major	Medium	10/major	10/major	Unlikely however major impacts should this occur	12/major	12/major	Medium	12/major	12/major	Medium	N/A	No Variation	Risks to transport networks from slope and embankment failure			
XX27	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Geotechnical	RAM GLD	Advanced weather warning for snow	Snow melt will decrease the stability of ground conditions	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Unlikely that accumulations of snow melt are large enough to result in such an impact	4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	Ground conditions will be inspected for deterioration following periods of heavy snow	No Variation	Risks to transport networks from slope and embankment failure			
XX28	Asset	Power distribution	Electrical equipment across multiple sites incl. location casing	Higher average temperature	Direct	Wales & Western	Wales & Western	RAMS, Professional Head of Plant & Asset Manager and Professional Head of Power Distribution HV/LV	RAM Electricfication	Advanced weather warning for extreme heat	AC/ventilation provision will regulate equipment temperature, avoiding risk of overheating	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Currently it is unlikely event that AC would fail AND that equipment would overheat simultaneously	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	AC is designed to operate in high temperatures	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX29	Asset	Power distribution	Electrical equipment across multiple sites incl. location casing	Higher average temperature	Direct	Wales & Western	Wales & Western	RAMS, Professional Head of Plant & Asset Manager and Professional Head of Power Distribution HV/LV	RAM Electricfication	Advanced weather warning for extreme heat	Higher demand for energy and maintenance leading to increased costs	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Currently it is unlikely event that AC would fail AND that equipment would overheat simultaneously	8/moderate	8/moderate	Medium	8/moderate	8/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning			
XX30	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Drier summers	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Geotechnical	RAM GLD	Linked to trigger level for investment which is asset condition	Changes in soil moisture lead to ground movements affecting geotechnical assets and track geometry increasing safety risk and asset damage. Increased intervention	6/moderate	Medium	9/moderate	Medium	4/moderate	9/moderate	Frequency of long enough and hot enough heatwaves/summers do not yet poses a grave risk, but impacts are felt in hot years	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	Current intervention levels, policy and method continue	No Variation	Risks to transport networks from slope and embankment failure			
XX31	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Intense rainfall	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Geotechnical	RAM GLD	Linked to trigger level for investment which is asset condition	Changes in soil moisture lead to ground movements affecting geotechnical assets and track geometry increasing safety risk an asset damage. Increased intervention	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Risk score assumes current rainfall conditions and assuming that ground conditions are monitored for deterioration	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	Ground conditions will be inspected for deterioration following periods of heavy rainfall	No Variation	Risks to transport networks from slope and embankment failure			
XX32	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Intense rainfall	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Geotechnical	RAM GLD	Linked to trigger level for investment which is asset condition	Weathering of geotechnical assets lead to ground movements/creep covering the cess increasing safety risk	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Risk score assumes current rainfall conditions and assuming that ground conditions are monitored for deterioration	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	Ground conditions will be inspected for deterioration following periods of heavy rainfall	No Variation	Risks to transport networks from slope and embankment failure			
XX33	Asset	Vegetation	Rock cuttings, soil cuttings, embankments/Trees	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM, Professional Head of Geotechnical and Professional Head of Drainage and Off Track	RAM GLD	Linked to trigger level for investment which is asset condition	Dependent on the prevalence of high water demand trees on the line	3/minor	Low	3/minor	Low	3/minor	6/moderate	Frequency of long enough and hot enough heatwaves/summers do not yet poses a grave risk, but impacts are felt in hot years	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	Assuming that there are not a great number of high water demand trees on the line?	No Variation	Risks to transport networks from slope and embankment failure			

AX34	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Intense rainfall	Direct	Wales & Western	Wales & Western	RAMs, Professional Head of Geotechnical and Professional head of Drainage and Off Track	RAM GLD	Linked to trigger level for investment which is asset condition	Dependent on the distance of the line to areas susceptible to flood	4/moderate	Low	4/moderate	Low	4/moderate	4/moderate	Silt deposition due to past flooding is a slow incremental process, unlikely to notice significant effects in the short term	5/moderate	6/moderate	Low	5/moderate	6/moderate	Low	Assuming that there are few areas of track which would be susceptible to this	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
AX35	Asset	Geotechnical	Rock cuttings, soil cuttings, embankments	Changes in soil moisture/intense rainfall/winter	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Geotechnical	RAM GLD	Burst water mains; life expired or product failure linked to asset damage and condition	Washout on surface soils would result in surface instability and disruption to operation and safety	6/moderate	Medium	9/moderate	Medium	9/moderate	9/moderate	Whilst these are 3rd party events outside our control it is assumed that mitigations and controls are in place for known risk locations	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	The water industry maintain current intervention levels, policy and methods	No Variation	Risks to infrastructure networks (water, energy, transport, ICT) from cascading failures				
AX36	Asset	Level crossing	Level crossing drainage	Intense rainfall	Interdependency (us on them)	Wales & Western	Wales & Western	RAM, Professional Head of Level Crossing and Professional Head of Drainage and Off Track	RAM GLD	Advanced weather warning of extreme rainfall	Third party run off impact ground conditions potentially affecting our crossing stability	6/moderate	Medium	6/moderate	Medium	8/moderate	8/moderate	Already an upper moderate risk given the potential impact	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	Highways Authorities maintain current intervention levels, policy and methods	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to infrastructure networks (water, energy, transport, ICT) from cascading failures			
AX37	Asset	Power distribution	Location case	Intense rainfall	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	Water ingress causes failure of/damage to electrical equipment housed in the location cases	6/moderate	Medium	6/moderate	Medium	8/moderate	6/moderate	Location cases have a degree of protection against corrosion from water ingress	5/moderate	6/moderate	Medium	5/moderate	6/moderate	Medium	Location case protection against corrosion from water ingress does not change	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
AX38	Asset	Power distribution	Location case	Intense rainfall	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Power Distribution HV/LV	RAM Electrification	Linked to trigger level for investment which is asset condition	Water ingress causes failure of/damage to electrical equipment housed in the location cases	6/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Location cases have a degree of protection against water ingress	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	Current policy is already placing location cases above ground level therefore mitigating some of the risk from flooding	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
AX39	Asset	Track	Flangeways	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Track	RAM Track	Advanced weather warning for snow/ice	Risk to service operation and safety	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	The severity of the issue varies depending on the severity of the winter and mitigation strategies are in place	5/moderate	4/moderate	Medium	5/moderate	4/moderate	Medium	Current intervention levels, policy and method continue	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX40	Asset	Level crossing	Track circuit	Extreme cold temperatures	Interdependency (us on them)	Wales & Western	Wales & Western	RAM and Professional Head of Level Crossing	RAM GLD	Signs of salts on the rails and impact to track	Inappropriate gritting on or near our crossings causes failures impacting on service and safety. Depends on the frequency of gritting	6/moderate	Medium	6/moderate	Medium	9/moderate	4/moderate	Co-ordination necessary with highways authorities	5/moderate	4/moderate	Medium	5/moderate	4/moderate	Medium	Current intervention levels, policy and method continue	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX41	Asset	Track	DC Conductor rails	Snow/ice	Direct	Wales & Western	N/A	Professional Head of Power Distribution HV/LV	N/A	Advanced weather warning for ice	Icicles shorting DC conductor rails leads to service disruption and workforce safety risk for clearing and repairs	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	This occurs every year, but varies depending on the severity of the winter and is confined to the lines with conductor rails. Mitigation strategies are in place	5/moderate	4/moderate	Medium	5/moderate	4/moderate	Medium	Current intervention levels, policy and method continue	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX42	Asset	OLE	Overhead wires and supporting infrastructure	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Contact Systems	RAM Electrification	Advanced weather warning for ice, seasonal preparation	Shorted OLE Can cause stranded trains with severe service disruptions and safety risks to passengers and staff and is managed by seasonal weather management programmes	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Under current weather conditions this risk occurs on an annual basis, although it varies from year to year, but is confined to lines with OLE. Mitigation strategies are in place	6/moderate	6/moderate	Medium	6/moderate	6/moderate	Medium	There will be a reduction in the likelihood of cod weather events and that the amount of OLE will rise, but that modern designs will be more resilient	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX43	Asset	OLE	OLE masts	High winds	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Contact Systems	RAM Electrification	Storm warning, maintenance and seasonal planning	Can cause stranded trains with severe service disruptions and safety risks to passengers and staff. Managed through maintenance and operational risk management such as TSRs	6/moderate	Low	6/moderate	Low	8/moderate	4/moderate	This is variable in severity/impact but occurs each year particularly in stormy winters, but is confined to lines with OLE. It is managed by seasonal planning and maintenance schedules	8/moderate	9/moderate	Low	8/moderate	9/moderate	Low	Storms will be come more severe and frequent and the amount of OLE will rise, but that modern designs will be more resilient	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX44	Asset	T&RS	Rolling stock	Storms	Direct	Wales & Western	Wales & Western	RAM and Professional Head of T&RS		Storm warning	Major risk to safety and disruption should this occur	8/moderate	Low	10/major	Low	10/major	10/major	This is a rare occurrence and is managed by loading procedures	8/moderate	9/moderate	Low	8/moderate	9/moderate	Low	More modern rolling stock will be more resilient	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX45	Asset	OLE	Pantograph	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Contact Systems		Advanced weather warning for ice	This can cause severe service disruption. It is assumed that OLE design contains properties to ensure reduce the risk with the residual risk managed through seasonal weather management programmes	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	This risk varies depending on the severity of the winter and is mitigated by seasonal preparation	5/moderate	4/moderate	Medium	5/moderate	4/moderate	Medium	The frequency and severity of cold winters will decrease and that new OLE designs will be more resilient even though there will be more of the asset	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX46	Asset	Vegetation	Trees/leaf fall	Adhesion	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM GLD	Contamination on the line, seasonal planning, vegetation management schedule	Unmitigated severe contamination is unlikely, but this is a mobile risk which can be worsened by weather events such as storms. The risk is managed by seasonal planned maintenance and first signs of contamination should be dealt with by prompt ad hoc cleaning is implemented in response to incident reports and observations	4/moderate	Medium	4/moderate	Medium	4/moderate	4/moderate	The onset of the issue and its severity is determined by the pattern of the autumn weather with high winds making the issue worse. Mitigation is by seasonal preparation maintenance with known problem areas specifically targeted	5/moderate	6/moderate	Low	5/moderate	6/moderate	Low	That warmer years will promote more growth and later onset of leaf fall running into the autumn storms which will be more frequent and severe	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX47	Asset	Vegetation	Trees/leaf fall	Adhesion	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM GLD	Signalling issues, Train detection failures, point switches failure, seasonal planning, vegetation management schedule	Unmitigated severe contamination is unlikely, but this is a mobile risk which can be worsened by weather events such as storms. The risk is managed by seasonal planned maintenance and first signs of contamination should be dealt with by prompt ad hoc cleaning is implemented in response to incident reports and observations	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	The onset of the issue and its severity is determined by the pattern of the autumn weather with high winds making the issue worse. Mitigation is by seasonal preparation maintenance with known problem areas specifically targeted	8/moderate	9/moderate	Low	8/moderate	9/moderate	Low	That warmer years will promote more growth and later onset of leaf fall running into the autumn storms which will be more frequent and severe	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX48	Asset	Vegetation	Trees/leaf fall	Adhesion	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM GLD	Reports of issues braking, seasonal planning, vegetation management schedule	This has a potentially catastrophic outcome if unmitigated, however as the risk is managed by seasonal planned maintenance and first signs of contamination should be dealt with by prompt ad hoc cleaning in response to incident reports and observations unmitigated severe contamination is unlikely	5/moderate	Medium	5/moderate	Medium	5/moderate	5/moderate	The onset of the issue and its severity is determined by the pattern of the autumn weather with high winds making the issue worse. Mitigation is by seasonal preparation maintenance with known problem areas specifically targeted	10/major	10/major	Low	10/major	10/major	Low	That warmer years will promote more growth and later onset of leaf fall running into the autumn storms which will be more frequent and severe	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX49	Asset	Buildings	Platforms	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Advanced weather warning for ice	Risk to safety of staff and passengers from slips trips and falls	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	The severity of this impact varies from year to year depending on the severity of the winter	4/moderate	3/minor	Medium	4/moderate	3/minor	Medium	Reductions in snow and frost days	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX50	Asset	Signalling	Signalling capability	Sea level rise/Storms	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Signalling	RAM Signalling	Storm/high winds warning	Salt water spray can lead to accelerated corrosion of assets and or ingress can short equipment	6/moderate	Low	8/moderate	Low	8/moderate	8/moderate	For areas of track in close proximity to the sea this is already a risk	4/moderate	2/minor	Low	4/moderate	2/minor	Low	That we follow the current long-term signalling deployment plan	No Variation	Risks to infrastructure services from coastal flooding and erosion	Risks to transport from high and low temperatures, high winds, lightning			
AX51	Asset	Structures	Coastal and estuarial protection	Sea level rise/Storms	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Structures	RAM Structures	Linked to trigger level for investment which is asset condition	Wave damage/erosion of the sea wall/defence or the substrate it sits on can impair the protection level/function of the asset and lead to damage to assets behind it. This can pose a safety risk and performance risk and repair costs	6/moderate	Low	6/moderate	Low	8/moderate	8/moderate	Existing sea walls are likely to be sufficient currently to withstand storm surge	6/moderate	9/moderate	Low	6/moderate	9/moderate	Low	That existing sea walls are not replaced	No Variation	Risks to infrastructure services from coastal flooding and erosion	Risks to transport from high and low temperatures, high winds, lightning			
AX52	Asset	Track	Coastal and estuarial protection	Sea level rise/Storms	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Structures	RAM Track	Linked to trigger level for investment which is asset condition	Damaged defences can expose defended assets to direct damage posing a safety and performance risk and repair costs	6/moderate	Low	6/moderate	Low	8/moderate	8/moderate	Existing sea walls are likely to be sufficient currently to withstand storm surge	9/moderate	12/major	Low	9/moderate	12/major	Low	That existing sea walls are not replaced	No Variation	Risks to infrastructure services from coastal flooding and erosion	Risks to transport from high and low temperatures, high winds, lightning			
AX53	Asset	Signalling	Signals	Sun glare	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Signalling		Reports of obscured/impaired sighting of signals/SPADS by drivers	Disruption to drivers ability/confidence. Potential risks to train operation, safety and performance	8/moderate	Medium	8/moderate	Medium	8/moderate	8/moderate	Whilst this is a seasonal issue primarily occurring in the autumn to spring months when the sun is low in the sky rather than a weather issue it can vary from year to year as clouc cover can play a part in reducing it	4/moderate	N/A	Medium	4/moderate	N/A	Medium	Assuming NR follow the current long term deployment plan	No Variation					
AX54	Asset	Buildings	Platforms	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture		Asset condition	Risk to passengers and staff on the station and safety and performance risks to trains	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	This is caused by frost heave and varies from year to year depending on the severity of the winter cold weather	5/moderate	4/moderate	Medium	5/moderate	4/moderate	Medium	That no design changes are made	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX55	Asset	H&S/Welfare	Staff	Extreme hot temperatures	Direct	Wales & Western	Wales & Western	RAMs, Professional Head of Buildings and Architecture and local Maintenance Teams		Advanced weather warning for extreme heat	Current risk is managed through risk assessments, working practices and welfare provision	8/moderate	Medium	8/moderate	Medium	6/moderate	10/major	Extreme temperatures and heatwaves are already experienced, particularly over the last few years, current practices are felt to be adequate	9/moderate	10/major	Low	9/moderate	10/major	Low	That existing risk assessment methods will allow sufficient planning and response to mitigate the majority of the increased risk	No Variation					
AX56	Asset	H&S/Welfare	Staff	Extreme cold temperatures	Direct	Wales & Western	Wales & Western	RAMs, Professional Head of Buildings and Architecture and local Maintenance Teams		Advanced weather warning for cold conditions	Current risk is managed through risk assessments, working practices and welfare provision	9/moderate	Medium	9/moderate	Medium	10/major	6/moderate	Current winters already pose this risk and current practices are felt to be adequate to manage them	8/moderate	6/moderate	Medium	8/moderate	6/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX57	Asset	Structures	Wall	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Structures	RAM Structures	Linked to trigger level for investment which is asset condition	The majority of the masonry asset stock is very old and lacks the expansion joints required for modern materials and required by current design codes of practice. Risk management is through condition assessment and intervention	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Whilst the old asset stock means that this risk is already felt current asset management methods are adequate to manage the risk	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	That current investment profile is maintained	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX58	Asset	Structures	Footbridges	High winds	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Structures	RAM Structures	Storm/high winds warning and trigger level for investment which is asset condition	Risk managed by structure risk assessment, condition monitoring and triggered intervention	6/moderate	Low	6/moderate	Low	8/moderate	4/moderate	Current assessment and management practices control this risk	8/moderate	9/moderate	Low	6/moderate	9/moderate	Low	That current investment profile is maintained	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX59	Asset	Vegetation	Trees	High winds	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM GLD	Storm/high winds warning and vegetation management programme	This risk is contributed to by a number of factors including, frequency/severity of winds, saturation of ground, tree disease/death, tree size and third party tree management	9/moderate	Low	9/moderate	Low	10/major	6/moderate	This is managed by the current vegetation management programmes, however the Varley review has highlighted improvements that form part of the Sustainable Land Use Programme	10/major	12/major	Low	10/major	12/major	Low	That the Sustainable Land Use Programme is implemented	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX60	Asset	Buildings	Roofs	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Linked to trigger level for investment which is asset condition	Risk managed by asset risk assessment, condition monitoring and triggered intervention	6/moderate	Medium	6/moderate	Medium	4/moderate	6/moderate	Current assessment and management practices control this risk	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	That current investment profile is maintained	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX61	Asset	Buildings	Paving	Snow/ice	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Linked to trigger level for investment which is asset condition	Risk managed by asset risk assessment, condition monitoring and triggered intervention	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current assessment and management practices control this risk	5/moderate	4/moderate	Medium	5/moderate	4/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX62	Asset	Track	Track bed	Flooding	Direct	Wales & Western	Wales & Western	Professional Head of Geotechnical	RAM GLD	Linked to trigger level for investment which is asset condition	This requires a combination of a track lowering scheme and the location being within a flood risk area/and or the work creating a new 'low point' or flow pathway without appropriate drainage being included in the scheme. This combination could lead to safety and performance risks and repair costs	6/moderate	Medium	6/moderate	Medium	8/moderate	8/moderate		9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	Assuming that track lowering schemes will continue	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding				
AX63	Asset	Track	Track	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Track	RAM Track	Advanced weather warning for extreme heat, seasonal preparation and operational procedures	This leads to an increase in the use of TSRs to manage the risk and/or an increase in buckles. The results in performance reductions and the potential for safety risks	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	TSRs manage the current risk, but frequency and extent is becoming challenge	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	Assumed that existing contingencies and improved application of track standards will be able to deal with an increasing CRT	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX64	Asset	Track	Track	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Track	RAM Track	Advanced weather warning for extreme heat, seasonal preparation and operational procedures	Whilst these manage the risk of buckles and the subsequent safety risks they have severe performance impacts	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	TSRs manage the current risk, but frequency and extent is becoming challenge	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	Assumed that existing contingencies and improved application of track standards will be able to deal with an increasing CRT	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX65	Asset	Track	Track	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM, Professional Head of Track and local maintenance	RAM Track	Planned maintenance schedules	Disruption to planned maintenance due to weather and climate conditions, inability to deliver volumes in the available time, Knock on safety and performance risks	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current processes and resources manage the risk	8/moderate	8/moderate	Medium	8/moderate	8/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX66	Asset	Track	Track	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM, Professional Head of Track and local maintenance	RAM Track	Linked to trigger level for investment which is asset condition	Track maintenance activity is currently scheduled to avoid periods of high temperature which may lead to CRTs	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current process manages the risk	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX67	Asset	Signalling	Signalling capability	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Signalling	RAM Signalling	Linked to trigger level for investment which is asset condition	Equipment is vulnerable to degraded performance in periods of higher diurnal temperature range and higher extreme temperatures	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Current processes manage the risk, but recent extreme summers have challenged this	5/moderate	4/moderate	Medium	5/moderate	4/moderate	Medium	That we follow the current long-term signalling deployment plan	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX68	Asset	Track	Track	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Track	RAM Track	Linked to trigger level for investment which is asset condition	Certain rail fastenings increase this risk as well as locations with significant track gradients and repeated braking of trains. Accelerated by temperature excesnes	8/moderate	Medium	8/moderate	Medium	6/moderate	10/major	Current processes manage the risk, but recent extreme summers have challenged this	10/major	12/major	Medium	10/major	12/major	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX69	Asset	Track	Track	Extreme cold temperatures	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Track	RAM Track	Linked to trigger level for investment which is asset condition		10/major	Medium	10/major	Medium	12/major	10/major	Current practices manage the risks	9/moderate	8/moderate	Medium	9/moderate	8/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX70	Asset	Vegetation	Trees	Lightning	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Drainage and Off Track	RAM Track	Advanced weather warning for lightning	This can have severe safety impacts if a fallen tree is struck by a train. This is controlled by vegetation management which seeks to eliminate trees tall enough and close enough to pose a risk	6/moderate	Low	10/major	Low	9/moderate	10/major	Current vegetation programmes are in place to manage the risks. The Sustainable Land Use Programme is improving these	9/moderate	9/moderate	Low	9/moderate	9/moderate	Low	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX71	Asset	Track	Track	Snow	Direct	Wales & Western	Wales & Western	RAM, Professional Head of Track and local maintenance	RAM Track	Advanced weather warning for snow	Managed by snow/cold weather fleet and seasonal management practices	6/moderate	Medium	8/moderate	Medium	8/moderate	6/moderate	Current processes and resources manage the risk	5/moderate	4/moderate	Medium	5/moderate	4/moderate	Medium	Risk of build up of snow can be fairly easily managed to avoid getting to the point that snow is allowed to build up and trains cannot run	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX72	Asset	Structures	Timber bearers	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Structures	RAM Structures	Linked to trigger level for investment which is asset condition	Hardwood is being replaced for a number of reasons including our sustainable timber policies	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate		5/moderate	4/moderate	Medium	5/moderate	4/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX73	Asset	Structures	Wall	Higher average temperature	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Structures	RAM Structures	Linked to trigger level for investment which is asset condition	The majority of the masonry asset stock is very old and lacks the expansion joints required for modern materials and required by current design codes of practice. Risk management is through condition assessment and intervention	6/moderate	Medium	6/moderate	Medium	4/moderate	8/moderate	Whilst the old asset stock means that this risk is already felt current asset management methods are adequate to manage the risk	9/moderate	9/moderate	Medium	9/moderate	9/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX74	Asset	Buildings	Floors/pavements	Extreme cold temperatures	Direct	Wales & Western	Wales & Western	RAM and Professional Head of Buildings and Architecture	RAM Buildings	Linked to trigger level for investment which is asset condition		4/moderate	Medium	4/moderate	Medium	6/moderate	3/minor		4/moderate	4/moderate	Medium	4/moderate	4/moderate	Medium	N/A	No Variation					
AX75	Asset	Structures	Coastal and estuarial protection	Sea level rise	Direct	Wales & Western	Wales & Western	Professional Head of Structures	RAM Structures	Linked to trigger level for investment which is asset condition	Flooding of assets can result in asset damage, disruption to services and safety risks to passengers and staff on trains and to operational staff responding	6/moderate	Medium	6/moderate	Medium	8/moderate	8/moderate	Current defence maintenance manages this risk	8/moderate	9/moderate	Medium	8/moderate	9/moderate	Medium	N/A	No Variation	Risks to infrastructure services from coastal flooding and erosion				
AX76	Asset	Drainage	Drainage system	Sea level rise	Direct	Wales & Western	Wales & Western		RAM GLD	Linked to trigger level for investment which is asset condition	This can result in flooding either because water backs up in the system due to the inability to discharge or through water flowing into the system from the estuary and can pose risks to passengers and staff on trains and to operational staff responding	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Current drainage standards and management addresses this risk	6/moderate	9/moderate	Medium	6/moderate	9/moderate	Medium	N/A	No Variation	Risks to infrastructure services from coastal flooding and erosion				
AX77	Asset	Vegetation	Trees	Snow/ice	Direct	Wales & Western	Wales & Western	Professional Head of Track & Region	RAM GLD	Advanced weather warning for snow, vegetation management schedule and seasonal preparation	Sagging or fallen trees can short OLE stranding trains and can pose a train strike an possible derailment risk. These can result in safety risks, performance reductions and asset damage	6/moderate	Medium	6/moderate	Medium	6/moderate	6/moderate	Vegetation management programmes manage this risk	4/moderate	3/minor	Medium	4/moderate	3/minor	Medium	The Sustainable Land Use Programme is implemented fully	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX78	Asset	Track	Track	Intense rainfall	Direct	Wales & Western	Wales & Western	Professional Head of Track & Region	RAM Track	Linked to trigger level for investment which is asset condition	Failure mechanisms tend to be sudden and have the potential to result in derailment and track asset damage. They pose safety risks, can severely impact performance and require significant investment	6/moderate	Medium	10/major	Medium	10/major	10/major	Current geotechnical and drainage asset management address these risks	8/moderate	12/major	Medium	8/moderate	12/major	Medium	N/A	No Variation	Risks to infrastructure services from river, surface water and groundwater flooding	Risks to transport networks from slope and embankment failure	Risks to subterranean and surface infrastructure from subsidence		
AX79	Asset	Vegetation	Signalling	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Signalling	RAM Signalling	Vegetation management and incident reports	This can greatly increase the risk to the public when crossing the railway	8/moderate	Medium	6/moderate	Medium	6/moderate	10/major	Vegetation management programmes manage this risk	9/moderate	10/major	Medium	9/moderate	10/major	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX80	Asset	Vegetation	Track/OLE/Lineside/passengers and staff	High winds	Direct	Wales & Western	Wales & Western		RAM GLD	Storm/high winds warning and vegetation management programme	Safety risk to train drivers and passengers should a train derail on hitting a fallen tree,	8/moderate	Medium	6/moderate	Medium	10/major	6/moderate	Based on past history the worst case scenario is highly unlikely and the overall risk is managed by vegetation management programmes	10/major	12/major	Low	10/major	12/major	Low	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX81	Asset	Vegetation	Maintenance activities	Higher average temperature	Direct	Wales & Western	Wales & Western	Professional Head of Geotechnical	RAM GLD	Vegetation management and inspection reports	This can increase the risk to staff undertaking inspection and maintenance work and can reduce the quality of observations compromising planned work	3/minor	Medium	3/minor	Medium	2/minor	3/minor	Vegetation management programmes manage this risk	4/moderate	5/moderate	Medium	4/moderate	5/moderate	Medium	N/A	No Variation	Risks to transport from high and low temperatures, high winds, lightning				
AX82	Asset	Boundary	All fence types	Drier summers	Direct	Wales & Western	Wales & Western	Professional Head of Geotechnical and RAM	RAM GLD	Increased risk of incursion both livestock and people. Maintenance or renewal required	There are links to earthworks shrinkage and heave where the boundary at the bottom or top of the embankment could be at risk	6/moderate	Medium	8/moderate	Medium	4/moderate	9/moderate	Shrinkage of the earth in which posts are seated could cause them to loosen leading to possible failure of the boundary measure potentially resulting in livestock incursion/trespass	8/moderate	9/moderate	Low	8/moderate	9/moderate	Low	Dependent on future earthworks programme. Development of more resilient embankments or cuttings should mitigate the increase in risk	No Variation	Risks to transport from high and low temperatures, high winds, lightning				

Asset Information		Action Information					Action Target			Delivery Year					Climate Adaptation / Resilience		Monitoring	
Asset Class / Lead Team	Sub-Asset Class	Category	Name	Location	Description	Cost (£m)	Target	Unit	Monitoring	1	2	3	4	5	Benefit	Risks Addressed	Monitoring Regime	Linked 11 levers
Resilience	Multiple Assets	Development	Resilience Scheme Development	Regional	NRDD to develop 12 highest priority resilience schemes in CP7 year 1 which will likely result in 6 schemes being developed within the control period. Development will include modelling and risk assessment for each site to determine the priority.	£1.0	6	Schemes		1					Establishes a representative risk for the region which will establish a prioritised list of sites based on modelling and climate change predictions. Modelling and desk study will have been completed for the majority of sites with potential options available for development at a later date.	Weather events occur that induce failure of sites that have been modelled and deemed low risk and pushed into the next control period. More than 6 sites are deemed high risk and more budget is required than is currently allocated to the programme. Legislation restricting necessary works on infrastructure.		All
Resilience	All Assets	Strategy	Adaptation Pathways	Regional	Adaptation Pathways program to be developed over the whole of CP7 for both the Wales and Western routes to determine the highest risk lines of route along the railway due to climate change. Adaptation pathways for railways involve dynamic, flexible strategies to respond to climate change and evolving needs. They provide a structured framework for incremental adjustments in infrastructure and operations. This approach enables timely upgrades, efficient resource allocation, and stakeholder collaboration. Adaptation action plans will be developed based on modelling of climatic risk to the infrastructure and options proposed for the route	£4.0	Multiple	Schemes		1	1	1	1	1	By adopting flexible and dynamic approaches, the region can incrementally adjust its infrastructure and operational strategies, ensuring resilience to future uncertainties. Adaptation pathways enable efficient resource allocation, facilitating timely upgrades and innovations. Additionally, the adaptive nature of the approach promotes stakeholder engagement, fostering collaboration between communities, authorities, and businesses to collectively address the evolving demands of the rail network.	Uncertainty surrounding future climate scenarios and accurately forecasting the most effective adaptations. The prolonged timeline of adaptation pathways may expose the region to short-term vulnerabilities if immediate action is not taken. Striking the right balance between flexibility and timely decision-making is crucial to mitigate these risks and ensure the long-term success of adaptation strategies.		All
Geotech	Embankment & Cuttings	Monitoring	Earthworks Monitoring	Regional	Enhanced earthworks monitoring of earthwork assets to better understand the risk across a portfolio level. The monitoring will be put in place at the most at risk assets as a result of the increased frequency of increment weather condition that affect the stability of the earthworks as a result of climate change.	£11.0	Multiple	Schemes		1	1	1	1	1	Earthworks monitoring enhances construction safety, detects potential issues early, and ensures project compliance. It improves efficiency, reduces costs, and aids in optimizing resource allocation.	Challenges in data accuracy and interpretation may pose risks. Overreliance on technology can lead to false positives or neglect of on-site conditions. Regular calibration and skilled interpretation are essential.		All
Based on the outcome of analysis at ~~-~~number 1, six of the following schemes (4-18) will be progressed within ~~this budget~~the remaining resilience budget of £18m																		
Resilience	Cutting	Renewal	MLN1	Sonning, Western	Adverse weather site east of reading which affects elizabeth line and GWR. Slope and crest drainage. Resilience not BAU.		1	Schemes		0	0	1			Reduced flooding damage to the track. and disruption to the railway network. Reduced delay minutes from extreme weather and repair time. Reduced repair costs. TSR will become redundant. Reduced maintenance time and costs.	Flood risk from extreme weather. Contamination of track equipment. Performance of railway. Landsliding. Damage to electrical equipment.		All
Resilience	Embankment	Renewal	SWM2	St Fagans, Wales	Once flowing beneath the bridge at 174.61 M.Chns, the River Ely changes direction 90 degrees northeast 50 metres downstream. At high water levels, this river bend could slow water flow leading to flooding of the land surrounding the railway. A flood level could be reached which means water overtops the railway. In January 2023, high water levels in River Ely led to flooding of the railway and washout events. These events will likely increase in the future with climate change.		1	Schemes		0	1				Reduce damage to bridge and increase life span. Reduce repair cost and time. Lower disruption time. Reduce flooding in surrounding areas as well.	Flood risk from extreme weather. Contamination of track equipment. Performance of railway. Structure damage. Long term disruption. Structure integrity. Damage to electrical equipment.		All
Resilience	EmbCokment	Renewal	SWM2	Clawd-Coch, Wales	The highest recorded river level of the river that flows beneath the railway at this site is 1.5m below the height of the embankment. In the future, it is expected with climate change that higher river levels will occur. Flood levels could reach the height of the embankment and therefore the railway could be overtopped. Tan 15 flood maps show that the railway at this site is in a flood zone.		1	Schemes		0	0	0	1		Reduce damage to bridge and increase life span. Reduce repair cost and time. Lower disruption time. Reduce flooding in surrounding areas as well.	Flood risk from extreme weather. Contamination of track equipment. Performance of railway. Structure damage. Long term disruption. Structure integrity. Damage to electrical equipment.		All
Resilience	Embankment	Enhance	SWB	Chipping Sodbury, Western	Determine size and capacity requirements of the proposed system which is operating at full capacity to provide resilience in the face of increased extreme weather and Climate Change. This is a repeat failure location with 8 major floods occured in the last 13 years.		1	Schemes		1					Avoid wet beds and voiding which can lead to damage to to rail and trains as well. Eliminate main line cosure during extreme weather conditions. Quick recovery from extreme weather. Reduced disruption. Reduced repair costs and time.	Main line disrupion between Paddington and Cardiff. Contamination of track equipment. Cyclic top derailment. Performance of railway. Damage to TQ. Damage to electrical equipment.		All
Resilience	Embankment	Renewal	HNL1	Llangua court, Wales	"At this site, the railway bridge squeezes the channel of the River Monnow. Therefore, at high river levels, it is likely water will build up before the bridge and spill on to the floodplain upstream of the railway. This floodplain has a pinch point due to a road being build close to the railway. As a result, when the flood plain reaches its maximum capacity, water would likely be pushed on to the railway and a washout event could occur. Tan 15 flood maps show that the railway at this site is in a flood zone."		1	Schemes		0	0	1			Reduce repair time and costs. Increased protection of railway. Avoid flooding in areas surrounding the railway. Redcued disruption and eliminate TSR.	Bllast washout. Damage to electrical equipment. Structural integrity of track and bridge.		All
Resilience	Embankment	Renewal	MLN1	Nailsea, Western	"At this site, the railway bridge squeezes the channel of the River Kenn. Therefore, at high flood levels, it is likely water will build up along the railway at the base of the hills. This floodplain has a pinch point due to hills on both sides of the railway pushing flood water to collect along the railway. This site is in a known floodplain, and it is expected to get worse due to sea level rise as it is exposed to tidal flooding." **Increase brdige size? Excavate pinch point? Drainage?**	**£18m**	1	Schemes		0	0	0	1		Reduce repair time and costs. Increased protection of railway. Avoid flooding in areas surrounding the railway. Redcued disruption and eliminate TSR. Reduce saltwater detoriation.	Bllast washout. Damage to electrical equipment. Structural integrity of track and bridge.		All
Resilience	Cutting	Renewal	SD12	Llangyfelach, Wales	Up size drainage system which is operatuing at full capacity to proivde resilience in the face increasing extreme weather caused by climate change. 500m earthwork renewal ditch/channel and 5 Schl Earthwork Refurb, 1100m track drainage		1	Schemes		0	1				Reduced flooding damage to the track and disruption to the railway network. Reduced delay minutes from extreme weather and repair time. Reduced repair costs. TSR will become redundant.	flood risk due to long spells of rainfall. ballast washout - contamination of track bed. Damage to electrical equipment.		All
Resilience	Cutting	Renewal	MLN1	Flax Bourton, Western	Install infrastructure to protect cutting from flooding in adverse weather. Bringing the existing Rosemount Road SUDS pond back online. Replacing the existing partially blocked culvert. Upsizing approximately 170m of existing track drainage from 450mm diameter to 500mm/525mm		1	Schemes				1			Avoid flooding damage to the track and disruption to the railway network. Reduced delay minutes from extreme weather and repair time. Avoidrepair costs. TSR will not be implemented.	flood risk due to long spells of rainfall. ballast washout - contamination of track bed. Damage to electrical equipment.		All
Resilience	Cutting	Renewal	MLN1	Wootton Bassett, Western	Remove the pinch point where water drains under the railway into a canal on the down side (south). When this floods both routes between Swindon and Bristol are closed. Take cognisance of recent and planned housing developments to north.		1	Schemes			1	1			Avoid wet beds and voiding which can lead to damage to to rail and trains as well. Eliminate main line cosure during extreme weather conditions. Quick recovery from extreme weather. Reduced disruption. Reduced repair costs and time. Protect equipment.	Main line disrupion between Paddington and Cardiff. Contamination of track equipment. Cyclic top derailment. Performance of railway. Damage to TQ. Damage to electrical equipment.		All
Resilience	Cutting	Renewal	MLN1	Dauntsey, Western	Outside party drainage here has caused flooding several times a year including in jan 2023 and Jan 2024 when a train ran into floodwater at 125mph. Recent targeted intervention to drainage has helped but not prevented flooding. Probably would look like some enhanced maintenance needed to address the problem.		1	Schemes			1	1			Avoid wet beds and voiding which can lead to damage to to rail and trains as well. Eliminate main line cosure during extreme weather conditions. Quick recovery from extreme weather. Reduced disruption. Reduced repair costs and time. Protect equipment.	Main line disrupion between Paddington and Cardiff. Contamination of track equipment. Cyclic top derailment. Performance of railway. Damage to TQ. Damage to electrical equipment.		All
Resilience	Cutting	Renewal	CCL	Somerton, Western	Frequent flood site and closes off fast route from Reading to West Country via Westbury. If coupled with a closure at Flax Bourton means both main routes out of west country are closed. Planned for intervention in year 3		1	Schemes				1.00			Avoid wet beds and voiding which can lead to damage to to rail and trains as well. Eliminate backup for main line cosure during extreme weather conditions. Quick recovery from extreme weather. Reduced disruption. Reduced repair costs and time. Protect equipment.	Main line disrupion between Paddington and West Country via Westbury. Contamination of track equipment. Cyclic top derailment. Performance of railway. Damage to TQ. Damage to electrical equipment.		All
Resilience	Sea Defence	Renewal	AMB	AvonMouth, Western	Flood defence protects railway from sea level rise creating salt water marsh nature area.		1	Schemes			1				Reduce repair time and costs. Increased protection of railway. Avoid flooding in areas surrounding the railway. Redcued disruption and eliminate TSR. Reduce saltwater detoriation.	Bllast washout. Damage to electrical equipment. Structural integrity of track. Flooding.		All
Resilience	Sea Defence	Renewal	MLN	Powderham, Western	Protect main line to Devon and Cornwall from threat from erosion of sand spit at mouth of exe estuary accelerating erosion and frequency of overtopping of powderham banks.		1	Schemes			1				Strengthen track stability and support. Reduce flood risk and avoid voids and wetbeds. TSR would become redundant. Performance of railway equipment would improve.	Alignment of track. Flooding in extreme weather. Derailment. Disruption. Perfomrance.		All
Resilience	Culvert	Renewal	DCL	Oxford, Western	Enlarged culverts under road bridge adjacent to railway to prevent build up of flood water to north imapcting railway		1	Schemes			1.00				Reduced flooding damage to the track and disruption to the railway network. Avoid voids and wet beds that may lead to serious failure events. Reduced delay minutes from extreme weather and repair time. Reduced repair costs. TSR will become redundant	flood risk due to long spells of rainfall . Wet beds and voids cause contamination of ballast and track resulting in failure of track support (rounded ballast) - cyclic top risk of derailment (similar to gloucester derailment event). Damage to electrical equipment.		All