



Rail Accident Investigation Branch

Rail Accident Report



**Track worker near miss at Chiltern Green,
between Harpenden and Luton
23 April 2024**

Report 06/2025
April 2025

This investigation was carried out in accordance with:

- the Railway Safety Directive 2004/49/EC
- the Railways and Transport Safety Act 2003
- the Railways (Accident Investigation and Reporting) Regulations 2005.

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Preface

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In some cases factors are described as 'underlying'. Such factors are also relevant to the causation of the accident or incident but are associated with the underlying management arrangements or organisational issues (such as working culture). Where necessary, words such as 'probable' or 'possible' can also be used to qualify 'underlying factor'.

Use of the word 'probable' means that, although it is considered highly likely that the factor applied, some small element of uncertainty remains. Use of the word 'possible' means that, although there is some evidence that supports this factor, there remains a more significant degree of uncertainty.

An 'observation' is a safety issue discovered as part of the investigation that is not considered to be causal or underlying to the accident or incident being investigated, but does deserve scrutiny because of a perceived potential for safety learning.

The above terms are intended to assist readers' interpretation of the report, and to provide suitable explanations where uncertainty remains. The report should therefore be interpreted as the view of RAIB, expressed with the sole purpose of improving railway safety.

Any information about casualties is based on figures provided to RAIB from various sources. Considerations of personal privacy may mean that not all of the actual effects of the event are recorded in the report. RAIB recognises that sudden unexpected events can have both short- and long-term consequences for the physical and/or mental health of people who were involved, both directly and indirectly, in what happened.

RAIB's investigation (including its scope, methods, conclusions and recommendations) is independent of any inquest or fatal accident inquiry, and all other investigations, including those carried out by the safety authority, police or railway industry.

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Track worker near miss at Chiltern Green, between Harpenden and Luton, 23 April 2024

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Summary

At about 09:53 on 23 April 2024, a train travelling at 104 mph (167 km/h) came very close to striking a track worker who was crossing an underbridge at Chiltern Green, between Harpenden and Luton Airport Parkway stations. The track worker was just stepping off the bridge, from an area where there was very limited space between the bridge parapet and train, when the train passed them. Upon seeing the track worker on the bridge, the driver sounded the train's horn and then made an emergency brake application. Once the train stopped, the driver reported the incident to the signaller, unsure as to whether the train had struck the track worker.

At the time of the incident, the track worker, who was a tester carrying out telecommunications cable testing, was walking to rejoin their group after a welfare break. RAIB found that the tester walked over the bridge because they were unaware of any other way to walk back to the rest of the group and because the person in charge had not arranged for the tester to safely leave and rejoin the group when taking a break.

The person in charge had previously taken the tester over the bridge using an informal and potentially unsafe system of work, using a route to the site of work which was not the one the project engineer planning the work had intended the group to use. This happened because the staff involved were unfamiliar with one of the locations, the person in charge had a very limited role when the work was planned and had not been briefed beforehand, and the documents issued to the person in charge did not give a clear description of the way the team was expected to walk to the site of work.

RAIB found that the tester had crossed the bridge without an effective safe system of work in place despite being aware of the risks in doing so. However, the tester's personal track safety competency, and the associated rules for walking alone on or near the line, did not prohibit them from crossing a structure with restricted clearance. RAIB also identified that the bridge was not signed as a limited clearance structure, which was a possible factor.

An underlying factor was that the overall methodology followed for planning the work did not provide the person in charge with clear information about how to carry out the walking element of the work. A possible underlying factor was that, although Network Rail had recorded the bridge as having restricted clearance, it and many other structures on the railway between London and Bedford were not fitted with the required signage to warn staff of this hazard.

RAIB also observed that:

- Historically, the rail industry has fitted limited clearance signage to structures with restricted clearance if they can be crossed safely while trains are running by using one of the warning safe systems of work, which are now much less commonly used.
- Network Rail's record of its warning signage assets on its East Midlands route is incomplete, and it has no inspection or maintenance regime for this signage.
- After the incident, the track workers walked over the bridge again while trains were still running, without an adequate safe system of work in place.

Since the incident, changes to the rules were published to prohibit personal track safety competency holders from crossing a bridge with restricted clearance unless an appropriate safe system of work is in place.

As a result of the investigation, RAIB has made four recommendations. The first is for Keltbray Infrastructure Services Limited to review and amend how it plans work on or near the line, so its staff can better understand how to manage and carry out the work they need to deliver. The second is for the Rail Safety and Standards Board to follow the relevant rail industry processes to review and amend as necessary the rail industry standard requirements for warning signage at structures with restricted clearance. The third is for Network Rail to record its lineside signage assets, determine what inspection and maintenance regime is required for these assets, and then schedule these activities to be done. The fourth, also addressed to Network Rail, is to reduce the risks to railway staff due to warning signage not being fitted to structures with restricted clearance.

RAIB has also identified four learning points. The first reminds staff involved in planning or carrying out work on or near the line of the importance of coming to a clear understanding about how the planned activities, including the walking elements, should be executed. The second highlights the importance of providing information that clearly identifies the access points to be used if the planned activity involves staff going to more than one access point and different sites of work. The third highlights the importance of not going into any area where there is reduced space between a structure and the nearest running rail of an open line. The fourth highlights the importance of track workers, who are involved in a near miss incident with a train, understanding how they will safely exit the railway, and seeking assistance from the signaller if required.

Introduction

Definitions

- 1 Metric units are used in this report, except when it is normal railway practice to give speeds and locations in imperial units. Where appropriate the equivalent metric value is also given.
- 2 The report contains abbreviations and acronyms, which are explained in appendix A. Sources of evidence used in the investigation are listed in appendix B.

The incident

Summary of the incident

- 3 At about 09:53 on 23 April 2024, a train travelling at 104 mph (167 km/h) came very close to striking a track worker who was crossing an underbridge at Chiltern Green, between Harpenden and Luton Airport Parkway stations (figure 1).

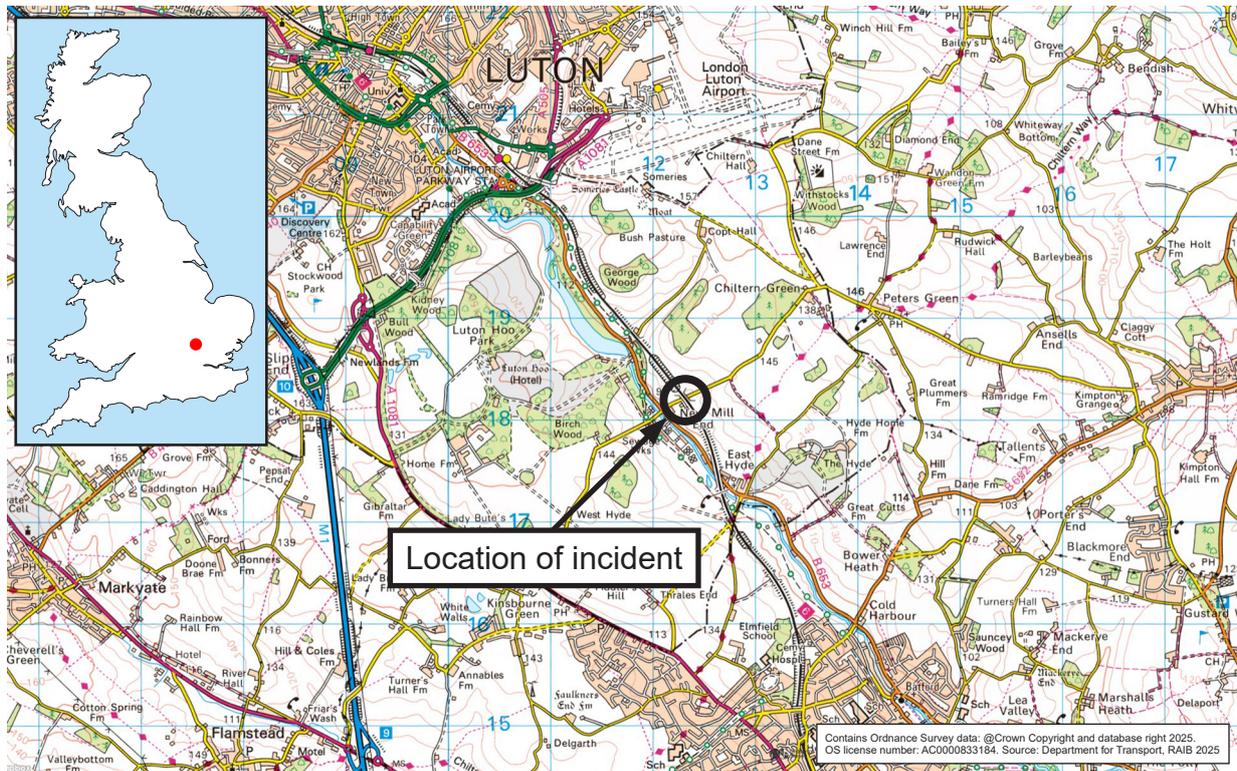


Figure 1: Extract from Ordnance Survey map showing location of incident at Chiltern Green.

- 4 Upon seeing the track worker on the bridge, the driver sounded the train's horn. The track worker reached the far side of the bridge and stepped off the bridge just as the train passed them (figure 2). The driver was unsure if the train had struck the track worker and made an emergency brake application. Once the train had stopped, the driver reported the incident to the signaller.
- 5 The track worker was a tester, who was part of a group that was working to the north of the bridge to test a telecommunications cable. The tester had earlier left the group and walked alone back to a van at a track access point, which was to the south of the bridge. At the time of the near miss, they were walking alone back towards the group.
- 6 The tester was not injured but both the tester and driver were shaken by the incident. The train driver was fit to continue their journey about 10 minutes later, once a member of staff at West Hampstead signal box had advised them that the tester had not been struck by the train.

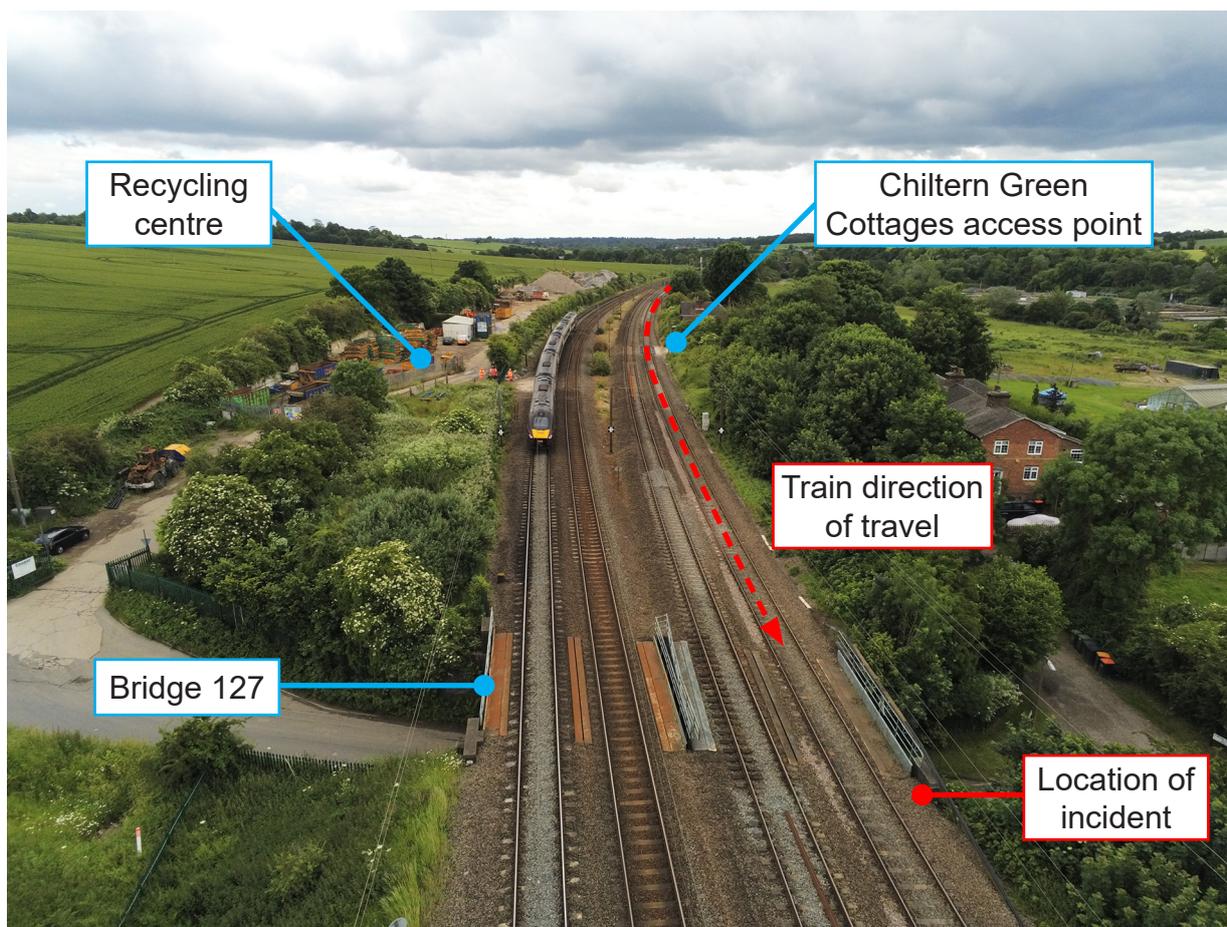


Figure 2: View of the bridge where the near miss happened.

Context

Location

- 7 The incident happened close to the site of the former station at Chiltern Green, on bridge 127, which is located at 27 miles 28 chains¹ from a zero reference at London St Pancras International (figure 3). Chiltern Green is on the Midland Main Line, which is part of Network Rail's East Midlands route,² within its Eastern region.³ The Network Rail reference for this section of the Midland Main Line, between London St Pancras International and Bedford, is SPC1.
- 8 At Chiltern Green, the railway comprises four tracks (figure 4). The incident happened on the Down Fast line which has a permissible speed of 105 mph (169 km/h). There is an authorised access point on the Down Fast side at 27 miles 23 chains, called Chiltern Green Cottages access point, which was used by the staff involved to enter and exit the railway boundary.

¹ A unit of length equal to 66 feet or 22 yards (20.1168 metres). There are 80 chains in one standard mile.

² Part of Network Rail's organisation which manages, operates and maintains the railway from London St Pancras International to Chesterfield and a number of routes that branch off main lines to Northamptonshire, Rutland, Leicestershire, Derbyshire, Nottinghamshire and Lincolnshire (but does not include the East Coast Main Line).

³ Part of Network Rail's organisation which supports four of its routes: Anglia, East Coast, East Midlands and North & East.

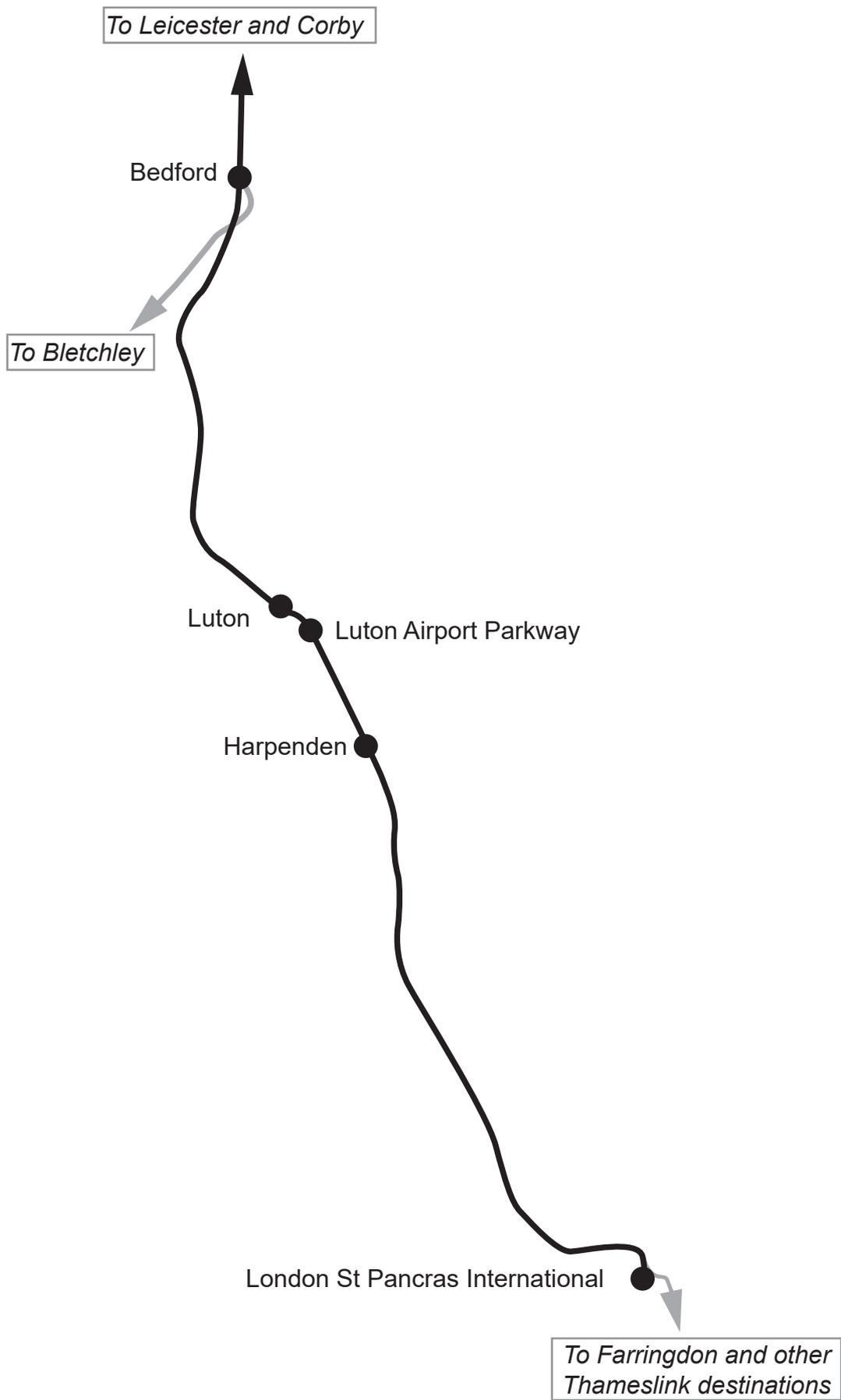


Figure 3: Overview of the railway from London St Pancras International to Bedford.

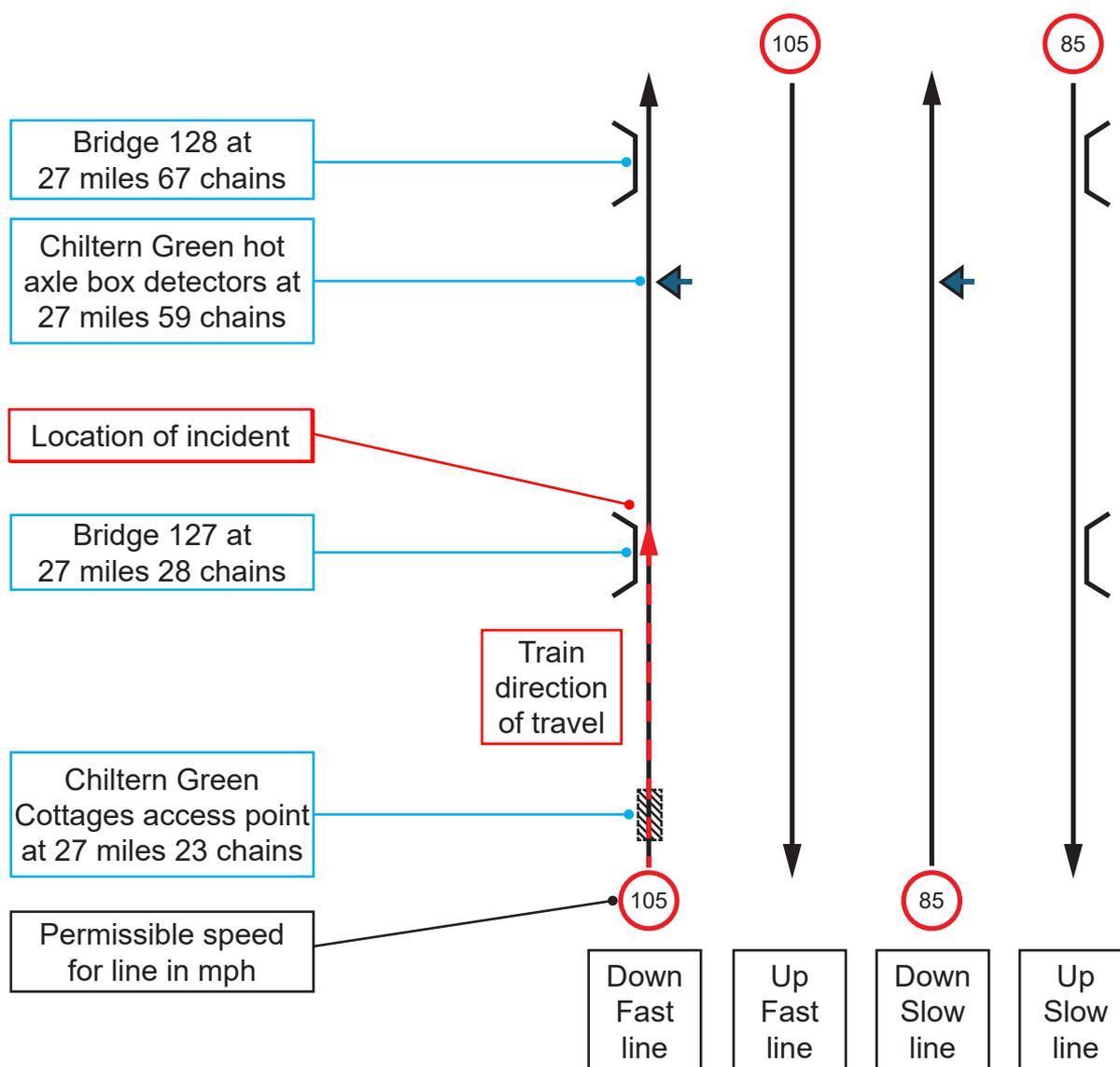


Figure 4: Track layout at Chiltern Green.

- 9 Signalling in the Chiltern Green area is controlled from the Luton workstation located at West Hampstead signal box. The railway at this location is electrified with 25,000 volts alternating current (25 kV AC) overhead line equipment.

Organisations involved

- 10 Linbrooke Services Limited was the lead contractor for the West Hampstead recontrol project (see paragraphs 26 to 30). It was the employer of the four staff who were working trackside at Chiltern Green that day to test a telecommunications cable. In October 2024, Linbrooke Services Limited was acquired by Keltbray Infrastructure Services Limited but is referred to as Linbrooke throughout this report, except for the recommendation addressed to this organisation.
- 11 Network Rail is the owner of the railway infrastructure and client for the West Hampstead recontrol project. It is the employer of the signallers at West Hampstead signal box.

- 12 East Midlands Railway was the operator of the train involved in the incident and is the employer of the driver.
- 13 Linbrooke, Network Rail and East Midlands Railway all freely co-operated with the investigation.

Train involved

- 14 The train involved in the incident, reporting number 1F20, was the 09:02 service from London St Pancras International to Sheffield. It comprised a five-car, class 222 diesel electric multiple unit, number 222023 (figure 5).



Figure 5: The train involved in the incident (courtesy of Govia Thameslink Railway).

Staff involved

- 15 The tester, who was the track worker involved in the near miss, had been employed as an installer and tester for Linbrooke for about 6.5 years. They were familiar with installing and testing telecommunications cables and had held the personal track safety⁴ (PTS) competency since 2018, the controller of site safety⁵ (COSS) competency since 2019 and they also held the site warden⁶ competency. The tester had not been involved in any previous incidents.

⁴ An awareness of the rules and practices relating to the safety of staff when on or near a railway line, which is assessed by an examination following training, repeated every 2 years.

⁵ Defined by Network Rail as a person who is certified as competent to enable activities to be carried out by a group of persons on Network Rail infrastructure in accordance with the requirements of the Rule Book.

⁶ A member of staff appointed to watch staff working near tracks that are open to traffic and provide a warning if any of those staff move outside of their safe working area.

- 16 The person in charge⁷ (PIC) for the work, who was also the COSS, had been employed by Linbrooke for 9 years. They were familiar with work to install and test telecommunications cables and had held the PTS competency since 2015 and COSS competency since 2016 (except for a short period between November 2021 and July 2022 when they needed to take the initial COSS course again). The PIC also had not been involved in any previous incidents.
- 17 An observer was on site with the tester and PIC to gain experience of how trackside telecommunications copper cables are tested. They had been employed by Linbrooke for about 5 months and had held the PTS competency since November 2023, although they had also held it in the past, from 2014 to 2021.
- 18 Also present at Chiltern Green was the tester in charge (TIC), who was the lead at Linbrooke for all the telecommunications testing and commissioning on the West Hampstead recontrol project. They were very experienced in testing telecommunications cables and had been employed by Linbrooke for just under 13 years. The TIC had held the PTS competency since 2003.
- 19 A project engineer was responsible for the delivery of the work at Chiltern Green. They had been employed by Linbrooke for about 11.5 years and was very experienced in managing the delivery of work to install and test new telecommunications cabling. The project engineer had managed and planned all the telecommunications cabling activities for the West Hampstead recontrol project.
- 20 A planner supported the planning of the work at Chiltern Green and had been working in this role for Linbrooke for about 3.5 years. They had about 23 years' experience of planning work on the railway and had held the COSS competency in the past. The planner was proficient in using planning systems to prepare and manage documents for work taking place on the railway.
- 21 The driver had been driving trains on main lines since 2018 and had worked for East Midlands Railway throughout this time.
- 22 The signaller had joined Network Rail as a trainee signaller in 2017, initially training and working as a signaller at King's Cross signal box until it closed in 2021. They then moved to West Hampstead signal box, initially working on the pushbutton signaller panels, which were subsequently replaced in December 2023 by visual display unit (VDU) signaller workstations (see paragraph 28).

External circumstances

- 23 It was daylight when the incident happened. Witness accounts, CCTV footage from a passing train, and data from local weather stations showed that it was overcast, with grey cloud cover. It was not raining at the time of the incident, although the ground was damp due to light rain and drizzle that had fallen earlier in the day. Visibility was good and the glare and position of the sun was not a factor.

⁷ The person who has overall accountabilities and responsibilities for the operational, site and task risks for the work being carried out. This includes being involved in the planning and verification of the documentation for the work activity alongside the planner, as well as being the person who is in charge on site when the work is being undertaken.

- 24 There was some transient noise at bridge 127 from road traffic passing under the bridge and from trains passing over it. There was also some noise from a recycling centre on the opposite side of the railway (figure 2), but levels were not significant and not a factor in this incident.
- 25 RAIB has not identified any other external factors that may have influenced this incident.

Background information

West Hampstead recontrol project

- 26 In 2020, Network Rail contracted Linbrooke as the principal contractor to deliver the West Hampstead recontrol project. The project's primary aim was to replace the life expired pushbutton signaller panels on the operating floor at West Hampstead signal box, with VDU signaller workstations.
- 27 The project had a planned timescale of 4 years from design concept to delivery and work started in August 2020. The construction phase took about 2 years and was undertaken in stages. The first stage was signalling related works to reduce the risk to the project when the area covered by West Hampstead signal box was recontrolled.
- 28 The next stage was to convert the maintainer's mess room on the ground floor of the signal box to accommodate a temporary operating floor with VDU signaller workstations. The signallers moved to this room on 27 December 2023. This then allowed the refurbishment of the existing operations floor to take place, with the removal of old equipment and the installation of new VDU signaller workstations. The signallers were working in the temporary facility when the incident took place. The signallers moved back to the refurbished operating floor after it was commissioned on 24 June 2024 (about 2 months after the incident).
- 29 The project also included work to replace all the telecommunications infrastructure between London and Bedford, with the installation of new trackside cabling and location cases to connect equipment to the Fixed Telecommunications Network (FTN). This is a nationwide digital transmission network that operates over fibreoptic and copper cables. It is used for all railway telecommunications and data requirements and also supports the railway's mobile radio network, the Global System for Mobile Communications-Railway (GSM-R). More recently FTN has been upgraded to FTNx, which uses an optical network to allow an assortment of equipment to be interconnected to it using internet protocol.⁸ The equipment is connected locally using copper cables, which run to small lineside equipment buildings, referred to as FTN nodes (figure 6).
- 30 As principal contractor, Linbrooke managed the project and carried out all the telecommunications related work. Much of the signalling related work, such as providing the new VDU workstations, was subcontracted to a signalling supplier.

⁸ Internet protocol, commonly referred to as IP, is a set of rules that govern how data is sent across networks and devices on the internet.



Figure 6: The Harpenden FTN node (courtesy of Linbrooke).

The sequence of events

Events preceding the incident

- 31 On 5 April 2024, the TIC asked the project engineer to plan some trackside telecommunications cable testing work. This was needed to investigate and address four items that had not yet been successfully commissioned due to possible cable faults. One of these items related to a telephone circuit for a hot axle box detector⁹ at Chiltern Green (figure 4), which had failed to work correctly during previous attempts to migrate that circuit to the new cabling. The project engineer then began planning the required work.
- 32 On 9 April, the project engineer attended an internal planning meeting which agreed what resources would be allocated to work alongside the TIC to test the cabling at Chiltern Green. This work was planned to take place sometime during the week starting 22 April. The meeting identified that the PIC and tester would be the ones to support these testing activities.
- 33 On 15 April, the project engineer gave the planner a safe work pack (SWP) request form. An SWP provides information about all the planned arrangements for carrying out work on Network Rail infrastructure, including the safe system of work (SSOW) to be implemented by the COSS. The SSOW covers the specific arrangements to make sure anyone who is required to walk or work on the railway is not put in danger by the movement of trains. An SWP also includes forms for recording these arrangements when they are put in place, plus sections to record the names of everyone who has been briefed on the arrangements. The SWP request form given to the planner included the information that the planner needed to prepare the SWP for the cable testing activities at Chiltern Green. This included specifying who would be the PIC and COSS for this work.
- 34 On 16 April, the planner created the SWP. After checking it, they issued it to the PIC for verification. The PIC verified the SWP later that day. The next day, 17 April, the project engineer authorised the SWP as the responsible manager. The responsible manager role is accountable for appointing a competent and capable PIC to the work. This was something that the project engineer did for all the SWPs produced for the telecommunications installation and testing work on the West Hampstead recontrol project.
- 35 On 19 April, the project engineer sent an email to the PIC, TIC, tester and observer about the logistics for the following week. It covered subjects such as what items were required from stores, which hotels people would be staying in, and it also explained who needed to meet up, where and at what time for the work planned to take place on the first day that week (which was Monday 22 April).
- 36 During the day on 22 April, the tester and PIC travelled to the area and then spent the night in a local hotel. The TIC also stayed in the same hotel that night, ahead of working on site at Chiltern Green the next day.

⁹ A device mounted close to a running rail which monitors passing trains and sends an alert to the controlling signal box if a heat source is detected, such as from an overheating axle. In response to an activation, the signaller should stop the train and ask its driver to examine the train, with remedial action taken as required.

- 37 By about 08:15 on 23 April, everyone had arrived at the Chiltern Green Cottages access point (figure 7). The tester and PIC had travelled there from the hotel together in one van, while the TIC had travelled separately in their own van. The observer had driven from their home earlier that morning. At 08:33, the PIC accepted the SWP for the work and recorded the start time as 08:36. The PIC, in their role as COSS, then gave an SSOW briefing to everyone. The PIC explained that a separated SSOW was to be used, so everyone must remain at least 2 metres away from the nearest running rail of any open line. The TIC then spoke to the others about the testing work. From 08:44 to 08:45, the observer, tester and TIC were recorded in the SWP as signing the briefing declaration, which was to acknowledge that they had understood the briefing given by the PIC.



Figure 7: The access point at Chiltern Green Cottages. The gate (top left), access point sign (top right), approach to the Down Fast line (bottom left) and view in the direction of bridge 127 (bottom right).

- 38 Soon after, the PIC and TIC set off along the railway from the access point (figure 8). They turned right to walk along the cess to the Harpenden FTN node, where one end of the cable to be tested was located. Once at the FTN node, the TIC gained access to it and then shut themselves inside. The PIC then returned to the access point, walking alone along the cess to rejoin the others.



Figure 8: The route taken between the access point at Chiltern Green Cottages and the FTN node (courtesy of Google with RAIB annotations).

39 At about 08:55, the PIC arrived back at the access point. The PIC then appointed the tester as the site warden for the group. The PIC, tester and observer set off at about 09:00 to walk to the other end of the cable (figure 9). At the access point, the group turned left and walked along the cess in a northerly direction. About a minute later, the group arrived at a location case which was about 75 metres from the access point. The tester called the TIC to check if this was where the cable to be tested was located. The TIC advised that they were not in the correct place, so at about 09:04 the group continued walking north in the cess and soon approached bridge 127.

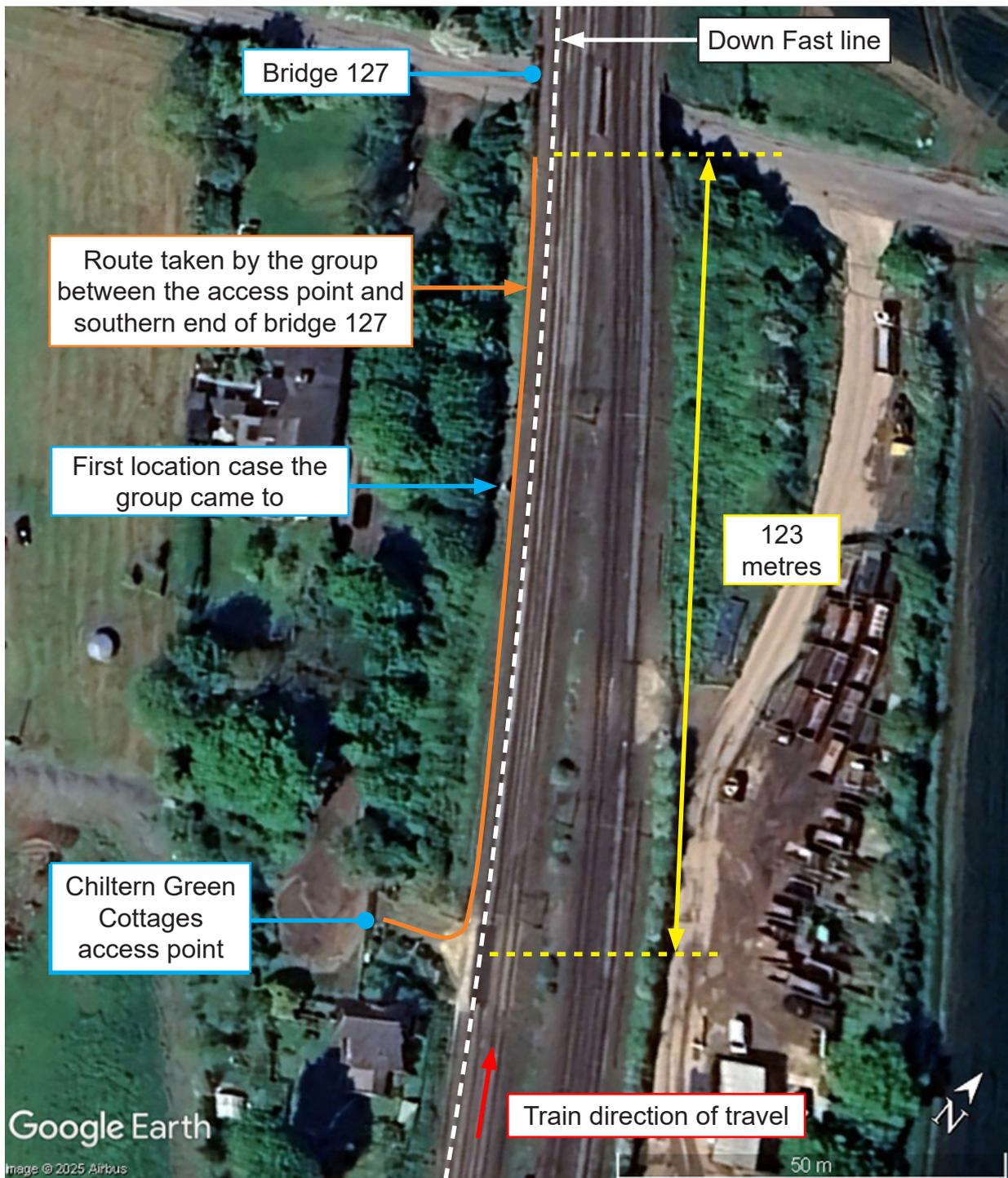


Figure 9: The route taken from the access point at Chiltern Green Cottages to get to bridge 127 (courtesy of Google with RAIB annotations).

- 40 Just after the group arrived at the southern side of bridge 127, while standing in the cess, a train approached on the adjacent Down Fast line. Soon after this train had passed, the group began crossing bridge 127, one at a time, with the PIC going first, the observer next and the tester last. The group then continued walking in the cess in a northerly direction and at about 09:18 arrived at the site of the Chiltern Green hot axle box detectors (figure 10). Here they found the location case that housed the other end of the cable to be tested (figure 11). The tester then began working to test the cable.

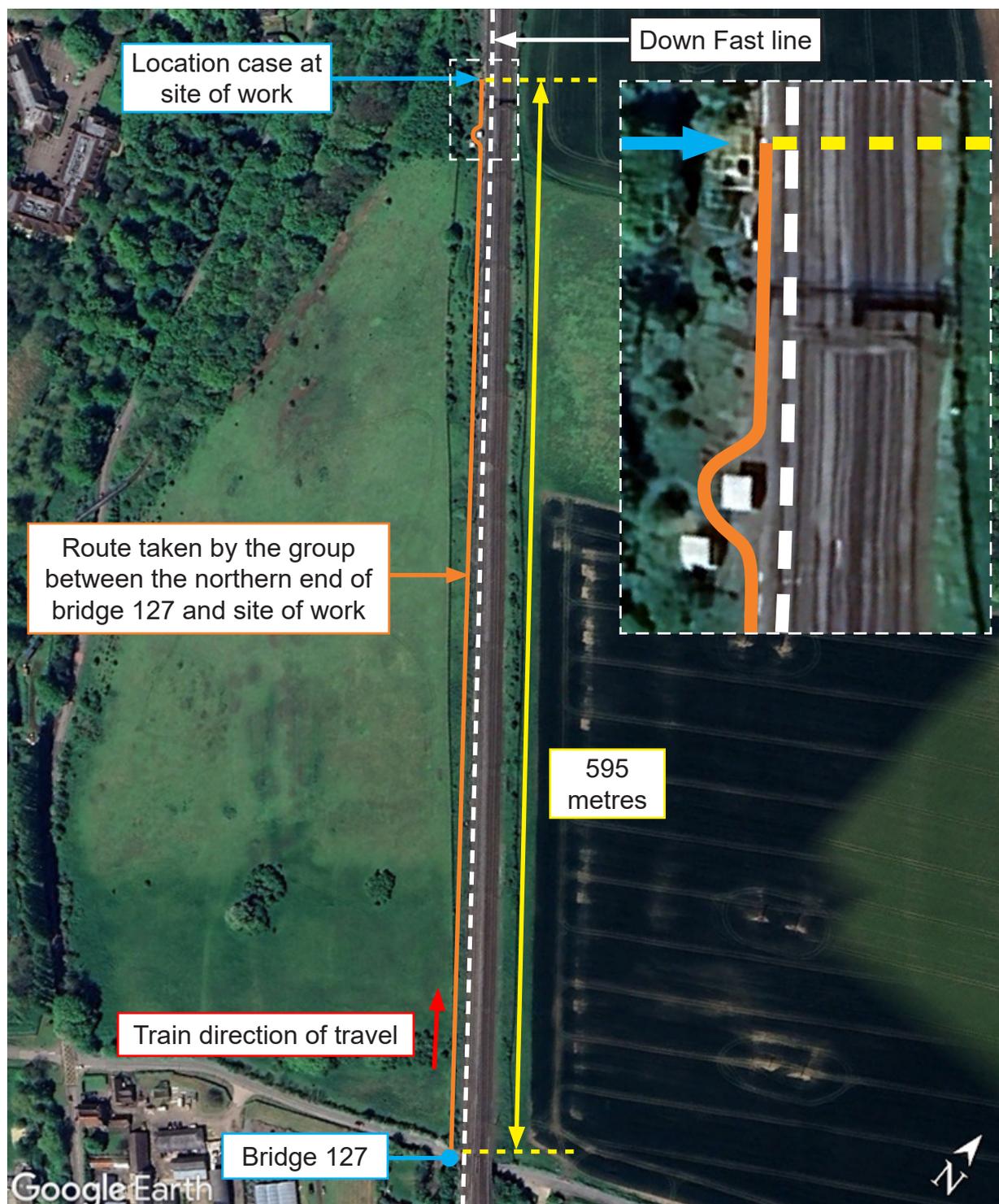


Figure 10: The route taken from bridge 127 to get to the site of work at the other end of the cable (courtesy of Google with RAIB annotations).



Figure 11: The location case at the site of work.

- 41 At about 09:30, the tester informed the PIC that they needed a welfare break. With permission from the PIC, the tester began walking back along the cess to Chiltern Green Cottages access point. At about 09:36, the tester crossed bridge 127 and a few minutes later they arrived back at the access point and left the railway.
- 42 At about 09:50, the tester came back through the gate at the access point and set off to rejoin the others. By 09:52, the tester had walked along the cess until they reached the southern end of bridge 127. The tester then waited briefly, as a train was passing on the Up Slow line. This was because they wanted the noise level created by the passing train to subside before crossing the bridge.

Events during the incident

- 43 While the tester was waiting at the bridge, train 1F20 was travelling towards it, running 29 minutes late. By 09:52:45, this train was about 460 metres from the tester, travelling at a speed of 103 mph (166 km/h).
- 44 About 4 seconds later, after the train on the Up Slow line had passed by, the tester looked to the south. They could not see a train approaching on the Down Fast line, due to the track's curvature, so began to cross the bridge. The tester ran to get across the bridge as quickly as they could (see paragraph 55).
- 45 About 3 seconds later, at 09:52:52, train 1F20 rounded the curve. It was now about 150 metres from the tester. At this point the driver saw the tester about halfway across the bridge and began sounding the train's horn continuously. The driver noticed that the tester was already running to get to the far side of the bridge.
- 46 At 09:52:55, train 1F20 crossed bridge 127 while travelling at 104 mph (167 km/h) and its front end passed the tester. This was just as the tester had reached the far side of the bridge and had stepped off it towards the cess. It was only as the front of the train passed that the tester realised that the train was there.

Events following the incident

- 47 Immediately after passing the tester, the driver began applying the train's brakes. The driver was unsure if the train had struck the tester, so about 0.5 seconds later they then made an emergency brake application. The driver then stopped sounding the train's horn, after it had been sounded continuously for about 7 seconds. At 09:53:09, the driver sounded the horn again when they saw the PIC at the location case. The PIC noticed that the train was braking heavily as it passed by. The train's speed had slowed to 69 mph (111 km/h) by this time.
- 48 At 09:53:34, train 1F20 stopped with its leading cab around 950 metres beyond the northern end of the bridge. The driver then called the signaller to report the near miss with the tester. Soon afterwards, at 09:54, while continuing to walk along the cess to rejoin the others, the tester called the PIC to report the near miss which had resulted in the train stopping. The tester could see the stationary train in the distance.
- 49 At 10:02, the PIC called West Hampstead signal box and spoke to a second signaller. This was just as the tester was approaching the rest of the group at the site of work. The PIC confirmed to this signaller that the tester had not been struck by the train. The signaller instructed the PIC to stop work, leave the railway with their group and wait for a Network Rail mobile operations manager to arrive, who would speak to them about what had happened. Mobile operations managers provide Network Rail's first-line response to incidents that affect the operation of the railway.
- 50 At 10:04, a member of staff at West Hampstead signal box called the driver and advised that the track worker had not been struck by their train. Upon hearing this, the driver felt fit to drive, so train 1F20 set off to continue its journey. It was now running about 40 minutes late.
- 51 At about 10:30, the PIC, observer and tester arrived back at the Chiltern Green Cottages access point. This had involved them walking along the cess and crossing bridge 127 again, one at a time, next to the Down Fast line on which trains were still running. After the others had exited the railway, the PIC walked from the access point, along the cess, to collect the TIC from the FTN node. The PIC and TIC arrived back at the access point at about 10:45 and exited the railway.
- 52 At about 11:15, the mobile operations manager arrived at the access point and began to take statements from the group. Shortly afterwards, Network Rail notified RAIB that a track worker near miss had occurred. By about 12:15, a member of staff from an occupational health provider arrived at the access point to carry out for-cause screening tests¹⁰ on the group, which subsequently returned negative results for both drugs and alcohol. These tests were completed by about 13:25, after which the members of the group departed from the access point and travelled to Brent Cross, London, to meet up with senior managers from Linbrooke.

¹⁰ For-cause screening is a procedure that Network Rail uses to test employees and contractors for drugs and alcohol. These tests are routinely carried out on anyone involved in an incident when working on Network Rail's infrastructure.

Analysis

Identification of the immediate cause

53 The tester was in an unsafe position on a bridge with restricted clearance as the train approached.

- 54 The tester was crossing bridge 127 to rejoin the PIC and observer at their site of work. Bridge 127 had restricted clearance, as the amount of space between the bridge parapet and the nearest running rail was reduced. There was nowhere on the bridge that allowed the tester to be more than 2 metres from the nearest running rail of the Down Fast line, as required by the separated SSOW being used for this work (paragraph 37). Instead, the distance between the bridge parapet and nearest running rail was about 1.5 metres at the southern end of the bridge, decreasing to about 1.3 metres at its northern end (figure 12). The vehicles that formed train 1F20 (paragraph 14) are 2.7 metres wide, so overhang the outside edge of the running rail on each side by about 0.6 metres. This meant the available space for the tester was reduced to about 0.7 metres at the northern end of the bridge, where the incident happened.
- 55 The tester had looked to see if a train was approaching on the Down Fast line before starting to cross the bridge (paragraph 44). However, due to the curvature of the track looking south, the sighting distance for an approaching train was only about 150 metres. This equated to about 3 seconds sighting time for a train travelling at the permissible speed of 105 mph (169 km/h). Being aware of the reduced sighting distance, and that they were placing themselves less than 2 metres from the nearest running rail of the Down Fast line, the tester moved as fast as possible over the bridge by running. Even if the tester had run at a relatively quick pace of 6 mph (2.7 metres per second) on ballast, it would have taken about 8 seconds to reach the far side of the bridge and get to a place that was more than 2 metres from the nearest running rail. However, the tester felt they had no choice but to cross the bridge as they needed to get back to the others to continue the testing work.
- 56 Due to a hardware fault, the CCTV equipment fitted to train 1F20 did not record any footage showing the incident. However, forward-facing CCTV footage from a train on the Down Slow line showed the tester was about halfway across the bridge as train 1F20 approached them (figure 13). It also showed that the tester was already moving quickly by this time.
- 57 The train passed the tester just as they were stepping off the bridge (paragraph 46). Here the available space is still restricted due to a cable run. However, the available space between the cable run and nearest running rail is increased, being about 1.8 metres (figure 12). This gave about 1.2 metres of space between the train and cable run for the tester to occupy.

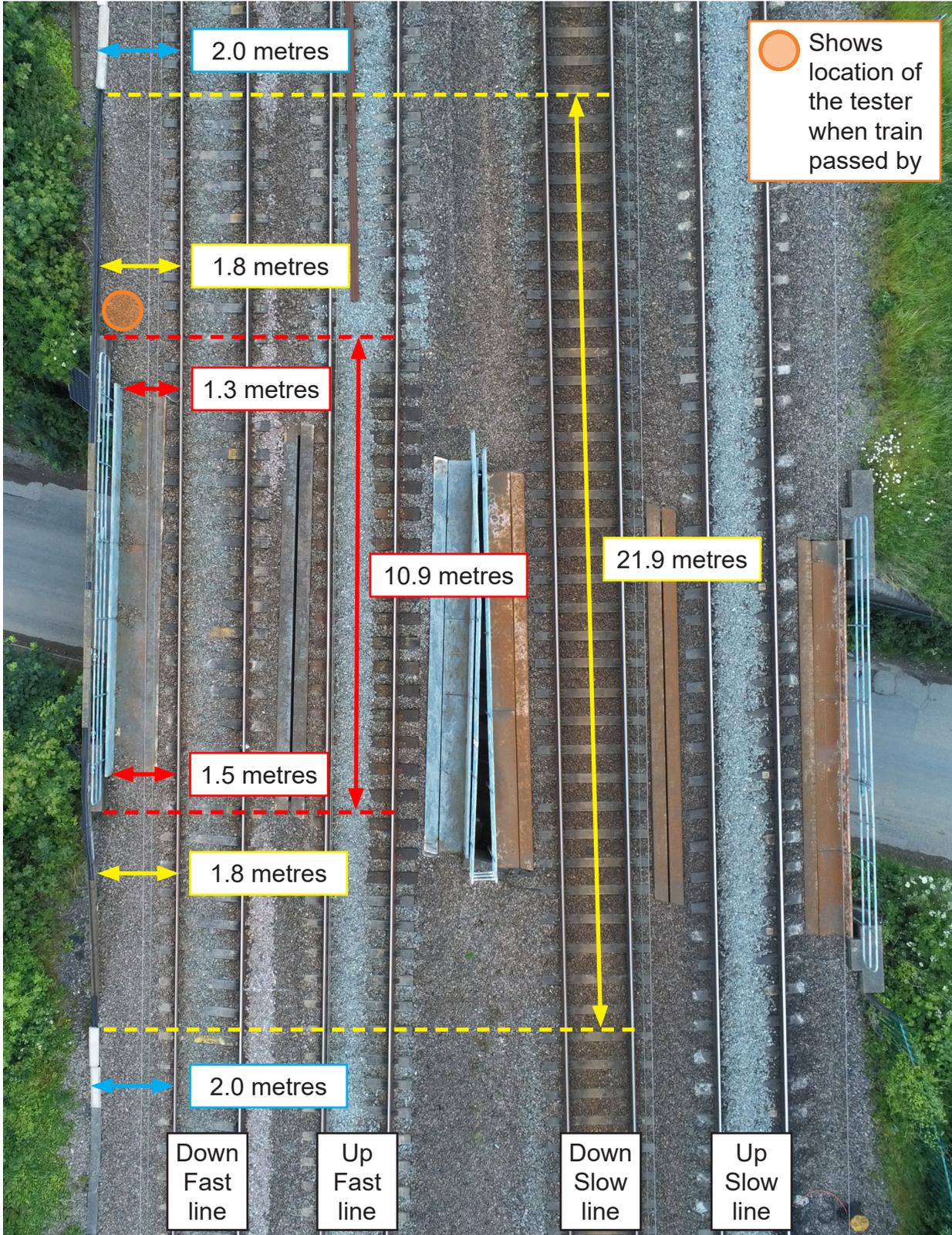


Figure 12: Bridge 127 dimensions.



Figure 13: Image from forward-facing CCTV footage recorded by a train on the Down Slow line (courtesy of Govia Thameslink Railway).

Identification of causal factors

- 58 The incident occurred due to a combination of the following causal factors:
- a. The PIC did not carry out the walking element of the work in the way that the project engineer had planned it (paragraph 59).
 - b. The tester crossed bridge 127 without an effective SSOW being in place, despite being aware of the risks involved in doing this (paragraph 114).
 - c. The tester's PTS competency and the associated rules did not prohibit crossing a structure with restricted clearance while walking alone (paragraph 124).
 - d. The bridge was not signed as a limited clearance structure. This is a possible causal factor (paragraph 132).

Each of these factors is now considered in turn.

How the planned work was carried out

59 The PIC did not carry out the walking element of the work in the way that the project engineer had planned it.

- 60 When the PIC first went onto the railway at the Chiltern Green Cottages access point that morning, they asked the tester and observer to wait at the access point gate while the PIC walked the TIC to the Harpenden FTN node under a separated SSOW (paragraph 38). The PIC then left the TIC on their own at the FTN node at one end of the cable to be tested. The PIC was able to do this because the TIC was working inside an equipment room, with the door closed, and was more than 10 metres from the nearest running rail. This element of the work was carried out as planned by the project engineer.
- 61 When the PIC rejoined the others at the access point, the project engineer had planned that the PIC, tester and observer would then get into their vans and drive to another access point, called the Luton Hoo and Cycleway South access point (figure 14). From the Luton Hoo and Cycleway South access point, the group could walk along a path up to the location case that housed the other end of the cable to be tested. By going this way, the group would have been able to maintain 2 metres of separation from the nearest running rail, as required by the SSOW they were working under. The project engineer's plan did not involve anyone walking from the Chiltern Green Cottages access point in the northerly direction along the cess, nor did it involve anyone crossing any structures with restricted clearance.
- 62 Unaware of the project engineer's plan, the PIC believed that they needed to walk the group from the Chiltern Green Cottages access point to the second site of work. This was because, although the PIC and tester knew the identifying number for the location case containing the far end of the cable, no one in the group knew exactly where it was. This was highlighted by the group stopping at the first location case they came to after they set off walking, before realising it was not the right one (paragraph 39).
- 63 The route taken by the PIC to get to the location case meant the group had to cross bridge 127 and then walk a further 595 metres along the cess. Had the project engineer planned for the group to cross bridge 127, because of the restricted clearance over it, the project engineer could have planned for the PIC to take a line blockage. This involves a signaller preventing trains from moving on a section of a railway line, by placing or maintaining signals at red (danger). That section of line is then blocked, according to defined rules, which then allows a COSS and their group to either carry out work that affects the safety of the line, or to gain access to or work in a place which otherwise would be unsafe to go into while trains are running.
- 64 The project engineer had a record of all the location cases associated with the project where line blockages needed to be taken to access them. Linbrooke had processes in place that allowed it to identify when suitable line blockages were available to take, to book the required line blockage, and then to plan the work so that its staff could use those line blockages to gain access to and from those location cases.

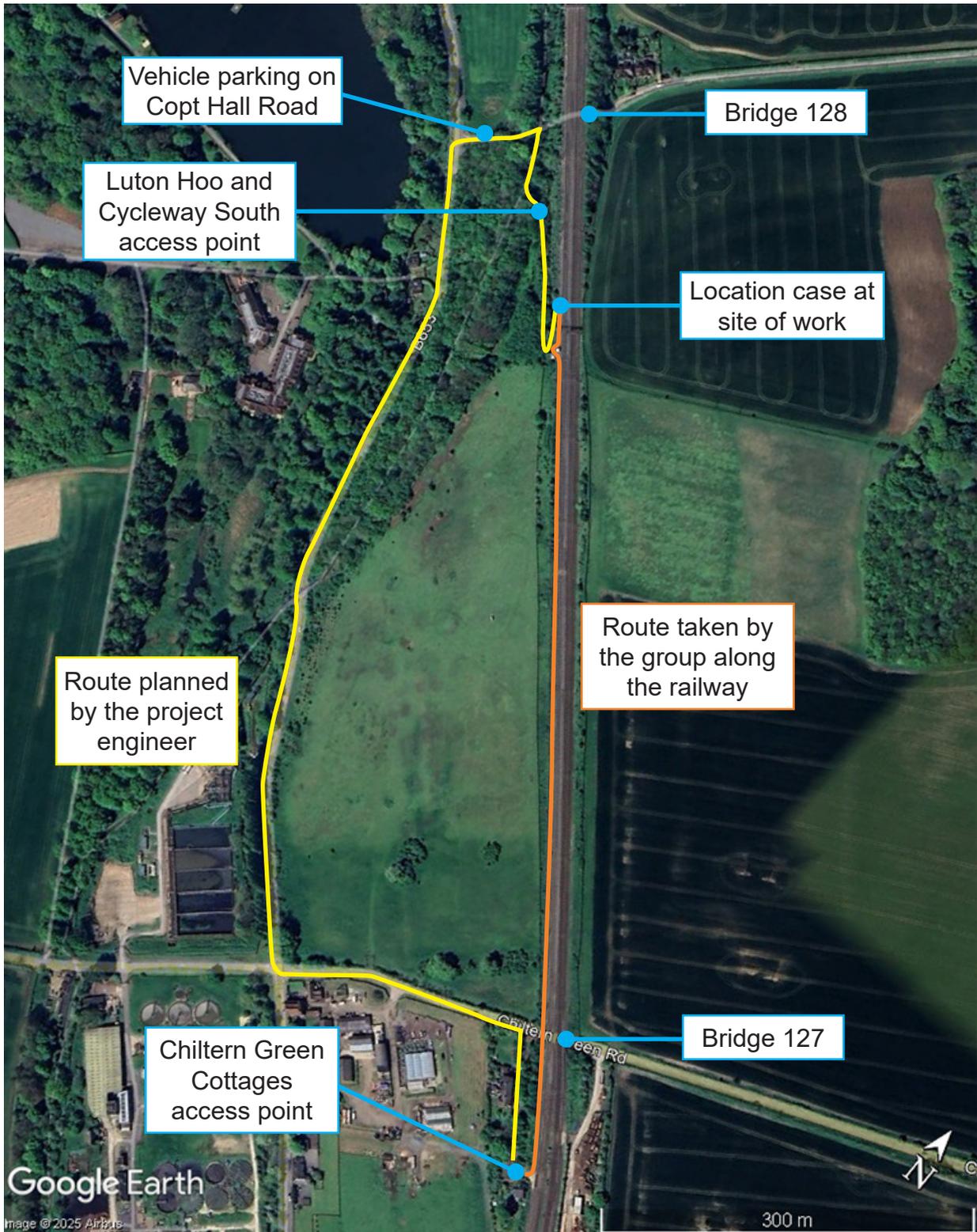


Figure 14: The route the project engineer had planned for the group to take versus the route taken by the group (courtesy of Google with RAIB annotations).

- 65 Another potential way of crossing a structure with restricted clearance, like bridge 127, is to use the 'crossing the line' procedure. This procedure was introduced in September 2020 when issue 7 of Rule Book¹¹ Handbook 7, GERT8000-HB7, 'General duties of a controller of site safety' was published by the Rail Safety and Standards Board (RSSB). It was introduced to make better use of planned gaps in the train service to improve access for track workers, as well as reducing the workload on planners and signallers, by not having to plan and facilitate line blockages for access. It also aimed to reduce instances of track workers crossing lines without any protection being in place.
- 66 The crossing the line procedure can only be used at a specific location to cross tracks or walk over a structure, if Network Rail has assessed and approved it as suitable. Signallers, and any COSS who wants to use the procedure, must be briefed in advance on how to use the procedure at that specific location. Every COSS who has been briefed is then named on a list held in the controlling signal box so that, when a COSS calls and asks to use the procedure, the signaller can first check that they have been briefed on using the procedure at that location. Once the signaller then gives permission for the COSS to use the procedure, the COSS can cross the tracks or structure, staying in contact with the signaller on the phone throughout. RAIB found that no one had ever asked for the crossing the line procedure to be used to cross bridge 127, so Network Rail had never assessed it to see if it was a location where the procedure could be approved for use.
- 67 RAIB also found there was confusion within both Linbrooke and Network Rail about whether non-Network Rail staff could use the crossing the line procedure. Some staff at Network Rail said it could be used by contractors while others said it could not. Linbrooke initially believed that the procedure was for use by Network Rail staff only but subsequently said it could be used by its staff. Due to uncertainty about how to use the crossing the line procedure, Linbrooke stated it always planned its work so that its staff would not use the procedure and would take a line blockage instead.
- 68 When the tester needed a welfare break (paragraph 41), they decided to cross the bridge again. This was because this was the only way the tester knew to get back to the vans at the access point. When the tester told the PIC that they needed to go back, the PIC did not offer an alternative way to go. Instead, the PIC advised the tester to be careful when crossing the bridge.
- 69 The tester looked for a train approaching on the Down Fast line when they crossed the bridge on their southward walk back to the access point, but they did not wait for one to pass before crossing as their need for a welfare break meant they did not want to spend time waiting. Despite this, the tester crossed bridge 127 without incident as a train did not approach on the Down Fast line (although a train passed over the bridge on this line about 2 minutes later).

¹¹ Railway Group Standard GERT8000 which describes the duties and responsibilities of staff, and the regulations in force, to ensure the safe operation of the railway.

- 70 The tester also did not consider using a different route once their welfare break was finished and they were ready to return, northwards, to the group, even though this now required them to cross bridge 127 for a third time. The tester was not aware, and had not been briefed on, the way that the project engineer expected the group to get to the location case by driving to the Luton Hoo and Cycleway South access point. This was because the PIC had not identified, from the information that they had been given, what this plan was. Although the tester remembered after the incident that they had been to the Luton Hoo and Cycleway South access point several years before, this was when they were working on a different project, and they had since forgotten about it.
- 71 This causal factor arose due to a combination of the following:
- The PIC was unfamiliar with one of the locations that they needed to go to for the testing work (paragraph 72).
 - The PIC had a very limited role in planning the work and had not been briefed beforehand (paragraph 78).
 - The documents issued to the PIC did not give a clear description of the expected way to carry out the walking element of the planned work (paragraph 89).

Each of these factors is now considered in turn.

Familiarity with the location

72 The PIC was unfamiliar with one of the locations that they needed to go to for the testing work.

- 73 Users of the Luton Hoo and Cycleway South access point need to park their vehicle on Copt Hall Road, then walk a short distance along a path to a gate in the boundary fence (figure 15). After passing through the gate, users follow another path that leads to the various location cases and equipment buildings associated with the Chiltern Green hot axle box detectors.



Figure 15: The gate for the Luton Hoo and Cycleway South access point and path leading from it.

- 74 Both the PIC and tester had been to the Chiltern Green Cottages access point about three or four times in the past. Each time, they had turned right after going through the access point gate and walked along the cess to the Harpenden FTN node. The PIC had never accessed the railway at the Luton Hoo and Cycleway South access point and had never been to the location case that housed the northern end of the cable being tested. Once, about a month before the incident, the PIC had been asked to go to the access point to drop off materials. They had got as far as parking on the nearby Copt Hall Road but were then called away to carry out another job.
- 75 The PIC's unfamiliarity with this location meant that they did not associate the Luton Hoo and Cycleway South access point with Copt Hall Road. It also meant that they did not associate this access point with the Chiltern Green hot axle box detectors and their related location cases. Consequently, the PIC did not consider going to this access point to get to the location case that housed the cable the group needed to test.
- 76 In the past, both the PIC and tester had been to another access point, which was also located off Copt Hall Road. On these occasions, they had gone to a pedestrian access point located next to bridge 128, where the railway passes over Copt Hall Road (figure 16). This access point is used to get to the Up Slow side of the railway. Both the PIC and tester knew this access point was on the opposite side of the tracks to where they needed to be working on the day of the incident.
- 77 Once they arrived at the location case, the PIC and observer noticed there was a path leading to where they were. While waiting for the tester to come back from their welfare break, the PIC asked the observer to follow the path to see where it led. The observer did this and found the access gate in the boundary fence and took photographs of it. The observer was doing this when the incident happened. Soon after, the PIC called the observer and told them to come straight back and wait with them. It was only after the incident that the PIC realised that they could have used this nearby access point instead of walking from the Chiltern Green Cottages access point.

Involvement in the planning

78 The PIC had a very limited role in planning the work and had not been briefed beforehand.

- 79 The project engineer planned the testing work. They decided what needed to be done, when it would take place, what access and egress points the staff working on site needed to go to and what SSOW would be used for both the walking and working elements of the task. The project engineer was present when it was decided what resources would be used for this work (paragraph 32). The project engineer acknowledged that the PIC and tester involved in this incident were not their first choice to undertake the planned task as they had not been working full time on the project. Despite this, the possibility that they might not be familiar with some of the locations they needed to go to was not considered as a potential issue when deciding who would do the work.

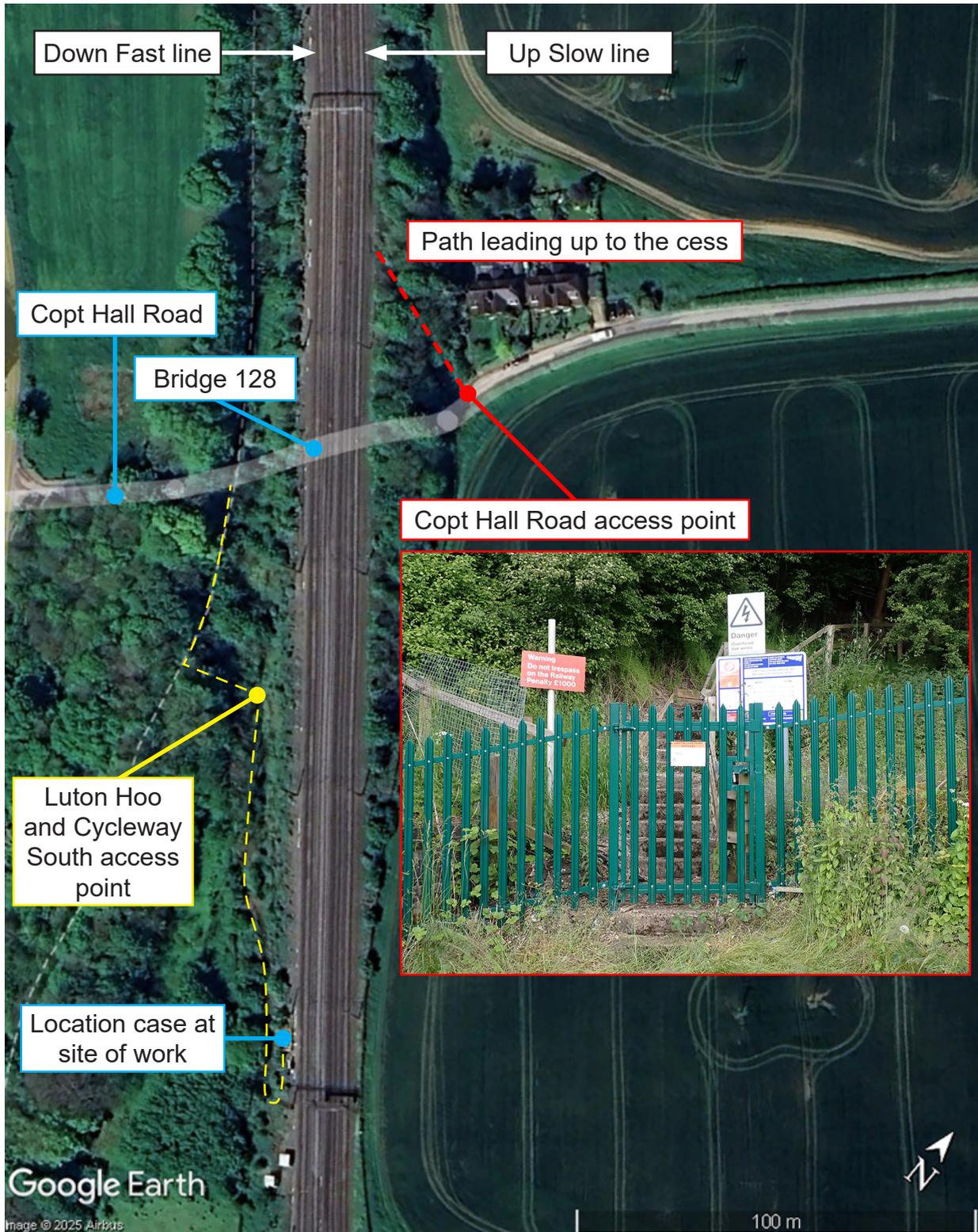


Figure 16: The Copt Hall Road access point (courtesy of Google with RAIB annotations).

80 After planning the work, the project engineer gave information to the planner on an SWP request form (paragraph 33). The planner used this information to create the SWP on a planning software application called RailHub. Linbrooke staff used RailHub to create and manage all its SWPs. RailHub is also used by Network Rail and many other contractors to manage SWPs for work taking place on Network Rail infrastructure.

81 Network Rail company standard NR/L2/OHS/019, 'Safety of people at work on or near the line', issue 12 dated 3 June 2023, defines the process that should be followed for planning work that is to take place on Network Rail infrastructure (figure 17). In step 3 (as shown in figure 17), the process requires the planner to consult with the PIC when producing the SWP. It also references that it is good practice for the planner and PIC to collaborate and create the plan for the work together. In this case, neither the project engineer nor the planner consulted with the PIC when the SWP was produced.

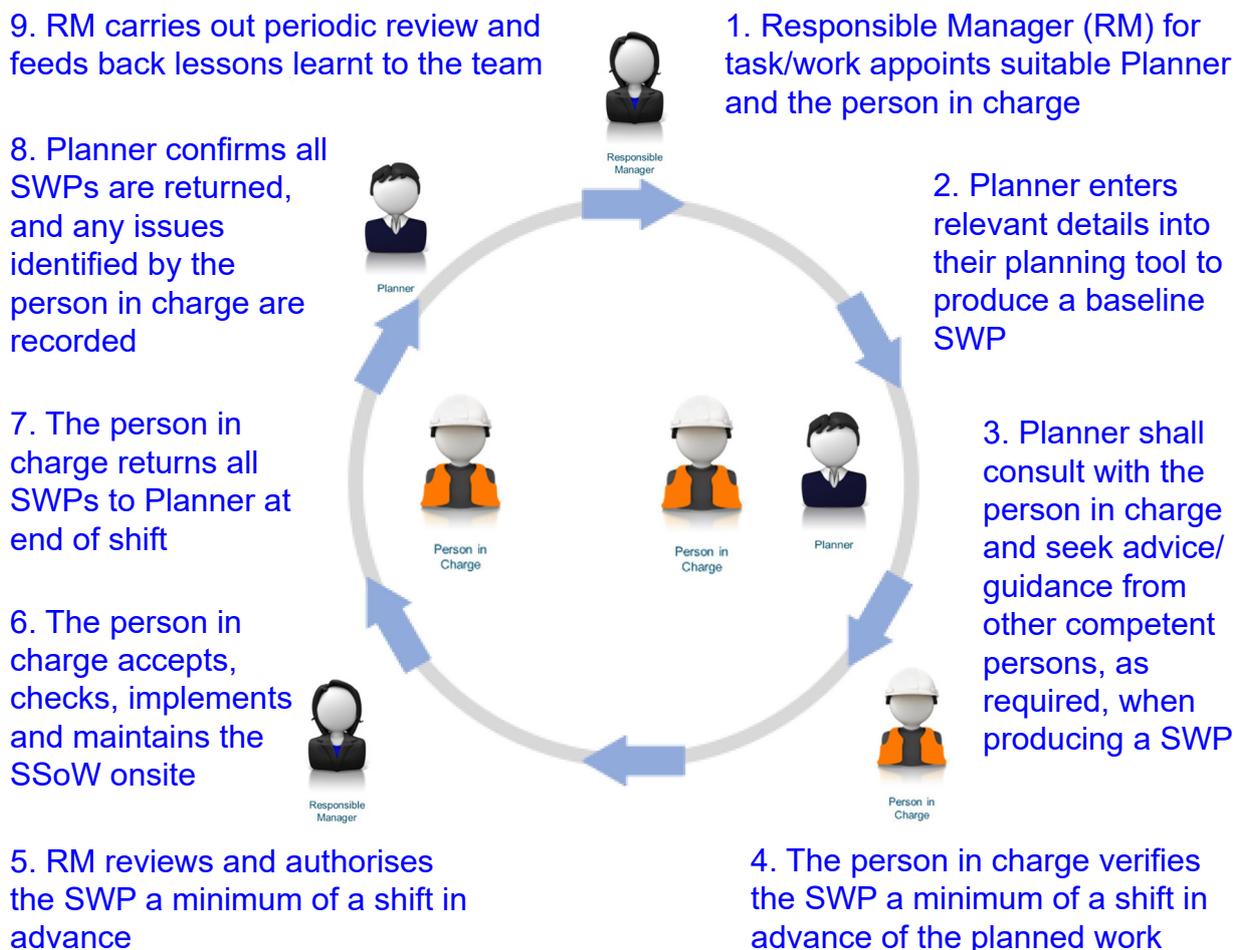


Figure 17: The planning process as defined in NR/L2/OHS/019 (courtesy of Network Rail).

82 The planning process in NR/L2/OHS/019 is aligned with how Network Rail delivery units operate, with maintenance teams that work locally and are based at fixed locations where the planners are also located. However, it can be difficult for contractor organisations to actively involve its staff who carry out the PIC role in the planning stages in a similar way. This is because these staff are often away from the office carrying out work, at the time when the work scheduled for the following weeks needs to be planned. This meant Linbrooke's implementation of the planning process as described in NR/L2/OHS/019 relied on the PIC understanding how the walking and working elements of the work on site should be executed through either the briefings they received or the documentation they were given.

- 83 Once the SWP was created, it was issued to the PIC to verify (paragraph 34). The PIC then received a notification via RailHub to tell them an SWP was waiting to be verified. The PIC verified the SWP on the same day, while they were working away on a different project, staying overnight in a hotel.
- 84 The minimum requirement for verifying an SWP in NR/L2/OHS/019 is that this be done at least one shift in advance. Linbrooke aimed to have all SWPs verified by the end of the week for any work taking place the following week. Witness evidence indicated that staff at Linbrooke who carried out the role of PIC were not allocated any specific time during their working day to verify SWPs. Linbrooke expected the PIC to verify SWPs when they had some spare time during the working day, or once back at their hotel in the evening. Planners were required to chase a PIC to verify an SWP if it was not done within a few days.
- 85 Witness evidence also indicated that the time spent by a PIC verifying an SWP varied depending on the selected SSOW. If the SSOW included taking line blockages, so was more complex, then a PIC would usually take more time to understand exactly what needed to be done to take the line blockage and to check the accuracy of the information in the SWP. However, if the SWP was for a separated SSOW, so much simpler, the checks by a PIC were much more cursory. Consequently, a PIC would normally complete the verification of an SWP for a separated SSOW within a few minutes, without necessarily commenting on its suitability or accuracy.
- 86 Witness evidence indicates that the PIC involved in this incident verified the SWP for the testing work at Chiltern Green, which was for a separated SSOW (paragraph 37), in a similar cursory manner. This was confirmed by records on RailHub which show the SWP was verified in less than a minute. The PIC tended to regard the verification of this type of SWP as a way of finding out in advance whereabouts they would be working on a particular day the following week.
- 87 The PIC did not receive a briefing beforehand to explain to them how they should have carried out the testing work. On the Friday before the incident, the project engineer held a face-to-face briefing for the testing work at Linbrooke's offices in Sheffield. This briefing was attended by the TIC but none of the others were present. On that day, both the PIC and tester were travelling back to their homes after working away in other parts of the country during that week. At the briefing, the project engineer and TIC discussed what needed to be done but focused on the technical aspects of testing the cable and commissioning the telecommunications circuit. The project engineer and TIC did not discuss the access arrangements or places where people needed to go to.
- 88 After the briefing, the project engineer gave the TIC paper copies of a document called the site works plan (see paragraph 110), so that copies of it would be available to everyone on site. The site works plan listed information about the locations for each activity. The project engineer also attached this plan to the email they sent to everyone involved (paragraph 35). The email explained what to do on the first day of the week but did not tell the PIC about where to go or what to do from Tuesday onwards. Instead, the project engineer expected that the PIC would use the information in the site works plan to work out for themselves what to do for each activity on the subsequent days that week.

Description of the plan

89 The documents issued to the PIC did not give a clear description of the expected way to carry out the walking element of the planned work.

90 Linbrooke had provided its staff on site with three documents for the work that day. These were the SWP, task briefing sheet and site works plan.

Safe work pack

91 The SWP described the SSOW that the PIC needed to implement for both the working and walking elements of the activity whenever they and their group were on or near the line (paragraph 33). Being on or near the line is defined in Rule Book Handbook 1, GERT8000-HB1, 'General duties and track safety for track workers', issue 7 dated September 2021, as when someone is within 3 metres (10 feet) of a railway line and there is no permanent fence or structure between them and the line, or they are on the line itself (figure 18). On a station platform, someone is on or near the line when they are carrying out engineering or technical work within 1.25 metres (4 feet) of the platform edge.

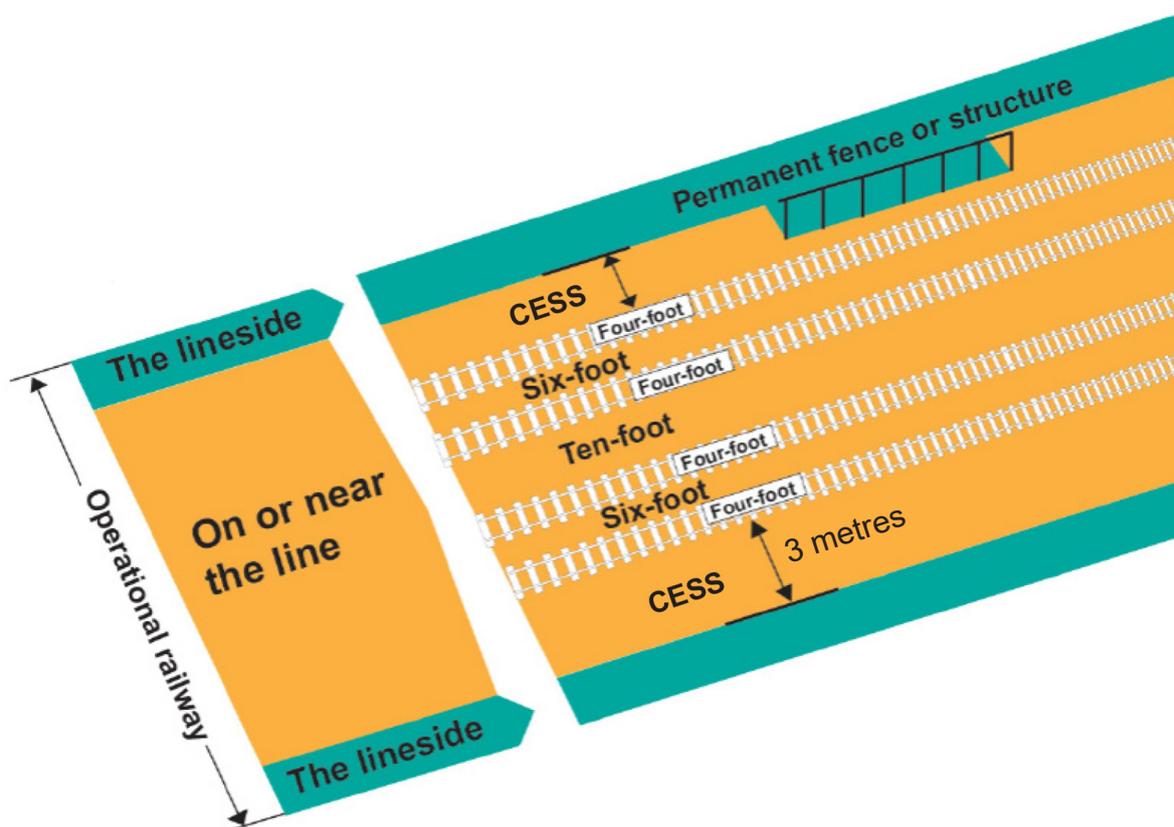


Figure 18: Diagram from GERT8000-HB1 showing how on or near the line is defined (courtesy of RSSB with RAIB annotations).

92 Section 2 of GERT8000-HB7 describes how a COSS can allow work to be done without blocking a line, provided it will not affect the safety of the line, and no one will come within 2 metres of the nearest running rail of an open line. The cable testing activities as planned met these criteria.

- 93 Section 4 of GERT8000-HB7 required the PIC, as COSS, to set up an SSOW whenever any member of their group would be within 3 metres of an open line. Members of the group needed to be within 3 metres of the Down Fast line to walk to either end of the cable. The project engineer planned the work so that the PIC would implement a separated SSOW for this walking activity. This required everyone in the group not to go within 2 metres of the nearest running rail on the Down Fast line when either working or walking.
- 94 When the PIC and TIC used the separated SSOW to get to the FTN node, the PIC, in their role as the COSS, was responsible for making sure that neither they nor the TIC went closer than 2 metres to the nearest running rail of the Down Fast line. The group that later went to the location case was formed of three people (paragraph 39) which meant the PIC needed to appoint a site warden. The tester held the site warden competency (paragraph 15) so was appointed by the PIC to give a warning if anyone went closer than 2 metres to the Down Fast line.
- 95 The duties of a site warden are described in Rule Book Handbook 3, GERT8000-HB3, 'Duties of the lookout and site warden', issue 3 dated September 2014. When appointing a site warden, there must be an identifiable limit to the site of work. This is so that the site warden can know when to give a warning if any of the group go beyond that limit. Network Rail stated that site wardens were only ever intended to be used for static sites of work when staff were working rather than walking. However, using site wardens when walking to and from a site of work was not explicitly prohibited in GERT8000-HB3. This had led to the rail industry interpreting the rules to mean that site wardens could be used with a separated SSOW while a group was walking between an access point and a site of work. Consequently, it had become common practice to do this.
- 96 The project engineer had not known that the observer would be present on site when planning the work. Consequently, when the SWP was produced, verified and authorised, no one was identified in it to be a site warden. This was because all the walking and working activities were planned to be just two people, the COSS plus one other. When the PIC found out on the day that the observer was coming with them and the tester to the location case, they adjusted the SSOW to accommodate this. Before setting off, the PIC briefed and appointed the tester as the site warden. The nominated limit given by the PIC to the tester for shouting a warning to the others was when anyone strayed into the area between the cable troughing lids and nearest running rail. The PIC had estimated that the cable troughing gave about 2 metres separation at this location.
- 97 The SWP issued for the work on 23 April 2024 contained no information about how to get to a particular site of work from an access point. In terms of where the PIC needed to go to gain access to the railway for the testing, the SWP only showed the Chiltern Green Cottages access point. While this was the correct access point for where the PIC needed to go onto the railway to take the TIC to the Harpenden FTN node, the SWP did not define a second access point where the PIC should then have accessed the railway to get to the location case. This was because RailHub had been designed in line with the requirements in NR/L2/OHS/019, which meant it only allows one access point to be defined in an SWP. When required, Linbrooke usually worked around this by using RailHub to specify the second access point to be used as the egress point in the SWP, instead of producing a separate SWP that defined the second access point.

- 98 On the SWP request form given to the planner (paragraph 33), the project engineer identified the second access point to be used by defining the egress point as 'Cophthall Road UB128' despite intending for staff to use the Luton Hoo and Cycleway South access point (paragraph 61). The project engineer had always referred to this latter access point as 'Cophthall Road' because anyone going to it parked their vehicle on Copt Hall Road before walking a short distance to the access point gate (figure 16). When the planner used this information on the form to create the SWP, it led to an inaccuracy as the planner selected the Copt Hall Road access point (paragraph 76) from the list of access points shown on RailHub. This was the access point on the Up Slow side of the railway and so was not the intended second access point for the work. This was not noticed by anyone when the SWP was checked, verified and authorised.
- 99 When on site that morning, the PIC had noticed that the SWP said to access at Chiltern Green Cottages access point and egress at Copt Hall Road access point. The PIC recognised that Copt Hall Road was being designated as the second access point to use, as opposed to being the designated egress. However, the PIC discounted using this access point knowing that it was on the other side of the railway, and it was not permitted to cross four open running lines to get between this access point and the site of work.
- 100 The Luton Hoo and Cycleway South access point that the PIC needed to use was mentioned in the SWP. It was shown in a list of intermediate access points within the mileage covered by the SWP. However, it was not shown on the supporting line diagram extract provided in the SWP (figure 19). Nor was it shown in the part of the SWP which defined the access points that should be used by the PIC to get to the sites of work.
- 101 NR/L2/OHS/019 explains that it is good practice to provide a specific description of the activity to be carried out in the SWP and provide details about the site where the work is planned to take place. In the SWP used by the PIC, the text that described the activity was taken directly from the SWP request form. It simply stated the work was telecommunications testing and listed the names of the sites of work. It did not describe how to execute the work or provide any information about the sites of work.
- 102 As the PIC did not know the whereabouts of the location case they needed to go to, and with no clear information in the SWP to guide them, they decided to walk to the location case from the Chiltern Green Cottages access point. The logic used was that the group would get to the correct location case at some point. This decision was also influenced by the PIC discounting Copt Hall Road as the second designated access point.
- 103 It was unusual for the PIC to carry out cable testing by using an access point in the middle of its length and then going in both directions from it. Normal Linbrooke practice was to have a COSS and tester at each end of a long cable when testing it. Each COSS would then have their own SWP to define what access point to use to get to their end of the cable. RAIB found that this practice matches how Network Rail signalling maintenance teams based in Derby plan their testing of long cables, with a COSS with their own SWP at each end, suggesting that it may be a common practice. However, despite this, the planned work on 23 April had not been resourced so that it could be carried out in this way.

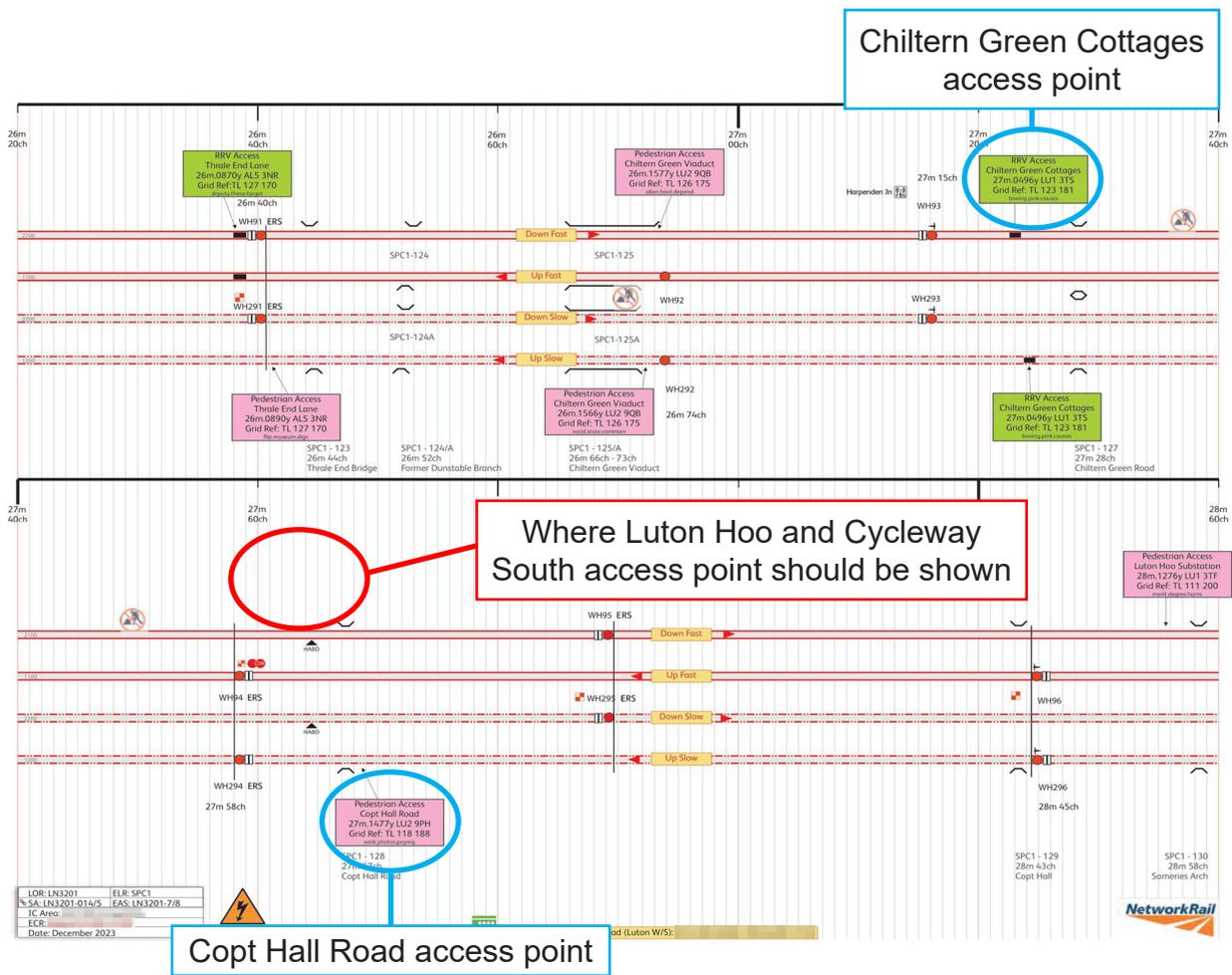


Figure 19: The line diagram extract in the SWP (courtesy of Linbrooke with annotations by RAIB).

104 There were optional sections in RailHub where planners could include further information in the SWP about the activity being carried out. These free text fields related to the sections that covered ‘operational risks’ and the ‘task or site risk controls’. However, the investigation found that a planner would not use either of these sections when creating the SWP to provide the PIC with information about how to carry out the work.

105 RailHub also includes a collaboration notes feature, which the planner could have used to provide additional information to the PIC about how to carry out the work activity. However, this feature was not being used by staff at Linbrooke. Another option was that the planner could have uploaded additional information as a document, which would then be attached to the SWP. Linbrooke had used this feature to include the task briefing sheet in the SWP.

Task briefing sheet

- 106 The second document Linbrooke provided to the PIC was the task briefing sheet for the testing activity. It was provided with the SWP and was available to be viewed by the PIC on a tablet. It is not clear from the available evidence if the PIC looked at it to give a briefing to the group before they started work. While witnesses agreed that the PIC gave the COSS briefing which covered the SSOW (paragraph 37), witness evidence is unclear about who gave the task briefing. Some thought the PIC gave a task briefing while others believed the TIC covered this briefing when they talked through the technical elements of the work that they were there to do (paragraph 37). Everyone signed the task briefing sheet, but Linbrooke later established that this was not done until everyone was back at the access point after the incident.
- 107 Section 1 of the task briefing sheet included a description of the testing work. It mentioned the sites where work was to take place but there was no description of what access point to use to get to any of these places.
- 108 Section 5 was titled 'Access & Egress to the Workplace'. However, the wording in this section was generic and referred to looking at the site works plan (see paragraph 110) and the what-3-words location references (a geographic coding system which provides locations to a 3 metres resolution) it provided. This section did not provide information about any access points for the PIC to go to.
- 109 Section 6 included information about the locations of the sites of work. In this section the relevant places were named, and a mileage was given for each one. The mileage for the location case that the PIC needed to go to was shown as 27 miles 1296 yards (59 chains). This information could have been used by the PIC to help identify where they needed to go in the absence of this information being included in the SWP. However, the PIC did not use it. Instead, the group began walking from the Chiltern Green access point checking different location cabinets as they went (paragraph 62).

Site works plan

- 110 The site works plan was the third document available to the PIC. The project engineer had expected the PIC to use this document to work out where they needed to go. The TIC had brought the paper copies of the plan given to them (paragraph 88), and everyone had access to an electronic copy (paragraph 88) which listed information about the locations for each activity. This included the mileage and the what-3-words reference for each access point to be used. It also provided this information for the location case at each site of work.
- 111 The site works plan described the access point the PIC, tester and observer needed to go to as 'Cophthall Road UB128'. The mileage given for this access point was 27 miles 1477 yards (67 chains), which matched the mileage of the Copt Hall Road access point on the Up Slow side of the railway at bridge 128 (figure 4). The plan also listed two what-3-words references for this access point, whereas all the other entries only had one. The first matched the Copt Hall Road access point on the Up Slow side of the railway. The second tallied with the location of the gate in the boundary fence for the Luton Hoo and Cycleway South access point on the Down Fast side (figure 15). This plan also provided the correct mileage and what-3-words reference for the location case that the group needed to go to.

- 112 Other than quoting its what-3-words location, the site works plan made no specific reference to the Luton Hoo and Cycleway South access point. Instead, the project engineer had referred to it as the 'Cophall Road' access point (paragraph 98). However, due to their unfamiliarity with the area (paragraph 72), the PIC only associated the name 'Cophall Road' with the access point on the opposite, Up Slow side, of the railway.
- 113 While the project engineer had expected the PIC to use the site works plan to determine where they needed to go, there is no evidence that the PIC looked at it. Had they done so, they might have become aware of the position of the location case. This could have changed their decision to walk to it from the Chiltern Green Cottages access point, but the use of 'Cophall Road' to describe the associated access point meant that it was likely that the PIC still would not have realised that the project engineer's intention was for them to use the Luton Hoo and Cycleway South access point to get to this site of work.

Crossing bridge 127

114 The tester crossed bridge 127 without an effective SSOW being in place, despite being aware of the risks involved in doing this.

- 115 When the group set off from the Chiltern Green Cottages access point, it was possible for them to maintain 2 metres of separation from the nearest running rail while walking in the cess. However, as they reached bridge 127, the PIC (as COSS) and tester (as site warden) could both see that the amount of separation to the nearest running rail was reduced to less than 2 metres (figure 12), even though there were no limited clearance signs displayed on the bridge (figure 20).



Figure 20: Limited clearance signage as defined in GERT8000-HB1 and example of this signage fitted to a tunnel portal (left image courtesy of RSSB).

- 116 Once at the bridge, the group stopped in a position of safety¹² while the PIC thought about what to do next. The PIC did not look on their tablet to check if the bridge was listed in the SWP as a site-specific hazard due to its restricted clearance. This was because very soon after stopping, a train passed the group on the Down Fast line. This prompted the PIC to decide that as there would now be a gap until the next train could approach on that line, they would have enough time to get the group safely across the bridge if they were quick.
- 117 The PIC suggested an impromptu method of working to the others, where each member of the group quickly crossed the bridge, one at a time, while the PIC and tester looked out for an approaching train. However, there was only about 3 seconds sighting and consequent warning time to get to a position of safety, should a train approach on the Down Fast line at the permissible speed of 105 mph (169 km/h). The way in which the PIC and tester managed how the group crossed the bridge was an informal arrangement, did not form part of the planned SSOW in the SWP, or meet with the requirements of the relevant rules for implementing an SSOW. The way the group crossed the bridge also showed that they were aware of the restricted clearance and conscious of the increased risk to the group by crossing the bridge.
- 118 No one objected or refused to cross the bridge using this informal arrangement, even though witness evidence established that members of the group were aware that they were no longer maintaining 2 metres of separation as required by their SSOW. No one in the group invoked Linbrooke's work safe procedure, which allowed its staff to stop work if they believed it was unsafe to continue an activity. This was despite witness evidence that found everyone knew about the procedure and would have had no hesitation in using it if they had felt the need to. In this case, they stated they did not feel the need to.
- 119 When the tester walked southwards to the access point for their welfare break (paragraph 69), they looked out for an approaching train before crossing the bridge. As none were approaching at the time, they crossed quickly and continued to the access point. When it was time to head back northwards to rejoin the group, crossing the bridge was now the tester's default route (paragraphs 68 to 69). The tester's actions in running across the bridge (paragraph 44) even when they thought a train was not approaching, showed an understanding of the risk associated with the action, but they still decided to proceed.
- 120 Although the tester was not appointed as a COSS on the day of the incident, the training course which the tester attended to gain their COSS competency (paragraph 15) included a section on the importance of understanding the site of work, including the access points and potential hazards. This part of the training covered how to access and egress the site of work when using a separated SSOW. It explained how a COSS must check that the arrangements are suitable, for example, that the required separation for the SSOW can be achieved when walking to or from a site of work.

¹² A place where it is considered safe to be when a train passes. According to the Rule Book, a person is in a position of safety if they are at least 1.25 metres from the nearest open line if the permissible speed on that line is up to 100 mph (161 km/h). If the permissible speed is over 100 mph (161 km/h) this distance increases to 2 metres.

- 121 The COSS training also covered issues that a COSS might encounter when establishing a 2-metre distance. This included a reference to it being difficult to establish this distance from within the cess and a warning that cable troughing routes are not always more than 2 metres from the nearest running rail.
- 122 In addition, the training looked at the potential dangers to consider when walking to a site of work while using a separated SSOW. Limited clearances were given as an example of this. The training also included information about risk mitigation for hazards, including how to manage changes to the level of risk during an activity. An example given was how the level of risk would increase when a place with restricted clearance is encountered. The training covered personal responsibilities too, explaining that a COSS is responsible for taking care of their own safety and those around them, and that they should always follow their safety training.
- 123 The tester frequently worked or walked using a separated SSOW. As a COSS, when walking on or near the line by themselves or with just one other person, the tester was experienced in judging the 2-metre distance from the nearest running rail. As a site warden, the tester was also experienced in giving a warning when someone strayed less than 2 metres from the nearest running rail. The tester's knowledge and experience from being a COSS and a site warden meant they would have been aware of the increased risk to themselves, due to not maintaining the minimum of 2 metres separation from the nearest running rail of an open line, so should have known not to cross bridge 127 without an effective SSOW being in place.

Rules for crossing limited clearance structures

124 The tester's PTS competency and the associated rules did not prohibit crossing a structure with restricted clearance while walking alone.

- 125 Although the tester held competencies as a COSS and site warden, they were not carrying out either of these roles when the near miss occurred. Instead, they were walking alone on or near the line using their PTS competency (paragraph 15).
- 126 Issue 7 of GERT8000-HB1 was current at the time of the incident. It stated in section 4 that anyone going on or near the line alone must hold a valid certificate of competence in PTS. Section 4 also stated that a PTS competency holder cannot work alone when on or near the line unless they are also a COSS. The only occasion a PTS competency holder can go on or near the line without a COSS is when they are walking alone, which is what the tester was doing at the time of the incident.
- 127 Section 4.2 of GERT8000-HB1 required the tester, as a PTS holder, to have some local knowledge before going on or near the line. This included information about each line such as its permissible speed, directions from which trains normally approach, where not to go when trains are running and any locations with limited clearance. The tester knew most of this information from the SSOW briefing that the PIC had given to the group (paragraph 37).

- 128 However, witness evidence indicates that hazards related to limited clearance were not discussed by the PIC during the SSOW briefing. The SWP included a list of specified hazards for the area it covered. These were taken from the national hazard directory¹³ and included an entry that identified bridge 127 as having restricted clearance. While the hazard at bridge 127 was not covered in the briefing, the tester was clearly aware of the restricted clearance at bridge 127 (paragraph 115).
- 129 As part of the training for the PTS competency, track workers are told that they need to be in a position of safety no less than 10 seconds before a train arrives. The tester knew this requirement but was aware from their COSS training that the available sighting distance, and subsequent warning time, could not be achieved when they were crossing bridge 127.
- 130 Section 10 of GERT8000-HB1 explained what a limited clearance warning sign (figure 20) was and how a track worker must not enter or stand within the length of a limited clearance structure when a train is approaching. This differs to the contents of RIS-3413-TOM, 'Provision of Information and Signs for Access on the Railway', issue 2 dated September 2018, which states that a limited clearance sign is provided to warn staff that the position of safety is interrupted by an obstruction and that there is no safe access to the designated area while trains are running, rather than when they are 'approaching' as stated in GERT8000-HB1. There were no rules in GERT8000-HB1 about what a track worker should do or not do when walking alone and encountering a structure with restricted clearance. This meant that GERT8000-HB1 did not explicitly prohibit the tester, as a PTS competency holder walking alone, from crossing bridge 127 while trains were running, even though this could never be a safe action to take.
- 131 Similar information was provided in RT3170, 'The Guide to Personal Track Safety', issue 10 dated 2020, which was current at the time of the incident. This document formed the basis of much of the training for the PTS competency. Section 1.6 explained what limited clearance signs were but again there was no guidance for PTS competency holders on what to do if a limited clearance sign or a structure with restricted clearance was encountered while walking alone. Section 4.5 in RT3170 covered walking alone and repeated much of the information in GERT8000-HB1. The only additional information found was in a paragraph that stated, '*There is no position of safety in an area of limited clearance – so don't enter if a train is coming. These are dangerous places and should be avoided*'. While this warned of the danger, it did not prohibit a PTS competency holder from going into an area of limited clearance when walking alone if they believed that no train was coming.

¹³ A database maintained by Network Rail which contains details of the health, safety and environmental hazards known to exist on Network Rail controlled infrastructure.

No warning signage

132 The bridge was not signed as a limited clearance structure. This is a possible causal factor.

133 Bridge 127 is listed in the national hazard directory as a hazard due to it being a structure that has restricted clearance (paragraph 54). The date for this entry is recorded as December 1999. However, no limited clearance signage was fitted to the bridge to indicate this. Photographic records for the bridge, going back as far as 1981 (figure 21), show no limited clearance signage fitted to the bridge, so it is unlikely that these signs have ever been fitted to it.



Figure 21: Photograph of bridge 127 taken in 1981 (courtesy of Network Rail with annotations by RAIB).

134 The requirement to fit lineside warning signage, such as limited clearance signs, is found in RIS-3413-TOM which sets out the requirements for providing information about access to and alongside the railway. It specifies where operational safety signs are required for personnel who are on or near the line or who are lineside (figure 18). Its requirements are replicated in Network Rail company standard NR/L2/OHS/069, 'Lineside Facilities for Personnel Safety', issue 3 dated December 2020. The requirements in both documents have been in place in previous iterations of these standards going back at least as far as 1996.

135 Section 2.1.4 of RIS-3413-TOM covers the general requirements for warning signs at obstructions. It calls on infrastructure managers, in this case Network Rail, to provide warning signs at obstructions as required. These should be at each end of the obstruction and where appropriate at intervals along the obstruction. RIS-3413-TOM explains that the purpose of these warning signs is to indicate the presence of an obstacle that obstructs a position of safety at track level. Not all structures, such as bridge parapets or retaining walls, interrupt a position of safety, so these warning signs show staff when the position of safety is affected by the structure. This then allows those staff to make appropriate arrangements to protect themselves from trains.

136 There are three possible warning signs that can be fitted to a structure but only one can be applied at any given location. These are limited clearance, no refuges¹⁴ and prohibition signs (figures 20 and 22). The requirements for providing each type of sign are stated in RIS-3413-TOM.



Figure 22: No refuge and prohibition signage as defined in GERT8000-HB1 (courtesy of RSSB).

137 RIS-3413-TOM requires Network Rail to provide limited clearance signage where a position of safety is interrupted for more than 2 metres, and the criteria for no refuges or prohibition warning signage are not applicable. The type of sign that should have been provided at bridge 127 is dependent on how these criteria are interpreted (see paragraph 154). However, no signage was fitted to the bridge.

138 Witness evidence suggests that the PIC would not have taken the group across bridge 127 if it had been fitted with limited clearance signage. However, the PIC did not check if bridge 127 was shown as a restricted clearance hazard in the SWP. If they had looked, they would have seen it was. Instead, a passing train influenced the PIC's decision to proceed with the group across the bridge (paragraph 116).

¹⁴ Recesses formed in a structure which provide positions of safety for track workers to stand in while a train passes.

139 Witness evidence also suggests that despite the lack of limited clearance signage, the tester was aware that the clearance over the bridge was restricted. Whether the presence of a sign pointing out something the tester already knew would have altered their decision-making cannot be known.

Identification of underlying factors

Planning output

140 The overall methodology followed by Linbrooke for planning the work did not provide the PIC with clear information about how to carry out the walking element of the work.

- 141 What the PIC needed to do to deliver the cable testing work, in terms of who needed to go where and how, was not described in any of the documents provided to them:
- The SWP was focused on the SSOW that the PIC needed to implement. It did not state all the access points that the PIC needed to go to for the planned work activities due to the limitation in RailHub (paragraph 97), and it did not include any information about where the FTN node or location case were.
 - The task briefing sheet was focused on the risks associated with the testing activity. While it did provide a mileage for the sites of work where the PIC needed to go, it only included a general statement about referring to other documents for information about which access points to use.
 - The site works plan provided details for all the locations to go to for each task. This included which access point to use, but it incorrectly referred to the Luton Hoo and Cycleway South access point as the 'Cophall Road' access point which the PIC, had they read the document, would have associated with the opposite side of the railway (paragraph 112).
- 142 The project engineer planned the work, knowing exactly how they intended the testing work to be carried out, in terms of who needed to go where and how they would get there. The project engineer did not record this methodology anywhere, instead, relying on the PIC using information from various documents to work it out for themselves.
- 143 Without a clear understanding of the methodology to follow to carry out the work, the PIC deviated from what the project engineer had expected them to do. If the methodology of who needed to go where and by what route had been given to the PIC, RAIB considers that it is highly unlikely that they would have walked their group from the Chiltern Green Cottages access point towards, and then over, bridge 127.
- 144 Recent research work completed by RSSB, Report 'Enhancing organisational learning about how trackwork is done', was published in August 2024. This report explains how procedures do not always reflect what happens in practice and presents ways that organisations can better understand the reality of work to improve safety.

- 145 This research was carried out in response to track worker related investigations, such as the double fatal accident at Margam in July 2019 ([RAIB report 11/2020](#)), which showed the importance of having a realistic assessment of how track worker safety is managed. The report considered:
- Work-as-imagined: how people think work on the track is carried out.
 - Work-as-prescribed: how work on the track is formally specified in documents.
 - Work-as-disclosed: what staff who work on the track can tell you about how the work is done.
 - Work-as-done: what staff who work on the track actually do when working.
- 146 The project collated evidence of organisational practices and lessons learned through literature reviews and interviews with safety professionals from rail and other safety-critical industries. While this work was primarily focused on why people do not always follow procedures and introduce workarounds, it did look at ways for organisations to better understand the realities of work taking place on the track by engaging with the workforce. It identified that there are many reasons why work-as-disclosed or work-as-done might not be fully aligned to the work-as-imagined or work-as-prescribed in documentation. In this incident, the work-as-done, as carried out by the PIC, did not align with the work-as-imagined, as planned by the project engineer.
- 147 The report noted that work by the Office of Rail and Road (ORR) was also clear about the need for organisations to consider its written procedures against how work is carried out in practice. This was so that decisions made by organisations on what improvements could be made were based on what is happening in practice, rather than on beliefs about how work is being done.

Widespread lack of warning signage

148 Although recorded in the national hazard directory as having restricted clearance, many structures on the railway between London and Bedford are not fitted with the required warning signage. This is a possible underlying factor.

- 149 When CCTV footage recorded by the train on the Down Slow line (paragraph 56) was reviewed, it showed that other structures in the vicinity of bridge 127 were also not fitted with any warning signs. This was despite these structures being listed in the national hazard directory as having restricted clearance.
- 150 RAIB obtained further forward-facing CCTV recordings from trains travelling on line SPC1 (paragraph 7). This footage was reviewed against a list of structures recorded in the national hazard directory as having restricted clearance. Between mileages 20 miles 0 chains and 40 miles 0 chains on line SPC1, the national hazard directory listed 54 structures with restricted clearance. Across the same mileage, RAIB's analysis identified that 10 of the 54 structures (18%) were fitted with limited clearance signs but 37 structures (69%) were not fitted with any warning signs. It could not be determined with confidence from the footage whether the remaining 7 structures (13%) had warning signs fitted or not.

- 151 Network Rail East Midlands route confirmed that no deviations were in place against RIS-3413-TOM that would permit the non-fitment of warning signs on this section of railway. No one at Network Rail on East Midlands route has been able to explain why, given this, there is no signage as required by both RIS-3413-TOM and NR/L2/OHS/069 on many of the structures within this section of railway.
- 152 NR/L2/OHS/069 identifies the role of ‘maintenance manager’ as one of the persons who is responsible for providing this warning signage, but there is no evidence that anyone within Network Rail’s maintenance organisation on East Midlands route is fulfilling this role. NR/L2/OHS/069 defines a maintenance manager as being responsible for leading and directing the maintenance engineers, but as a generic term and not reflecting a specific post title. NR/L2/OHS/069 also identifies the role of ‘asset owner’ as the accountable person, but again this is a generic term, not a post title.
- 153 Network Rail East Midlands route advised that no assurance activities were taking place to check compliance with RIS-3413-TOM or NR/L2/OHS/069 for the provision of warning signage. Route assurance activities for Network Rail company standards tend to be focused on specific disciplines (such as track, signalling, telecommunications and electrification) or staff welfare. NR/L2/OHS/069 does not fall within any of these categories. Consequently, it is possible that this issue of structures not being fitted with the required warning signage might exist on other Network Rail routes.

Observations

Implementation of RIS-3413-TOM

154 The rail industry’s interpretation of the requirements in RIS-3413-TOM (and its predecessors) has allowed limited clearance signage to be fitted to structures where, because of sighting distances, the time needed to reach a position of safety or refuge can only be achieved by implementing a warning safe system of work.

- 155 RIS-3413-TOM states that where there is not adequate time to reach a position of safety or refuge because of sighting distances or other reasons, infrastructure managers should provide a prohibition sign (figure 22) on a structure with restricted clearance. The fitment of prohibition signage means that no other type of warning sign, such as one for limited clearance, can be fitted to the structure.
- 156 Historically, the rail industry has interpreted this requirement to mean that if adequate time to reach a position of safety or refuge could be achieved by using a warning SSOW, then prohibition signs were not necessary. A warning SSOW is one where track workers, who are on or near open lines, are warned by competent persons or warning equipment of an approaching train so that they can then move and be in a position of safety at least 10 seconds before the train arrives. This meant these structures with reduced sighting distances could be fitted with limited clearance signage instead. However, it relied on anyone crossing the structure while trains were still running to implement a warning SSOW, so that they could cross it safely.

- 157 In the past, the unassisted lookout¹⁵ warning SSOW was commonly used when crossing structures with restricted clearance. Since the accident at Margam in July 2019 (paragraph 145), use of this SSOW has been dramatically reduced and it is no longer routinely used on Network Rail infrastructure, with Network Rail considering further changes to remove its use completely. Network Rail has also placed restrictions on the use of other types of warning SSOW on its infrastructure. This means that without a warning SSOW in place, there are now structures fitted with limited clearance signage which track workers can no longer cross safely while trains are running.
- 158 RIS-3413-TOM is silent about whether a warning SSOW can be used to obtain adequate warning time to reach a position of safety or refuge when considering what signage should be provided. However, this is fundamental in deciding whether prohibition or limited clearance signage should be fitted to a structure. Limited clearance signage does not differentiate between places where the sighting distance is sufficient or not. As these signs are for everyone (see paragraph 161), it is unclear how a member of train crew, mobile operations manager or PTS competency holder would know the difference.
- 159 Without the option of using a warning SSOW, RIS-3413-TOM would require a structure with restricted clearance and reduced sighting of approaching trains to be fitted with prohibition signage. This would prevent anyone from crossing the structure while trains are running. This is effectively the situation at bridge 127, as without implementing a warning SSOW, the only time anyone can safely cross bridge 127 is when no trains are running on the Down Fast line.

RIS-3413-TOM signage

160 While the limited clearance and no refuge signage as required by RIS-3413-TOM (and its predecessors) informs railway staff that a structure has restricted clearance, this signage does not stop railway staff from crossing that structure without a safe system of work in place.

- 161 Regardless of the type of sign that is fitted to a structure with restricted clearance, RIS-3413-TOM is clear that the provision of its warning signage is important to all types of rail personnel. These warning signs are not just provided for track workers. RIS-3413-TOM notes that the consistent use of its signage is important for other roles, such as train crew or mobile operations managers, who might need to go on or near the line as part of their duties but might not have local familiarity of structures with restricted clearances.
- 162 At the time of the incident, PTS competency holders could walk alone across a structure with restricted clearance without an SSOW in place (paragraph 131). While PTS competency holders were trained to know what a limited clearance sign meant (paragraph 131), they were not told as part of their training that it might be necessary for a warning SSOW to be implemented for them to cross a structure safely. Even at those structures where a PTS competency holder might have had sufficient sighting of approaching trains to obtain adequate time to reach a position of safety or refuge when crossing, this would have required them to look out for trains. This went against recent changes by Network Rail to reduce and remove ways of working that involved track workers looking out for approaching trains (paragraph 157).

¹⁵ A member of staff whose sole responsibility is to look out for and give warning of approaching trains.

163 Recent rule changes mean a PTS competency holder can no longer walk alone on or near the line until a COSS has put suitable arrangements in place and briefed them (see paragraph 185). The SSOW that is implemented by a COSS should not require a PTS competency holder to walk alone over a structure with restricted clearance while trains are running. However, there are no similar rules or controls in place for other railway staff, such as train crew, who might need to walk alone along the railway and cross a structure with restricted clearance, while trains are operating.

Maintenance of warning signage assets

164 Network Rail's record of its warning signage assets on Ellipse,¹⁶ its asset management system, is incomplete and there was no inspection or maintenance regime for these signs on East Midlands route.

165 On East Midlands route, there are 1094 places with restricted clearance recorded in the national hazard directory. Out of these, 446 entries are on railway line SPC1 (paragraph 7). These comprise 93 entries where a signal post telephone is in a place with restricted clearance, with the remaining 353 entries for structures that have restricted clearance.

166 On Ellipse across East Midlands route there are 107 records for warning signage assets. This means that only about 10% of the warning signage assets that should be fitted on East Midlands route are recorded on Ellipse. Just 4 of the 107 records were for warning signage on line SPC1, meaning less than 1% of the required warning signage assets on line SPC1 are recorded on Ellipse. Network Rail advised that if an asset is not recorded on Ellipse, then there will be no associated inspection or maintenance tasks scheduled to take place for that asset.

167 Network Rail advised that the maintenance requirements for signs that are related to signalling are defined in signalling maintenance specifications. Signalling maintenance teams are responsible for inspecting and maintaining this type of signage in accordance with these specifications. Network Rail advised it has no similar maintenance requirements defined for the types of warning sign as required by NR/L2/OHS/069. Network Rail Track Work Instruction 2L007, 'How to maintain signs', version 1 dated March 2005, covers how to keep lineside and operational signs in good repair. It also states that signs should be kept clean. However, it is unclear exactly who within Network Rail should be carrying out the activities as described in work instruction 2L007. In the past, it is possible that track maintenance staff would have checked these signs as they walked through the area when carrying out visual track inspections. This no longer happens in many places since most visual inspections of the track by staff on foot have been replaced by train-based inspections.

¹⁶ A computer-based asset management system used by Network Rail to record and prioritise what inspection and maintenance work is required to be done and when it needs to be done by.

168 Network Rail's asset accountability matrix, which shows which parts of its organisation are responsible for what assets, indicates that the off-track function in each maintenance delivery unit would be responsible for inspecting and maintaining lineside warning signs. However, Network Rail could not provide any records to show that any inspection or maintenance activities were planned or had been carried out for these signs. Similar issues with the inspection and maintenance of lineside speed signage were also found by RAIB's investigation of a train overspeed incident at Peterborough ([RAIB report 06/2023](#)) and more recently for another train overspeed incident at Manor Park ([RAIB safety digest 01/2025](#)). It is unknown how widespread these issues with the inspection and maintenance of lineside signage assets are across Network Rail infrastructure, but anecdotal evidence suggests it is a national issue.

Post-incident actions

169 After the near miss, the group walked over bridge 127 again to get back to the Chiltern Green Cottages access point, while trains were still running and without an adequate safe system of work in place.

170 Soon after the near miss had happened, the PIC called West Hampstead signal box to explain what had happened (paragraph 49). The signaller who answered this call was the rostered signaller for the Luton workstation (paragraph 9) and had just resumed their duties after taking a planned break. This signaller was not present when the driver of train 1F20 had called earlier to report the near miss (paragraph 48), but the signaller who had been on duty at that time had informed the second signaller about it during a handover.

171 The PIC told the signaller that a member of their group had been involved in the near miss with the train and confirmed that no one had been struck by the train. The signaller asked the PIC if they and their group were clear of the track and the PIC confirmed that everyone was in a position of safety. After obtaining the PIC's name and contact details, the signaller asked the PIC what access point they had used. The PIC replied that it was the access point at Chiltern Green Cottages.

172 After a short delay, the signaller asked the PIC to stop work, leave the railway and wait for a mobile operations manager who was coming out to meet the group (paragraph 49). The PIC then repeated back to the signaller the instruction that they and their group now needed to stop work and exit the railway. The signaller advised them to go back to the access point they had used to get onto the railway, which the PIC confirmed they would do. The PIC also said they would call the signaller back to let them know once they had done this.

173 The signaller did not specify how to get to the access point, nor did they ask the PIC how they would be exiting the railway. The signaller knew where the Chiltern Green area was but did not know the exact whereabouts of the PIC and their group on the railway. The PIC did not tell the signaller that to get back to the access point it would require them to cross bridge 127.

- 174 The PIC followed the signaller's instruction and headed back to the access point that they had come from. They had limited options to do anything else. The PIC could have exited the railway via the Luton Hoo and Cycleway South access point, which they were now aware of (paragraph 77). However, the group would have had to walk about 0.8 miles via the local roads to get back to the Chiltern Green Cottages access point (figure 14). The PIC knew that these roads were narrow, had no footpaths for pedestrians and in places vehicles could travel at speeds up to the national speed limit of 60 mph (97 km/h) so decided it was safer to walk back along the railway.
- 175 To get back to the Chiltern Green Cottages access point, the group crossed bridge 127 again, while trains were still running. As when they first crossed the bridge (paragraph 40), they crossed one at a time while looking out for an approaching train. However, as before, this meant adopting an informal system of work (paragraph 117), and there remained inadequate sighting to give sufficient warning time to reach a position of safety had a train approached. The group crossed the bridge at about 10:25. The previous train on the Down Fast line had passed about 15 minutes earlier at 10:10 and the next train passed about 10 minutes later at 10:35. Two other trains were timetabled to pass on the Down Fast line in between these trains, at 10:23 and 10:27 respectively, but both were delayed due to late arrivals into London after an incident between Leicester and Market Harborough earlier that morning.
- 176 The PIC was reluctant to ask the signaller for a line blockage on the Down Fast line before they crossed the bridge to get back to the Chiltern Green Cottages access point. They did not expect that the signaller would grant one as in their experience all line blockages had to be booked in advance, otherwise they would be refused. The signaller stated that had they been told by the PIC that the group did not have a safe way back to the access point, they would have told the PIC to remain in a position of safety. The signaller would then have worked with the mobile operations manager (paragraph 49) to help get the PIC and their group safely off the railway.

Previous occurrences of a similar character

- 177 RAIB investigated an accident where a track worker was struck by a train on Grosvenor Bridge, London Victoria, on 13 November 2007 ([RAIB report 19/2009](#)). During the investigation, RAIB observed that no limited clearance signs were fitted to Grosvenor Road Bridge at the time of the accident. The investigation noted this was not causal to the accident but was not in compliance with standard NR/SP/OHS/069 (now NR/L2/OHS/069). Network Rail subsequently fitted limited clearance signage to the bridge.
- 178 As part of this investigation, RAIB has collated data from a rail industry safety reporting system for near miss incidents recorded in the period from 1 January 2019 to 30 April 2024. RAIB identified that 152 of the 193 incidents in the data were relevant to track workers. Of these, 5 involved near misses with track workers in places with restricted clearance. Each incident involved staff in different roles and with various types of SSOW in place, but common themes were the staff not being involved in planning the work, not setting up or following an appropriate SSOW and being unfamiliar with the area they were working in.

- 179 About 20% (31 out of 152) of these track worker near miss incidents involved staff who were walking, rather than working, when on or near the line. The most common SSOW that was in place when a walking near miss happened was the unassisted lookout warning SSOW. This accounted for 29% (9 out of 31) of the incidents. Next were the separated SSOW and line blockage SSOW, each of which accounted for about 16% (5 out of 31) of the incidents.
- 180 The data showed the total number of track worker near miss incidents, covering both walking and working, fell after 2020. This reduction was due to fewer incidents involving the use of the unassisted lookout warning SSOW, which averaged 15.5 incidents per year from 2019 to 2020 and fell to an average of 2.3 incidents per year from 2021 to 2023. The number of incidents each year involving staff using a separated SSOW has remained at similar levels throughout this period (between 3 and 5 incidents each year).

Summary of conclusions

Immediate cause

181 The tester was in an unsafe position on a bridge with restricted clearance as the train approached (paragraph 53).

Causal factors

182 The causal factors were:

- a. The PIC did not carry out the walking element of the work in the way that the project engineer had planned it (paragraph 59, **Recommendation 1 and Learning points 1 and 2**). This causal factor arose due to a combination of the following:
 - i. The PIC was unfamiliar with one of the locations that they needed to go to for the testing work (paragraph 72, **Recommendation 1 and Learning point 1**).
 - ii. The PIC had a very limited role in planning the work and had not been briefed beforehand (paragraph 78, **Learning point 1**).
 - iii. The documents issued to the PIC did not give a clear description of the expected way to carry out the walking element of the planned work (paragraph 89, **Recommendation 1 and Learning points 1 and 2**).
- b. The tester crossed bridge 127 without an effective SSOW being in place, despite being aware of the risks involved in doing this (paragraph 114, **Learning point 3**).
- c. The tester's PTS competency and the associated rules did not prohibit crossing a structure with restricted clearance while walking alone (paragraph 124, see paragraph 185 for action already taken).
- d. The bridge was not signed as a limited clearance structure. This is a possible causal factor (paragraph 132, **Recommendation 4**).

Underlying factors

183 The underlying factors were:

- a. The overall methodology followed by Linbrooke for planning the work did not provide the PIC with clear information about how to carry out the walking element of the work (paragraph 140, **Recommendation 1 and Learning points 1 and 2**).
- b. Although recorded in the national hazard directory as having restricted clearance, many structures on the railway between London and Bedford are not fitted with the required warning signage. This is a possible underlying factor (paragraph 148, **Recommendation 4**).

Additional observations

184 Although not linked to the incident on 23 April 2024, RAIB observes that:

- a. The rail industry's interpretation of the requirements in RIS-3413-TOM (and its predecessors) has allowed limited clearance signage to be fitted to structures where, because of sighting distances, the time needed to reach a position of safety or refuge can only be achieved by implementing a warning safe system of work (paragraph 154, **Recommendation 2**).
- b. While the limited clearance and no refuge signage as required by RIS-3413-TOM (and its predecessors) informs railway staff that a structure has restricted clearance, this signage does not prevent railway staff from crossing that structure without a safe system of work in place (paragraph 160, **Recommendation 2**).
- c. Network Rail's record of its warning signage assets on Ellipse, its asset management system, is incomplete and there is no inspection or maintenance regime for these signs on East Midlands route (paragraph 164, **Recommendation 3**).
- d. After the near miss, the group walked over bridge 127 again to get back to the Chiltern Green Cottages access point, while trains were still running and without an adequate safe system of work in place (paragraph 169, **Learning point 4**).

Actions reported as already taken or in progress relevant to this report

Actions reported that address factors which otherwise would have resulted in an RAIB recommendation

- 185 In 2022, Network Rail and RSSB started work to support making changes to the Rule Book to provide improved guidance for staff when walking on or near the line. This was in response to the changes Network Rail had introduced to reduce and remove the use of the unassisted lookout warning SSOW (paragraph 157). Network Rail was unsure how this change might have altered the risk level for other types of SSOW, so wanted to identify where supporting changes to the rules might be needed. The scope of this work included what a PTS competency holder, an individual working alone¹⁷ (IWA) or a COSS with their group could do when on or near the line. It also included providing improved controls for what a PTS competency holder was allowed to do when walking alone on Network Rail's infrastructure.
- 186 The output of this work supported revisions that were subsequently made to GERT8000-HB1 and GERT8000-HB7, and Rule Book Handbook 6, GERT8000-HB6, 'General duties of an individual working alone (IWA)'. These changes were published in September 2024, with compliance required from 7 December 2024.
- 187 Previously, section 4 of GERT8000-HB1 had allowed a PTS competency holder to go on or near the line without a COSS when they were walking alone. This has now been removed, so someone who is not acting as a COSS or IWA cannot go on or near the line and walk alone unless one of the following applies:
- They have been told by a COSS that they can walk on or near the line to get to or from a site of work where the other members of their group are working.
 - There is a method of working in their company instructions that allows them to do so.
- 188 GERT8000-HB1 was updated to include a new section titled 'Joining or leaving a group'. GERT8000-HB1 now requires the COSS and PTS competency holder to agree the locations of the access point to be used and where the site of work can be found. The COSS must then explain the route the PTS competency holder is required to follow between the access point and site of work, including telling the PTS competency holder which one of the following applies:
- They can reach the site of work or a location where the COSS can meet them without going on or near the line.
 - They will be on or near one or more running lines but these are not open to traffic.
 - They will be on or near one or more running lines and the COSS has set up an SSOW for them to walk.
 - The COSS will come to them, brief them on the SSOW and accompany them to the site of work.

¹⁷ A person certified as competent to implement a safe system of work for their own protection on Network Rail controlled infrastructure.

- 189 These changes mean a PTS competency holder cannot start walking until the COSS has told them what the arrangements are. The COSS must also make sure that the PTS competency holder has understood the arrangements.
- 190 This new section also describes what to do if an obstacle is encountered while walking, which is not covered by the cases described in paragraph 188. It states, *'If you come across any unexpected obstacles or obstructions whilst you are joining or leaving a group, that mean you will have to go on or near a running line that is open to traffic, you must tell the COSS and carry out the instructions given by the COSS'*.
- 191 RT3170 (paragraph 131) has also been updated and now explains that, unless a PTS competency holder is making their way to their normal place of work on an authorised walking route (a designated pedestrian route provided for railway staff going to or from a place of work such as a depot, station or signal box), they should not be on or near the line unless they are under supervision by a COSS. Network Rail advised that these changes to the rules will also be supported by corresponding changes to the PTS training course materials.
- 192 These changes to the Rule Book were supported by work that identified the hazards and assessed the risks associated with staff walking on Network Rail infrastructure. This work considered current good practice and possible enhancements to risk controls, to identify opportunities for safety improvements. An important part of the adopted risk assessment process was a series of hazard and identification workshops which involved people working in the rail industry. Four sessions were held that looked at the hazards associated with walking on or near the line, with the output summarised in a document which supported the rule changes.

Other reported actions

- 193 Immediately after the incident, Linbrooke issued a briefing to its staff which described what had happened and the timeline of events leading up to the incident. Network Rail also issued a safety bulletin to its staff and contractors which gave an overview of what had happened. It raised discussion points for staff to consider if they found themselves in a similar situation.
- 194 Linbrooke revised its planning process by making changes to its SWP request form. The form given to the planner now specifies each access point that needs to be used for the planned work. Linbrooke also updated the format of its task briefing sheet, so it is clearer when more than one access point or site of work is involved. This includes providing mileages for each site of work in the task briefing sheet.
- 195 Linbrooke has made further changes so that its planners, PICs and responsible managers now use the collaboration notes within RailHub (paragraph 105). The responsible manager is now required to discuss the SWP with the PIC and advise the planner of any errors or omissions if required. These conversations about the SWP and planned work are captured in the collaboration notes. This change, along with all the other changes made by Linbrooke to its planning process, has since been adopted by Keltbray Infrastructure Services Limited after it acquired Linbrooke (paragraph 10).

Recommendations and learning points

Recommendations

196 The following recommendations are made:¹⁸

- 1 *The intent of this recommendation is to reduce the risk of a person in charge not understanding how the walking element of the planned work should be executed and then taking their group into an unsafe area.*

Keltbray Infrastructure Services Limited should review, and amend as necessary, its planning processes for any activity taking place on or near the line, so that its staff who carry out the role of person in charge are provided with the information necessary for them to understand how to manage and execute the activity that they are required to deliver. This should include providing the person in charge with a methodology for carrying out both the task and walking elements of the activity when on or near the line, particularly if the activity involves going to or from multiple access points and/or multiple sites of work (paragraphs 182a, 182a.i, 182a.iii and 183a).

This recommendation may apply to other organisations that plan and carry out work on Network Rail infrastructure.

- 2 *The intent of this recommendation is to reduce the risk of railway staff not understanding what measures need to be in place to safely cross a restricted clearance structure.*

The Rail Safety and Standards Board should follow the relevant rail industry processes to review and as necessary amend the requirements in Rail Industry Standard RIS-3413-TOM for providing warning signage at structures with restricted clearance. This work should consider:

- how the rail industry has implemented the current requirements by using warning based safe systems of work
- whether this approach is still suitable following the changes within the rail industry to reduce and eliminate the use of warning safe systems of work

¹⁸ Those identified in the recommendations have a general and ongoing obligation to comply with health and safety legislation, and need to take these recommendations into account in ensuring the safety of their employees and others.

Additionally, for the purposes of regulation 12(1) of the Railways (Accident Investigation and Reporting) Regulations 2005, these recommendations are addressed to the Office of Rail and Road to enable it to carry out its duties under regulation 12(2) to:

- (a) ensure that recommendations are duly considered and where appropriate acted upon; and
- (b) report back to RAIB details of any implementation measures, or the reasons why no implementation measures are being taken.

Copies of both the regulations and the accompanying guidance notes (paragraphs 200 to 203) can be found on RAIB's website www.gov.uk/raib.

- providing guidance on the implementation of the requirements in RIS-3413-TOM, with particular reference to:
 - the choice of warning signage (such as limited clearance, no refuge or prohibition) for a structure with restricted clearance
 - whether the type of warning signage fitted to the structure would be reliant on a specific safe system of work being implemented to allow it to be crossed safely while trains are running
 - how the chosen warning signage is applicable to staff in non-track worker roles, who might also need to go on or near the line while trains are running as part of their duties
 - following relevant rail industry processes to propose and implement any associated changes that need to be made to the Rule Book, GERT8000, so that the meanings and definitions of the types of warning sign in it are aligned with RIS-3413-TOM (paragraphs 184a and 184b).
- 3 *The intent of this recommendation is to reduce the overall risk to railway staff due to missing or poorly maintained lineside signage.*

Network Rail should record what warning signage assets, as required by Rail Industry Standard RIS-3413-TOM, should be fitted to the structures on its East Midlands route infrastructure that are listed in the national hazard directory as having restricted clearance (so would include warning signs for limited clearance, no refuges and prohibition while trains are running). It should also review what other lineside signs are not recorded as assets on its asset management system, Ellipse.

Network Rail should then determine what inspection and maintenance regime is required for these lineside signage assets on its East Midlands route infrastructure, and then schedule tasks on Ellipse for these activities to be done (paragraph 184c).

This recommendation may also apply to other Network Rail routes.

- 4 *The intent of this recommendation is to reduce the risk of railway staff entering an unsafe area when on or near the line due to a lack of warning signage.*

Using the record of warning signage assets developed by recommendation 3, Network Rail should identify what warning signage, as currently required by Rail Industry Standard RIS-3413-TOM, is missing from structures with restricted clearance, such as bridge 127, on the infrastructure on its East Midlands route. It should then take steps to eliminate or mitigate the risks, due to this warning signage not being fitted to these structures, to railway staff who might go on or near the line at these locations (those staff who might go on or near the line is not limited to track workers as other roles, such as train crew, might need to access the track when carrying out their duties) (paragraphs 182d and 183b).

This recommendation may also apply to other Network Rail Routes.

Learning points

197 RAIB has identified the following important learning points:¹⁹

- 1 Staff who plan work that will be taking place on or near the line, and staff who then carry out the person in charge role to deliver that work, are both reminded of the importance of coming to a clear understanding about how the planned activities, including the walking elements, should be executed when on or near the line. This incident highlights the importance of the person in charge being involved in planning the work and being briefed in advance on what needs to be done to execute all the planned activities safely (paragraphs 182a, 182a.i, 182a.ii, 182a.iii and 183a).
- 2 This incident highlights that RailHub, a software tool used to produce safe work packs for activities taking place on or near the line, was specified by Network Rail to only allow one access point to be defined in a safe work pack. If the planned activity involves staff going to more than one access point to get to different sites of work (for example, when testing long cables), then the planner, person in charge and responsible manager are reminded of the importance of providing information that clearly identifies which access point needs to be used to get to each site of work. They are also reminded that, when using RailHub, this will require a safe work pack to be provided for each access point used for the planned activity (paragraphs 182a, 182a.iii and 183a).
- 3 This incident highlights to railway staff who work or walk on or near the line with a separated safe system of work in place the importance of not going into any area where there is reduced space between a lineside structure and the nearest running rail of an open line. It is very likely that there will not be a position of safety in these areas while trains are running (paragraph 182b).
- 4 The post-incident events at Chiltern Green highlight the importance of track workers, who are involved in a near miss incident with a train, understanding how they will safely get back to an access point, and seeking assistance from the signaller as required, if they are instructed by the signaller to egress the railway afterwards (paragraph 184d).

¹⁹ 'Learning points' are intended to disseminate safety learning that is not covered by a recommendation. They are included in a report when RAIB wishes to reinforce the importance of compliance with existing safety arrangements (where RAIB has not identified management issues that justify a recommendation) and the consequences of failing to do so. They also record good practice and actions already taken by industry bodies that may have a wider application.

Appendices

Appendix A - Glossary of abbreviations and acronyms

Abbreviation / acronym	Term in full
COSS	Controller of site safety
FTN	Fixed Telecommunications Network
IWA	Individual working alone
OTDR	On-train data recorder
PIC	Person in charge
PTS	Personal track safety
RAIB	Rail Accident Investigation Branch
RSSB	Rail Safety and Standards Board
SSOW	Safe system of work
SWP	Safe work pack
TIC	Tester in charge
VDU	Visual display unit

Appendix B - Investigation details

RAIB used the following sources of evidence in this investigation:

- information provided by witnesses
- site photographs and measurements
- forward-facing CCTV footage from a train on the Down Slow line
- information taken from the train's OTDR
- documentation related to the task taking place on or near the line
- information provided by Linbrooke about work planning and assurance
- staff training and competence records
- Rule Book modules, railway industry standards and Network Rail company standards
- rail industry data sources related to the infrastructure such as the national hazard directory, sectional appendix and line diagrams
- information from Network Rail about ongoing work related to improving track worker safety
- train timetable and running data from rail industry systems
- weather reports and observations at the site
- rail industry records for previous track worker near miss incidents
- a review of previous RAIB investigations that had relevance to this incident.

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