RAIB

Rail Accident Investigation Branch

Rail Accident Report

Near miss with track workers at Bookham Tunnel, Surrey 29 April 2025

Report 07/2026
June 2026

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

The purpose of a Rail Accident Investigation Branch (RAIB) investigation is to improve railway safety by preventing future railway accidents or by mitigating their consequences. It is not the purpose of such an investigation to establish blame or liability. Accordingly, it is inappropriate that RAIB reports should be used to assign fault or blame, or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

RAIB's findings are based on its own evaluation of the evidence that was available at the time of the investigation and are intended to explain what happened, and why, in a fair and unbiased manner.

Where RAIB has described a factor as being linked to cause and the term is unqualified, this means that RAIB has satisfied itself that the evidence supports both the presence of the factor and its direct relevance to the causation of the accident or incident that is being investigated. However, where RAIB is less confident about the existence of a factor, or its role in the causation of the accident or incident, RAIB will qualify its findings by use of words such as 'probable' or 'possible', as appropriate. Where there is more than one potential explanation RAIB may describe one factor as being 'more' or 'less' likely than the other.

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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Near miss with track workers at Bookham Tunnel, Surrey, 29 April 2025

Contents

Summary

At around 11:42 on 29 April 2025, a passenger train was involved in a near miss with a team of three track workers walking through Bookham Tunnel, on the approach to Bookham station in Surrey. The train was travelling at 33 mph (53 km/h) as it passed the team. The track workers either moved to refuges inside the tunnel or stood against the tunnel wall as the train passed them.

RAIB's investigation found that the track workers were walking in a different location to that which had been blocked to trains and that neither the track workers, nor the signaller who had granted the line blockage, had realised this. This happened because the safe work pack, which formally detailed the safety arrangements for the task, incorrectly contained line blockage arrangements for the nearby Mickleham Tunnel, and not the tunnel around which the team was working. The error in the safe work pack had been introduced during the planning stage for the work and went unnoticed, despite the pack being checked multiple times during various stages of the safe work process.

RAIB identified two underlying factors. The first was that Network Rail's lack of a specific process for managing the transfer of information between its asset management systems and the system it uses for producing safe work packs allowed the introduction of the error into the safe work pack. The second was that steps in Network Rail's process for producing safe work packs were either not routinely carried out or were not carried out effectively.

As a result of its investigation, RAIB has made three recommendations to Network Rail. The first recommendation aims to reduce the risk of errors being introduced when using information from multiple systems to produce a safe work pack. The second aims for Network Rail to improve the implementation of its process covering work taking place on or near operational railway lines. The third recommends Network Rail improves its assurance activities by better using the information provided by its safe system of work planning software.

RAIB has also identified two learning points. The first of these reminds track workers and signallers undertaking safety-critical communications of the importance of clarity, effective listening, and reaching a clear and unambiguous understanding of what has been agreed. The second is that staff who plan work on or near the line, and those who then deliver that work, are reminded of the importance of coming to a clear understanding about how all planned activities, including the walking and working elements, will be undertaken.

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 around 11:42 on 29 April 2025, a train travelling at approximately 33 mph (53 km/h), was involved in a near miss with a team of three track workers in Bookham Tunnel, which is situated on the approach to Bookham station, in Surrey (figures 1 and 2).

4 The train involved, reporting number 2D23, formed the 10:54 South Western Railway service from London Waterloo to Guildford. It was slowing down for a scheduled stop at Bookham station when the driver saw the track workers ahead and sounded the train's warning horn. Upon becoming aware of the approaching train, the track workers moved quickly to avoid it. Two of them moved into separate tunnel refuges (small alcoves in the tunnel wall) and the other stood against the tunnel wall as the train passed.

5 The train driver did not consider the incident to be a near miss. Consequently, they did not make an emergency brake application or make a report to the signaller. The train continued its timetabled journey following the incident.

6 The track workers reported the near miss to the signaller immediately after the event. No one was injured in the incident.

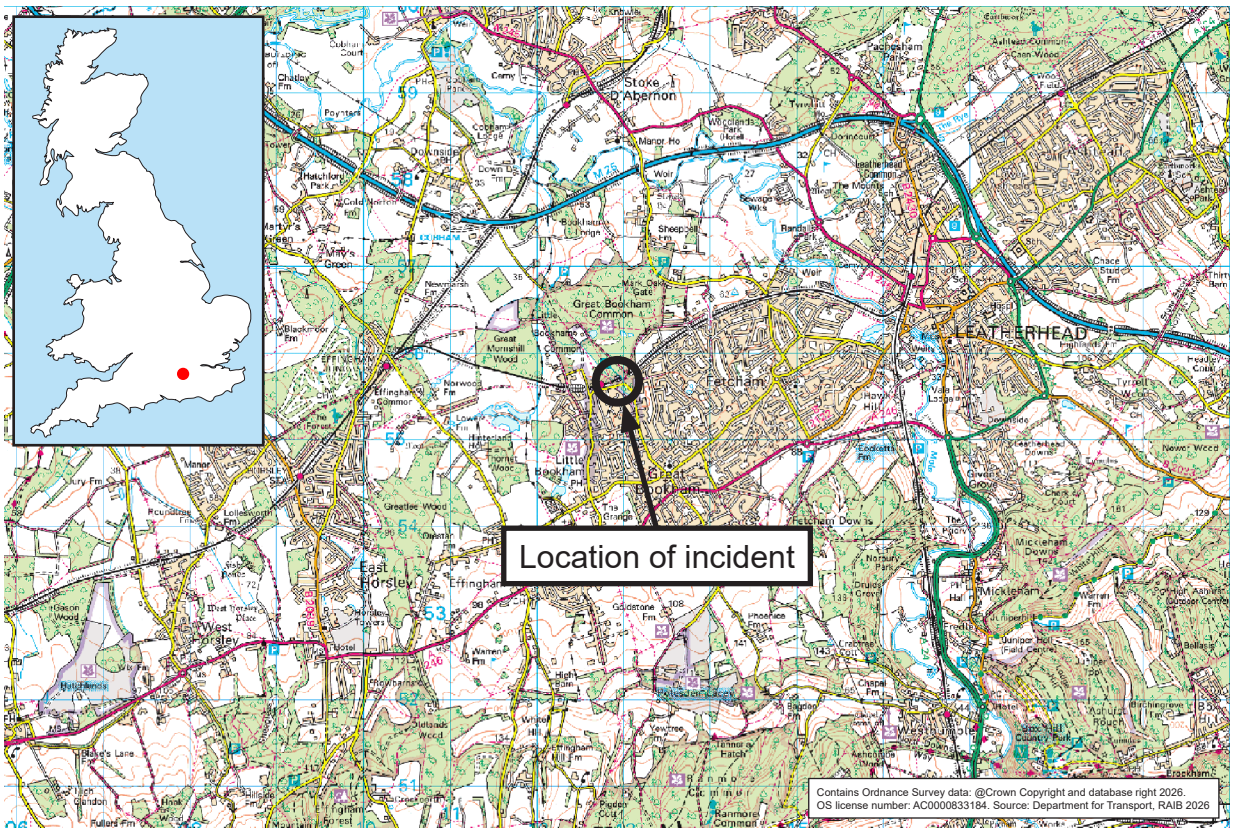

Figure 1: Extract from Ordnance Survey map showing location of the incident at Bookham Tunnel.

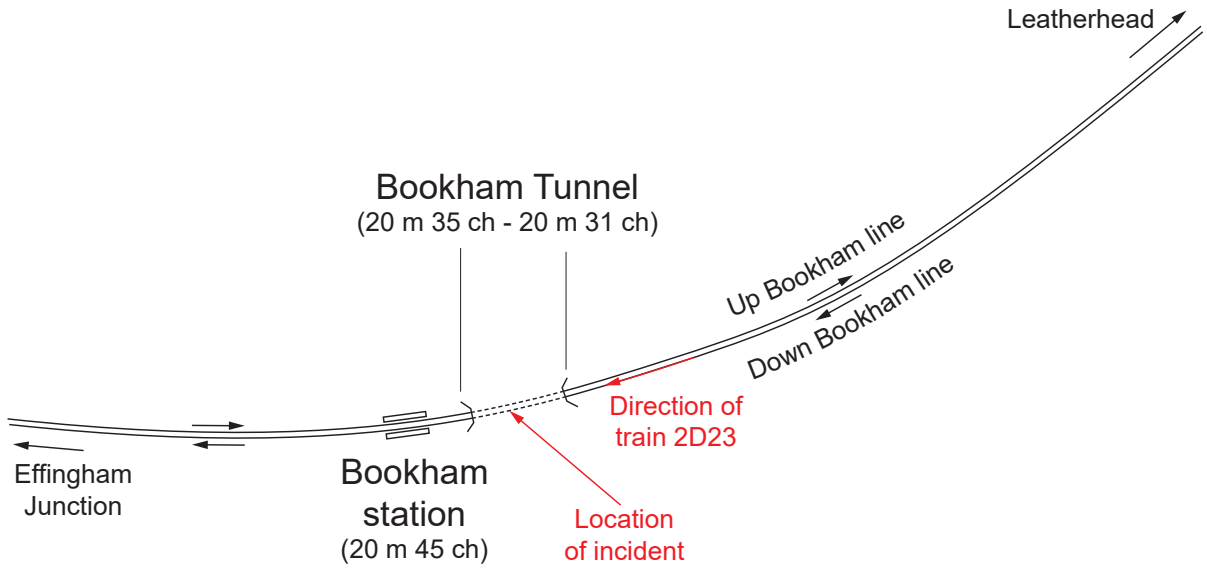

Figure 2: Overview of site showing geographical relationship of main features.

Context

Location

7 The incident occurred in Bookham Tunnel which is located between Leatherhead and Bookham stations, on the Leatherhead and Effingham Junction line (figure 3). The tunnel runs between 20 miles 31 chains (a chain is 22 yards or around 20 metres) and 20 miles 35 chains, measured from a zero-reference located at Waterloo via Worcester Park. The tunnel is located approximately 0.1 miles (0.2 km) east of Bookham station and is on a curve within a shallow cutting.

8 The Leatherhead and Effingham Junction line is a twin-track railway consisting of the Up Bookham line (on which trains travel towards Leatherhead) and the Down Bookham line (on which trains travel towards Effingham Junction). The line is fitted with third-rail conductor equipment, electrified at 750 V DC. Both lines have a permitted speed of 70 mph (113 km/h) at the point where the incident occurred. This reduces to 40 mph (65 km/h) approximately 80 metres beyond the incident site, between the western tunnel portal and Bookham station. Signalling in the area is controlled from the Wimbledon Area Signalling Centre in south-west London.

9 There is a second tunnel in the area called Mickleham Tunnel (figure 3). Mickleham Tunnel is located between Leatherhead and Box Hill & Westhumble stations. It runs between 19 miles 55 chains and 19 miles 78 chains on the Epsom Junction to Horsham Junction line. This is also on a twin-track railway consisting of the Up Portsmouth line (on which trains travel towards Leatherhead) and the Down Portsmouth line (on which trains travel toward Dorking).

10 Both tunnels are on Network Rail's Wessex route, which, along with Kent and Sussex routes, forms part of its Southern region. Both tunnels are marked as having limited clearance on both lines, meaning there is no position of safety (a safe place for people to stand) along the length of the tunnels when trains are running.

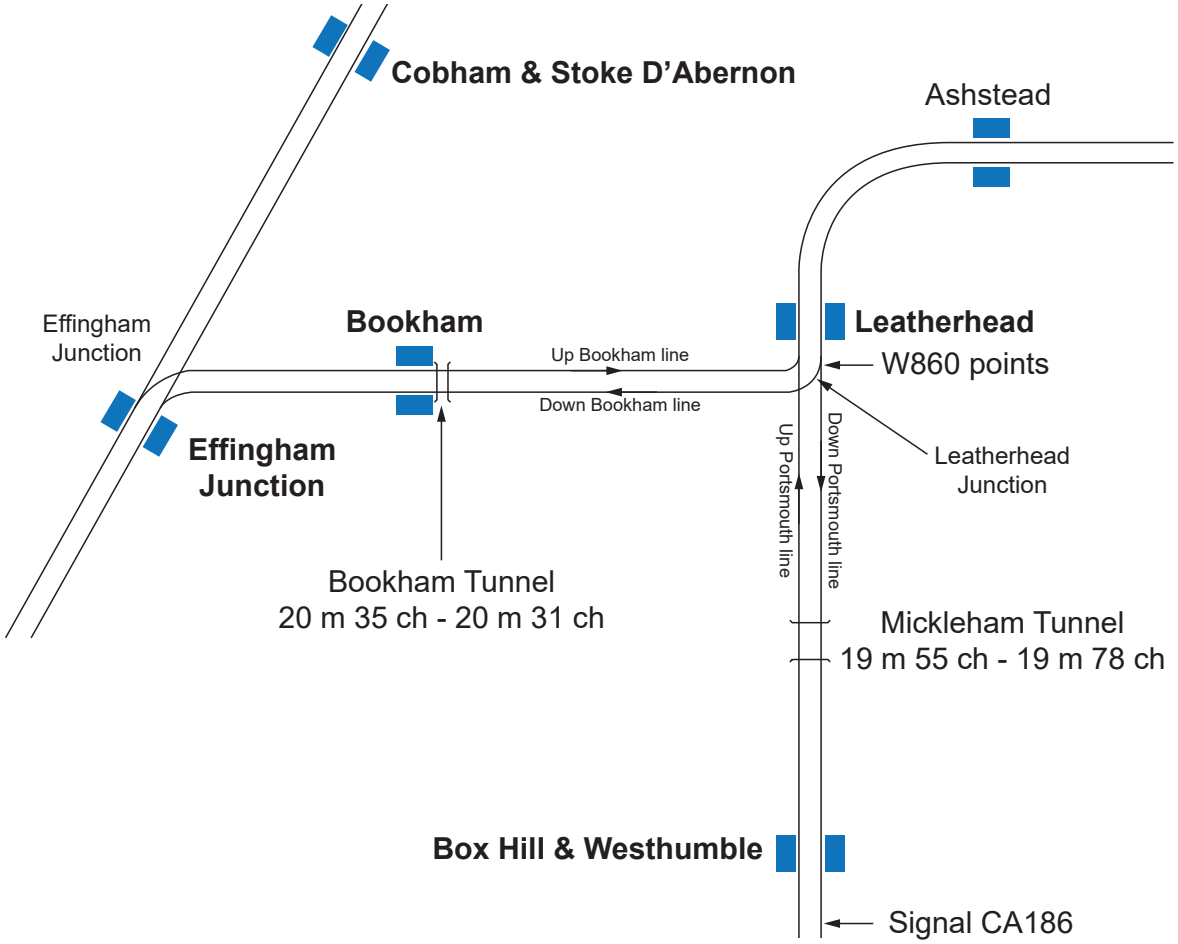

Figure 3: Track layout with relevant infrastructure highlighted.

Organisations involved

11 Network Rail owns and maintains the infrastructure at this location. It also employs the track workers involved in the incident, those who planned the work being undertaken, and the signallers at the Wimbledon Area Signalling Centre.

12 South Western Railway (SWR) was the operator of train 2D23 and employs its driver.

13 Network Rail and SWR freely co-operated with the investigation.

Train involved

14 The train involved consisted of two, four-car, class 455 electric multiple units. Unit 455905 was leading the train, while unit 455718 was trailing.

Staff involved in the incident

15 Network Rail's Wessex Route splits the management of its infrastructure into two delivery units. These are Wessex Inner, which manages the commuter corridors closest to central London, extending through south-west London into the immediate edges of Surrey, Berkshire and Wessex Outer, which manages the long-distance mainline infrastructure and regional routes across Surrey, Berkshire, Hampshire, Dorset, Wiltshire, and Somerset. The track workers involved in the incident are all members of the Wessex Inner delivery unit. The team was made of a person in charge (PIC, see paragraph 31) and two track workers (referred to in this report as track worker 1 and track worker 2). The PIC and track worker 1 are members of the signalling and telecommunications (S&T) team based at Wimbledon, while track worker 2 is part of the telecommunications team also based at Wimbledon.

16 The PIC had been based at Wimbledon for 17 years at the time of the incident and had held a controller of site safety (COSS) competency for 13 years. A COSS competency permits the holder to supervise activities to be carried out by a group on Network Rail infrastructure, in accordance with the requirements of the Rule Book (see paragraph 29). The PIC was familiar with the area, and all their required track safety competencies were in date at the time of the incident.

17 Track worker 1 had over 40 years' experience of working on the railway and had been involved with signal maintenance for the majority of this time. They held a personal track safety competency (PTS), which allows railway staff to work under the supervision of a COSS on or near operational railway lines, and also a COSS competency. All their required track safety competencies were in date.

18 Track worker 2 had 36 years' experience of working on the railway as a telecommunications technician. They also held both PTS and COSS competencies. All their required track safety competencies were in date.

19 The signaller had 25 years' experience of working as a signaller at the Wimbledon Area Signalling Centre. All their required competencies were in date.

20 The train driver had over 23 years' experience of driving with SWR and is based at Guildford depot. All their required competencies were in date.

Staff involved in the planning of the work

21 The planner had over 12 years' experience of planning work on the railway at the time of the incident. They created the safe work pack (SWP) for the work which was being undertaken when the incident occurred. An SWP is a pack of information which comprises the risk assessment, site and task-specific safety information that will be used by the PIC to access the track, including the planned safe system of work (SSOW). The planner had moved to the Wimbledon S&T team in 2023, having previously been the planner for Wimbledon's rail testing and lubrication team. The planner had the required competency to use planning systems to prepare and manage documents for work taking place on the railway.

22 The section supervisor had over 35 years' experience of working on the railway. Their role was to assist with managing the workload and staff within the Wimbledon S&T team. They also approved the SWP in their role as the responsible manager, which they had undertaken for around 3 years. They also held the planner competency.

23 The section manager had over 20 years' experience of working on the railway. They were responsible for prioritising and allocating work as well as the management of the Wimbledon S&T team. They had been the section manager since 2020. They were the line manager for the planner and section supervisor. They also held the responsible manager competency.

External circumstances

24 The incident happened during daylight. The forward-facing CCTV (FFCCTV) footage from the train showed the weather was dry and partially cloudy, with sunny spells. At the time of the incident, the sun was approaching its highest point in the sky for that day. During the incident, the train moved from sunlight into the darker environment in the tunnel. However, there is no evidence that this change in lighting affected the driver's view of the track workers, or vice-versa. There is also no evidence that other external factors played a part in the incident.

Background information

Staff organisation

25 The Wimbledon S&T team is headed by a section manager who has two section supervisors reporting to them (one of these positions had been vacant for several months before the incident). A total of 17 staff including team leaders, technicians, and administration staff report to the section manager and section supervisors. The team covers a geographical area around south-west London, including London Waterloo, and works a shift system that ensures continuous coverage.

26 The team works on signalling equipment, undertaking both cyclical inspections, and maintenance activities including those arising from faults found during inspections. The cyclical tasks that have not been undertaken in the specified time period are known as 'backlog' items. Information on inspection and maintenance activities is held in Network Rail's asset management database, Ellipse. Downloads from Ellipse are sent to the S&T team on a daily basis from Monday to Friday. These give the team information on any work that is required to be undertaken. Network Rail also uses a separate management system to log any faults with its infrastructure that may affect the safe passage of trains.

27 A 'plan, do, review' meeting (PDR) is held every Monday morning by the Wimbledon S&T Team where the section manager and section supervisor decide on the work to be undertaken for the period starting the following Monday. Following this meeting, the planner would begin the process of creating the SWPs needed by the staff who undertake the PIC role to allow the teams to access the railway infrastructure and to undertake the work.

Safety of staff working on or near the line

28 Network Rail defines any track work which takes place within 3 metres of a railway line as being 'on or near the line' (where there is no permanent structure or fence between the work taking place and the railway line). Any work being undertaken on or near the line must take place within an SSOW, a formal plan to ensure that staff can work safely and be protected from the movement of trains. This SSOW is then detailed (along with other safety information) within an SWP.

29 The production of an SSOW is managed in accordance with two main standards:

a. the Rule Book, Railway Group Standard GERT8000, which is managed on behalf of the mainline railway by the Rail Safety and Standards Board (RSSB)[1]

b. Network Rail standard NR/L2/OHS/019, 'Safety of people at work on or near the line', issue 12 of which, dated June 2023, was current at the time of the incident.

[1] The Rail Safety and Standards Board (RSSB) is a not-for-profit company owned by major industry stakeholders. It is the independent safety, standards and research body for Great Britain's rail network.

30 The Rule Book contains instructions for railway staff, including those who work on the track. It has a series of handbooks, which detail the duties of a particular role. Handbook 7, 'General duties of a controller of site safety', issue 9 dated September 2024 (which was in force at the time of the incident[2]), contains the rules that staff should follow when acting as a COSS. This includes the requirement to establish an SSOW and to brief all members of the group to ensure they fully understand the arrangements within it.

31 NR/L2/OHS/019 details the Network Rail processes used, and the roles involved, in planning, verifying, authorising and implementing an SSOW when working on or near the line. These processes result in the production of an SWP. The standard also includes details of three specific roles to be used when planning and undertaking work. These are:

a. The PIC: this is the person who has overall accountability and responsibility for the operational, site, and task risks for the work being carried out. This includes being involved in the planning and verification of the SWP alongside the planner, as well as being the person who is in charge on site when the work is being undertaken. The PIC role is not an assessed competence, but anyone acting as a PIC must hold the COSS competence. A PIC will often undertake the duties of the COSS for their team but may delegate this duty to another suitably competent COSS; this must be decided during the planning process.

b. The planner: a person who plans and produces an SWP for preplanned work, in collaboration with the PIC. Planners within Network Rail use a computer-based planning system (RailHub) to plan each SSOW, ready for inclusion in the SWP.

c. The responsible manager: a person who appoints a planner and PIC for each item of work, and checks and authorises each SWP before it can be used.

32 NR/L2/OHS/019 contains a hierarchy of controls for operational risks, which gives details of the various types of SSOW that can be used. These include using a protection system (preventing trains from entering areas where workers are located or vice versa) and warning systems (where equipment or designated individual(s) are responsible for alerting track workers to approaching trains). These are ranked by the decreasing levels of risk associated with their usage, with the safest systems at the top. When planning work, planners should try and use the highest possible level in the hierarchy (that is to say, the method with the lowest relative risk) and only use a lower level (relatively less safe) method where using a higher level cannot be justified.

33 Within the Wimbledon S&T team, the information and systems used by the planner to create an SWP consists of:[3]

a. Notes from the PDR meeting, highlighting what work items will need an SWP.

b. A download from Ellipse (this takes the form of an Excel spreadsheet with multiple tabs of data consisting of both cyclical and backlog activities).

[2] Issue 10 was published in December 2025; there were no changes made that would have affected the causation of this incident.

[3] Table A.1 of NR/L2/OHS/019, reproduced in appendix C, shows the minimum contents of an SWP.

c. Locally held spreadsheets, such as the roster (which confirms when staff are available) and a sheet capturing the line blockages (where a specific line, or portion of it, is closed to the passage of trains to allow work to take place safely) that have already been arranged (as these can be used by other railway staff to access the infrastructure).

d. The RailHub system which allows an SWP to be generated and line blockages to be booked.

e. A website developed with the signalling community on Wessex route which captures the workload for each signalling panel and allows planners to identify suitable times to book line blockages.

34 In accordance with NR/L2/OHS/019, once an SWP has been created by the planner, it should be passed to the PIC to verify it. This verification requires the PIC to check all the information in the SWP and sign the front sheet to confirm that the SWP is correct. Any changes required to the SWP are fed back to the planner, who amends it and passes it back to the PIC, until the PIC is satisfied they can implement the planned activity as set out in the SWP.

35 After being verified, the SWP is sent to the responsible manager for authorisation. By authorising the SWP, the responsible manager confirms agreement with the selected SSOW (paragraph 32), that the SSOW is suitable for the location and that the task risks are adequately controlled. They are also signing to confirm that there is suitable competence in the team to undertake the work.

36 Once authorised, an SWP is then sent back by the responsible manager to the PIC, ready for use on site. Immediately before using the SWP on site, the PIC should check it again to ensure that it is still suitable for the site conditions. The PIC should then accept it by signing the relevant section.

The sequence of events

Events preceding the incident

37 On Monday 21 April 2025, a decision was made during the PDR meeting (paragraph 27) to undertake a number of outstanding work items which included maintenance activities on a track circuit at Mickleham Tunnel and two telephones at Bookham Tunnel. These telephones, which are located at either end of the tunnel, had been out of use due to a fault raised during the previous year.

38 After the PDR meeting concluded, the planner began the process of creating the SWPs required to access the infrastructure to enable these work items to be completed. Witness evidence indicates that, during this process, the planner misread the information drawn from Ellipse about these work items. As a result, they incorrectly believed that the work for the telephones at Bookham Tunnel and that for the track circuit at Mickleham Tunnel were both due to take place within Mickleham Tunnel (see paragraph 78).

39 At 13:32 on 23 April, the planner finished creating an SWP (referred to as SWP A, figure 4) to allow work on the telephones to be undertaken on 29 April. The work required the team to walk between the location cabinets (trackside enclosures designed to safely house signalling, communications, and electrical power equipment) on either side of Bookham Tunnel. As the tunnel has limited clearance (paragraph 10), a line blockage was needed to safely walk through it. The location of the work and the associated line blockage in SWP A was given as Mickleham Tunnel. However, the comments section towards the rear of the pack referred to three work items:

- Bookham Tunnel (West) – telephone test
- Bookham Tunnel (East) – telephone test
- Mickleham – track circuits.

SWP A was sent to the PIC for verification at 13:34 on 23 April.

40 At 13:43, the planner created a second SWP (SWP B) to undertake work on the track circuit. As they believed that this work involved the track circuit on the up line (while the telephones were located adjacent to the down line), a second and separate line blockage was needed. The location of the work and the associated line blockage in SWP B was again given as Mickleham Tunnel and the comments page referred to the same three work items as SWP A. SWP B was completed on 24 April and was then also sent to the same PIC for verification.

41 Although the planner checked the details contained in the SWPs before sending them to the PIC, they did not notice that SWP A mentioned work items which were in a different place to the location being protected by the line blockage in the SWP.

42 In addition to the SWPs, extra information known as a ‘production sheet’ is also supplied by the planner to PICs. This sheet includes a diagram showing the extent of any line blockages requested, a copy of the line blockage information, and some brief details of the work to be undertaken. These are uncontrolled documents that are produced locally to assist Wimbledon S&T staff and do not form part of the SWP.

Safe Work Pack

Cover Information

About

Name of person receiving SWP:	
Register Number:	**Pack Type:** non cyclical
On Call Manager Name:	**Tel:**
ELR : BTH3	**Mileage :** 18.0220 yd (18.10 ch) (29.169 km) to 21.0880 yd (21.40 ch) (34.601 km)

Site

Possession Reference: Not Applicable
Local Name: Mickleham Tunnel
Nature of Work: S&T Telephone & Track Maintenance

Prohibitions for working with warning SSOW (formerly Red Zone) within your Primary and Related ELRs: No

Access Point: MICKLEHAM TUNNE AUTH A (BTH3 19.51)
Egress Point: MICKLEHAM TUNNE AUTH A (BTH3 19.51)

Signatures

SWP checked by:		Date:	23/04/2025
SWP verified by:		Date:	28/04/2025
SWP authorised by:		Date:	28/04/2025

Figure 4: Front sheet of safe work pack A (courtesy of Network Rail).

43 Once SWP A and SWP B had been completed and sent to the PIC, a summary of the work and the line blockages was transferred to the production worksheet. These were placed in the relevant tray for the PIC in the mess room at least 3 days before the site was to be visited. The front page of this additional pack of information summarised the work planned for the day ahead (figure 5).

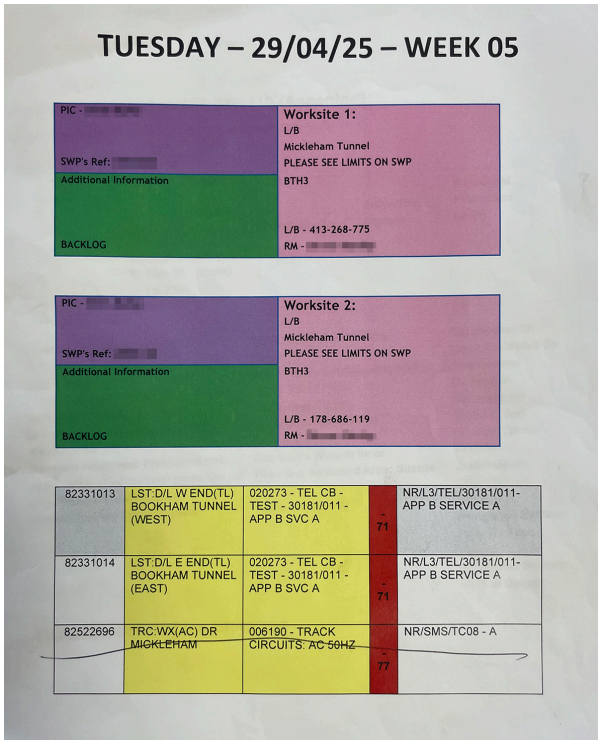

Figure 5: Front page of the production sheet provided to the PIC (courtesy of Network Rail).

44 On the evening of 24 April, a works delivery team from a different part of Network Rail replaced a section of rail at Mickleham Tunnel. As part of this, they also completed the work item on the track circuit that had been previously identified (paragraph 38). On 28 April, the S&T team was made aware that the work on the track circuit had been undertaken, although no one had yet closed the work order in Ellipse.

45 At around 13:50 on 28 April, the PIC verified both SWP A and SWP B. The PIC did not notice the error with the location of the planned works in SWP A when they verified the packs.

46 As well as SWP A, the PIC had separately been given a production worksheet. The production worksheet issued to the PIC showed the two different SWPs (A and B) for the work they were undertaking, with both shown as being for Mickleham Tunnel. The work items listed below the SWPs were identical to those included at the rear of the SWPs and included the telephone tasks at Bookham Tunnel (figure 5). The PIC did not notice that the production sheet also showed a mismatch between the location given in SWP A and the work items listed.

47 Once both packs had been verified by the PIC, they automatically went to the section supervisor, as the responsible manager, to be authorised. By the time they noted the email requiring them to authorise the packs, they had finished work for the day and had returned home. Knowing that the packs needed to be authorised for the work to be completed the next day, and that staff from other teams had also been mobilised to attend, they authorised the SWPs from home between 16:30 and 16:45. They also did not notice the mismatch in SWP A.

48 On 29 April, the day of the incident, the PIC arrived at Wimbledon at around 07:30 and met track worker 1. Track worker 2 (the specialist telecommunications team member) was due to meet with them at Bookham station later that morning. The PIC was aware by then that the track circuit work had been completed by another team and that the only outstanding work items were the phones at Bookham Tunnel. The PIC familiarised themselves with the work required at Bookham Tunnel while track worker 1 spoke to track worker 2 on the telephone to confirm that the work was going ahead.

49 Before leaving the depot, the PIC downloaded both SWP A and SWP B electronically to their work tablet and then left for site around 09:20 along with track worker 1. They met track worker 2 at Bookham station at around 10:00.

50 The PIC then gave a briefing to the two track workers using SWP A on the work to be undertaken on the telephones at Bookham Tunnel. This included a description of the SSOW and the hazards present on the site. The PIC again did not realise that the line blockage in SWP A applied to Mickleham Tunnel when they gave the briefing. Nothing in the briefing caused the two track workers to question the PIC over the validity of the SSOW being used.

51 After the PIC finished the briefing, both track workers signed the SWP on the tablet to say they had understood what they had been told. The PIC ticked the ‘all shifts accepted’ tab on the tablet at 10:23 to reflect that the team was ready to go lineside. The PIC and the track workers then accessed the track via the end of the platform at Bookham station.

Events during the incident

52 Once on the track, the PIC and the two track workers walked in the cess (the space alongside the line, outside the ballast shoulder) to the first telephone located at the western end of the tunnel. The track workers then started working on the telephone and associated location cabinet.

53 At 10:56, once work on the telephone had been completed, trackworker 1 tried to contact the signaller using the tunnel telephone to confirm it was now working. The call was not answered and trackworker 1 then contacted the signaller by mobile telephone. The signaller answered the mobile call and confirmed the line to the tunnel telephone had been ringing on the concentrator, but they had been unable to answer it as they were busy managing other line blocks. The telephone concentrator (a panel that shows where the calls come from) has a button for each of the two telephones at Bookham Tunnel (figure 11), one of which would have been illuminated at the time. During the call, the signaller used the concentrator to ring the tunnel telephone which was then answered by trackworker 1. At 10:57, a further call was made between track worker 1 and the signaller on the tunnel telephone and concentrator to test it was working in both directions.

54 Once the work on the telephone at the western end of Bookham Tunnel was completed, the PIC called the signaller at Wimbledon at 11:00 to request the granting of the booked line blockage. This was intended to allow the group to walk through Bookham Tunnel on the down line to undertake work on the telephone on the eastern side of the structure (figure 9).

55 In the call to the signaller, the PIC started by stating that they were “at Bookham” and they had a line blockage on “the Down Portsmouth”. The Down Portsmouth is a line that runs through Mickleham Tunnel (paragraph 9). The line blockage form (which records details of blocking a line such as type of protection being used, location and time) used by the PIC on site showed that the line blockage arrangements were for Mickleham Tunnel, but the PIC did not realise this during this initial call (figure 6). They then gave the reference number of the booked line blockage.

56 The signaller found the line blockage information using the reference number provided by the PIC (figure 7). This information had been provided to the signaller at the start of their shift on a printed list of pre-arranged line blockages. This showed that the line blockage being requested was for Mickleham Tunnel. The signaller asked for the PIC’s contact details and how long they required for the work. The phone call ended with the signaller telling the PIC that a train was approaching and hence the line blockage could not be taken at this time. The signaller said that they would call the PIC back about the line blockage. The signaller did not realise that the PIC was at Bookham Tunnel and not at Mickleham Tunnel during this initial call (figure 8).

57 At 11:11, the signaller called the Dorking signaller as the line blockage request extended into the area controlled by that signal box. This was needed to check that trains were clear of the requested area of the line blockage, so that the signaller could grant it.

NR3180 LINE BLOCKAGE FORM V4 Plan: Status: Pack Returned December 2018: Side 1 of 2

SECTION 1: GENERAL ARRANGEMENTS *[Note: * Delete as applicable]*

WON / GZAC No/SBSI Safe Work Pack (SWP)	413-268-775	**Incident Response** *[tick box]*	**Fault No**
Role Requesting Line Blockage *[tick box]*	IWA ☐ SWL ☐ COSS ☑ PC ☐ DP ☐ Train Crew ☐ Platform Staff ☐	**Name of Signaller**	
		Signal Box	Wimbledon Panel 4
Name of Requester		**Panel / Workstation***	
Phone Number		**Phone Number**	
Employer	Network Rail	**Total time required to complete the work activity**	01:00
Site of work	Mickleham Tunnel to Mickleham Tunnel	**Time needed/notice required to give up the Line Blockage**	00:07

SECTION 2: BLOCKING THE LINE *[Note: * Delete as applicable]*

Line to be Blocked	Between *[Signals / Points / Block Marker/Buffer Stops]**	And *[Signals / Points / Block Marker/Buffer Stops]**	Protecting Signal/s Maintained at Danger	Additional Signals / Route Closed / ARS Isolated / Position of Points *[indicate in brackets 'N' or 'R' next to Point No.]*
Down Portsmouth	BEYOND W860PTS	CA186	W483	

Signal Post Replacement Switch (SPRS)	1	2	3	4	5	6
Signal No/s.						
Time Keyed to Danger						
Time Signal Keyed to Auto						

Are there any Level Crossings affected by the work? Y / N *[If Yes record these on side 2, Section 6]* N — **Are Axle Counters affected? Y / N** *[For EPR process see Appendix B if applicable]* N

SECTION 3: ADDITIONAL PROTECTION *[Note: Additional protection must be considered for all line blockage requests]*

Will the work affect the safety of the line? Y / N *[If Yes, tick below and record on Appendix A or B as applicable]* N — **Has additional protection been planned? Y / N** *[If Yes, tick below and record on Appendix A or B as applicable]* N

What additional protection is being used? *[tick box]* Signalling Disconnection ☐ Route Barring ☐ Detonator Protection ☐ Token ☐ T-COD ☐ Lock Out Device ☐ EPR ☐

SECTION 4: TESTING COMMUNICATIONS

Have communications been tested? *[tick box if Yes]* ✓ **What is the current location of the requester?** Bookham

SECTION 5: GRANTING AUTHORITY BY THE SIGNALLER

Note: The controlling signaller MUST read the form back to the requester and confirm all details are correct every time the Line Blockage is taken?

LB No	Is the line to be blocked clear of trains? (Y / N)	Advised requester that all necessary protection is in place and reminders applied. (Y)	Are any other Signallers involved? (Y / NA) *(Controlling Signaller must reach a clear understanding with them?)*	Has the additional protection been applied if required? (Y / NA)	Agreed hand back time	Blockage Taken At: Time	Blockage Taken At: Date	Authority Number	Blockage Given Up At: Time	Blockage Given Up At: Date
1	Y	Y	Y	NA	11:19	11:13	29/04/2025	w41112	11:16	29/04/2025
2	Y	Y	Y	NA	11:47	11:40	29/04/2025	w41140	11:47	29/04/2025
3										
4										

Figure 6: PIC copy of line blockage form (courtesy of Network Rail).

13:36-15:xx

NR3180 LINE BLOCKAGE FORM V4 December 2018: Side 1 of 2

SECTION 1: GENERAL ARRANGEMENTS *[Note: * Delete as applicable]*

***WON / GZAC No/SBSI Safe Work Pack (SWP)**	413-268-775	**Incident Response** *[tick box]*	**Fault No**
Role Requesting Line Blockage *[tick box]*	IWA ☐ SWL ☐ COSS ☑ PC ☐ DP ☐ Train Crew ☐ Platform Staff ☐	**Name of Signaller**	
		Signal Box	Wimbledon Panel 4
Name of Requester		**Panel / Workstation***	4
Phone Number		**Phone Number**	
Employer	NETWORKRAIL	**Total time required to complete the work activity**	7 MINS
Site of work	BOOKHAM	**Time needed/notice required to give up the Line Blockage**	✓

SECTION 2: BLOCKING THE LINE *[Note: * Delete as applicable]*

Line to be Blocked	Between *[Signals / Points / Block Marker/Buffer Stops]**	And *[Signals / Points / Block Marker/Buffer Stops]**	Protecting Signal/s Maintained at Danger	Additional Signals / Route Closed / ARS Isolated / Position of Points *[indicate in brackets 'N' or 'R' next to Point No.]*
Down Portsmouth	BEYOND W860PTS	CA186	W483	A.R.S OFF

Signal Post Replacement Switch (SPRS)	1	2	3	4	5	6
Signal No/s.						
Time Keyed to Danger						
Time Signal Keyed to Auto						

Are there any Level Crossings affected by the work? Y / N *[If Yes record these on side 2, Section 6]* N — **Are Axle Counters affected? Y/ N** *[For EPR process see Appendix B if applicable]* N

SECTION 3: ADDITIONAL PROTECTION *[Note: Additional protection must be considered for all line blockage requests]*

Will the work affect the safety of the line? Y / N *[If Yes, tick below and record on Appendix A or B as applicable]* No — **Has additional protection been planned? Y / N** *[If Yes, tick below and record on Appendix A or B as applicable]* No

What additional protection is being used? *[tick box]* Signalling Disconnection ☐ Route Barring ☐ Detonator Protection ☐ Token ☐ T-COD ☐ Lock Out Device ☐ EPR ☐

SECTION 4: TESTING COMMUNICATIONS

Have communications been tested? *[tick box if Yes]* ✓ **What is the current location of the requester?** BOOKHAM

SECTION 5: GRANTING AUTHORITY BY THE SIGNALLER

Note: The controlling signaller MUST read the form back to the requester and confirm all details are correct every time the Line Blockage is taken?

LB No	Is the line to be blocked clear of trains? (Y / N)	Advised requester that all necessary protection is in place and reminders applied. (Y)	Are any other Signallers involved? (Y / NA) *(Controlling Signaller must reach a clear understanding with them?)*	Has the additional protection been applied if required? (Y / NA)	Agreed hand back time	Blockage Taken At: Time	Blockage Taken At: Date	Authority Number	Blockage Given Up At: Time	Blockage Given Up At: Date
1	✓	✓	✓	N/A	11:19	11:12	29/04/25	W41112	11:16	29/04/25
2	✓	✓	✓	N/A	11:47	11:40	29/04/25	W41140	11:47	29/04/25
3										
4										
5										
6										

Figure 7: Signaller copy of line blockage form (courtesy of Network Rail).

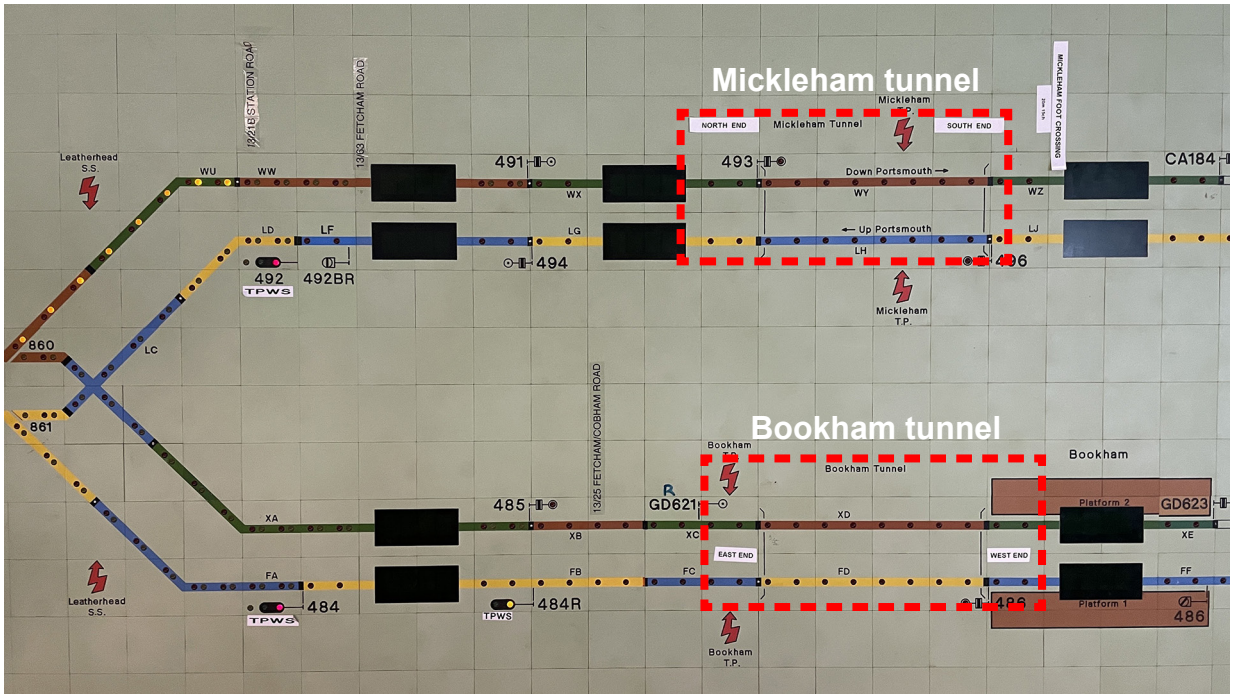

Figure 8: Signaller's panel showing the location of the tunnels (highlighted in red dotted boxes).

58 At 11:12, the signaller called the PIC back to grant the line blockage. During the conversation, the signaller confirmed the blocking points (defined railway features, such as signals, used to geographically bound a line block) given in their copy of the line blockage documentation, which matched the documentation held by the PIC (figure 7). There was no repeat of the blocking point information by the PIC back to the signaller and no mention of the physical location of the line blockage. The line blockage was granted, and a handback time was agreed. The Down Portsmouth line through Mickleham Tunnel was now blocked but the Down Bookham line through Bookham Tunnel, where the team was, remained open. The PIC and the track workers walked from west to east, on the Down Bookham line through the tunnel (figure 10).

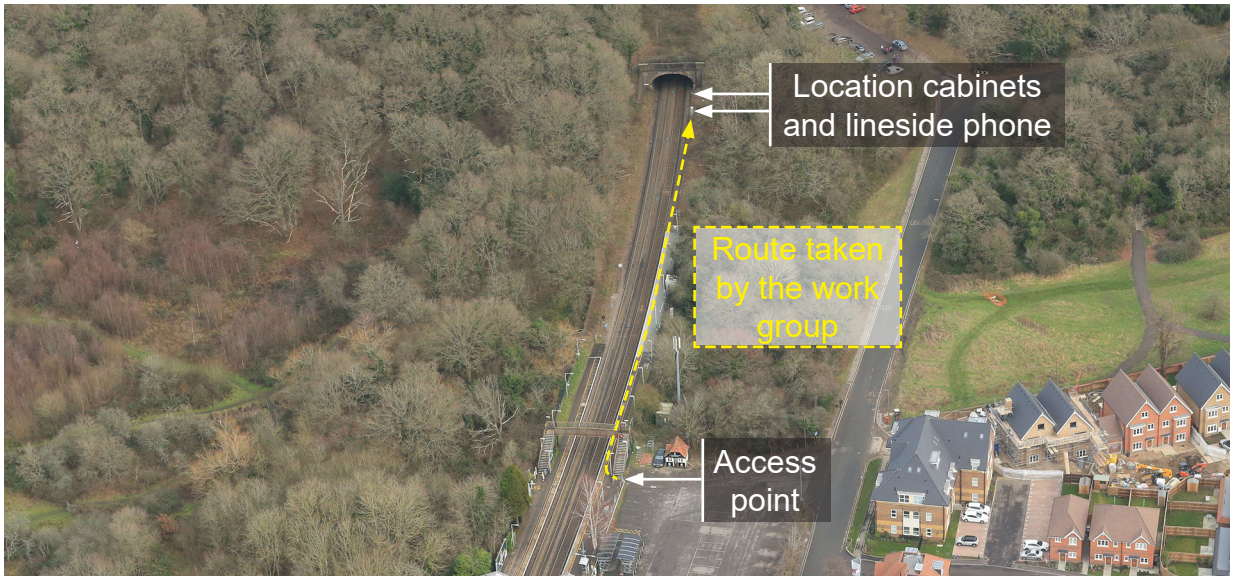

Figure 9: Track workers location before taking first line blockage (courtesy of Network Rail with RAIB annotations).

Figure 10: Track workers location after taking first line blockage (courtesy of Network Rail with RAIB annotations).

59 At 11:15, the PIC called the signaller to give up the agreed line blockage. During the call, the PIC made reference again to the Down Portsmouth line. The PIC confirmed that the group were then going to undertake work on the lineside phone and that the signaller might have some interference if using the phone on the concentrator, while the work was being undertaken.

60 At 11:23, the PIC called the signaller to test the telephone that the group had been working on. The PIC first used their mobile phone and then the tunnel-end telephone itself. The signaller confirmed that the telephone was working. During this call, the PIC mentioned they were calling from the telephone at Bookham Tunnel.

61 At 11:29, the PIC called the signaller to ask for the same line blockage to allow the team to walk back through Bookham Tunnel (figure 12). They again referred to the Down Portsmouth line. Having waited for the passage of another train, the signaller called the Dorking signaller at 11:37 to check that they could grant the requested line blockage.

62 At 11:39, the signaller phoned the PIC back to confirm the line was clear for the requested line blockage. The signaller confirmed the blocking points and agreed a handback time with the PIC. This again blocked the Down Portsmouth line through Mickleham Tunnel, while the down line through Bookham Tunnel remained open. The team set off back to Bookham station with the PIC leading, followed by trackworker 2 and trackworker 1. At the same time, train 2D23 left Leatherhead station.

63 At approximately 11:41, while walking inside the tunnel, trackworker 1 heard a train approaching behind them and shouted a warning to the rest of the group. At around the same time, the train driver saw the group and sounded the horn. The group then moved quickly to the side of the tunnel. Once the train had passed, the group then headed toward Bookham station (figure 13).

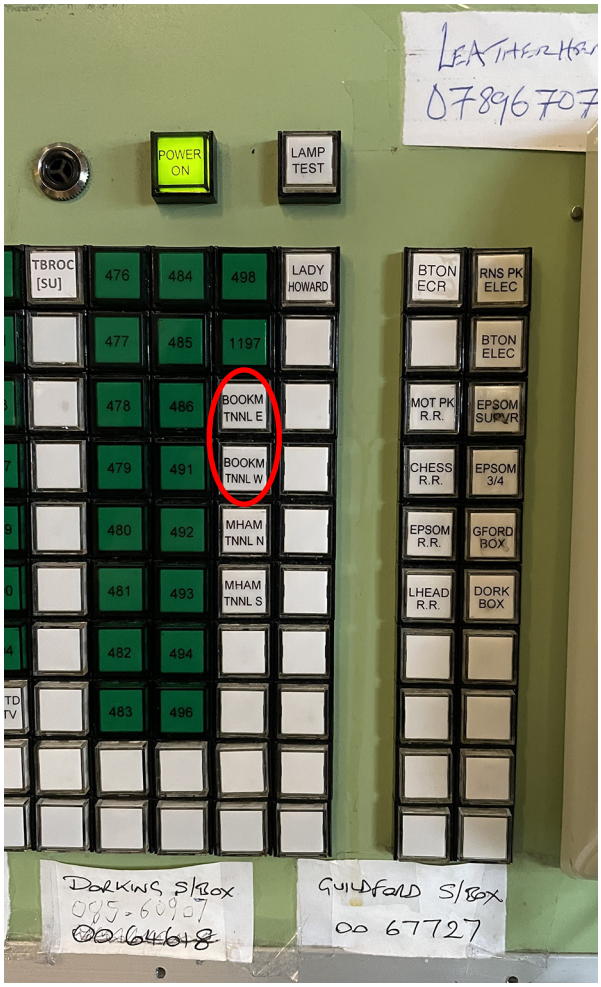

Figure 11: Phone concentrator on Wimbledon panel No.4 with Bookham Tunnel east and west telephone buttons highlighted.

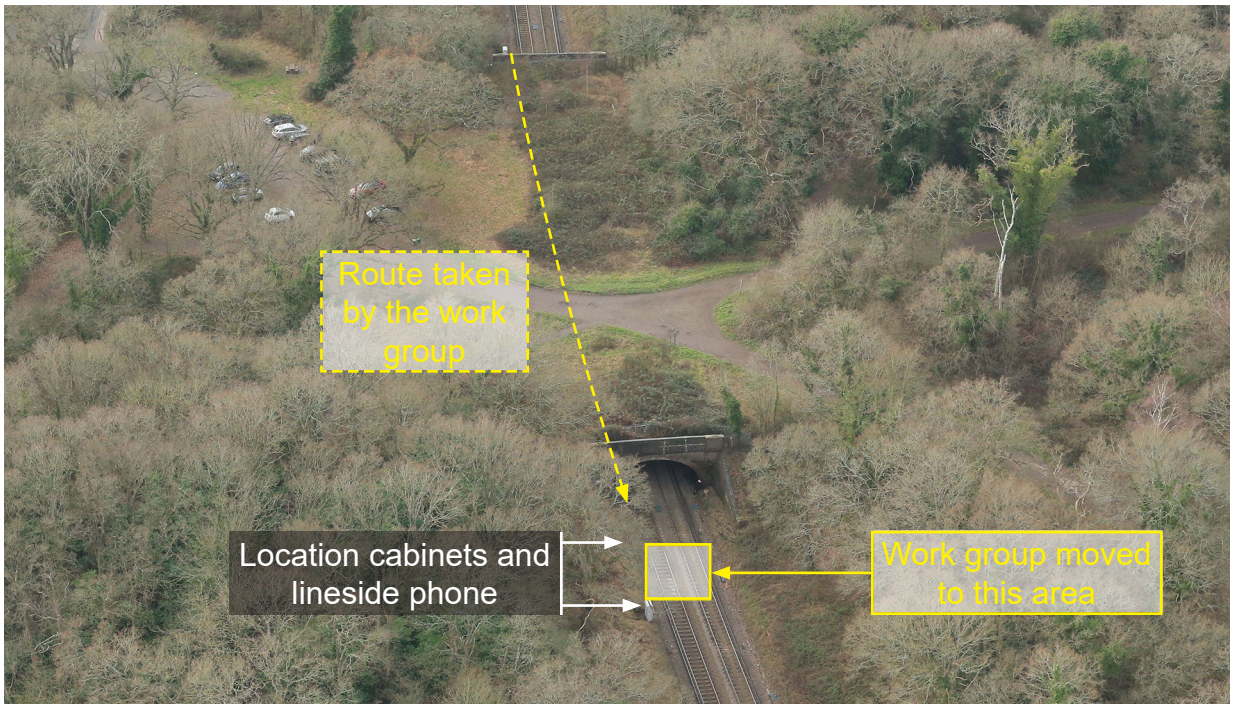

Figure 12: Track workers location before taking second line blockage (courtesy of Network Rail with RAIB annotations).

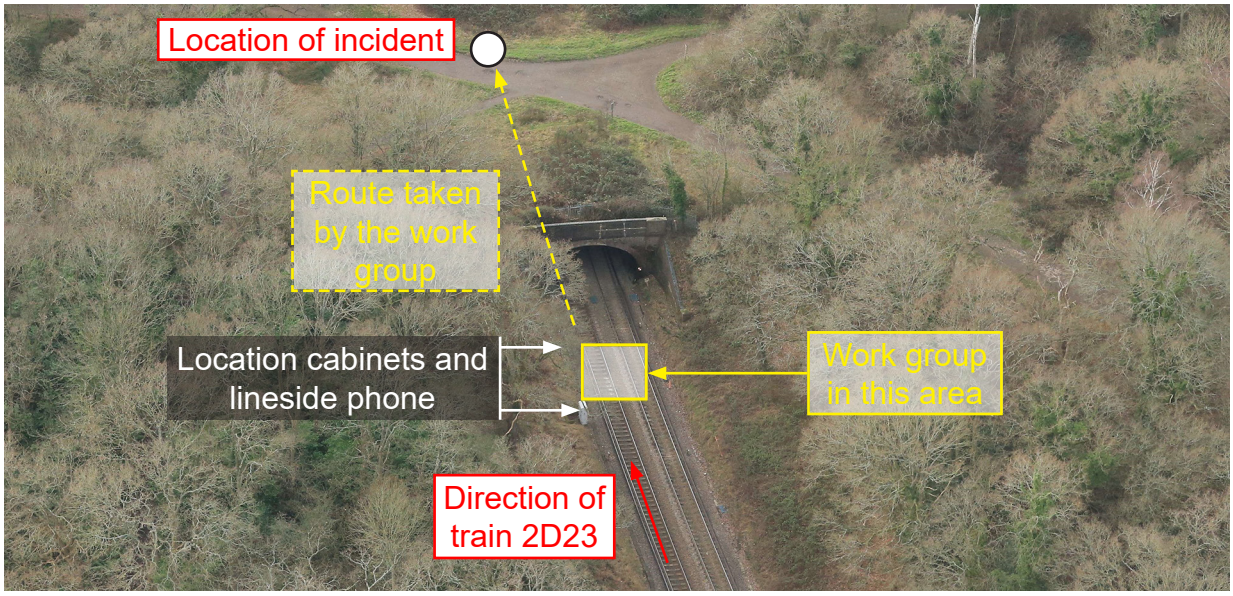

Figure 13: Track workers location after taking second line blockage and during incident (courtesy of Network Rail with RAIB annotations).

Events following the incident

64 At 11:45, a relief signaller took over from the signaller at Wimbledon who had granted the line blockage. At 11:46, the PIC called to hand the line blockage back. Having done this, the PIC then mentioned that a train had passed through the blockage. The relief signaller handed the phone to the original signaller, who questioned this with the PIC. The PIC confirmed their line blockage limits and stated they were at Bookham Tunnel. The signaller replied that these were the blocking limits for Mickleham Tunnel, not Bookham Tunnel. The PIC said that they would look at their paperwork and then ended the call (figure 14).

Figure 14: Track workers location post-incident (courtesy of Network Rail with RAIB annotations).

Analysis

Identification of the immediate cause

65 The track workers were in an unsafe position, in a tunnel with limited clearance, as the train approached them.

66 The track workers were inside Bookham Tunnel when the train passed them. Bookham Tunnel is designated as a limited clearance structure, meaning the amount of space between the tunnel wall and the nearest running rail is considered insufficient to provide a position of safety (a designated area where it is safe to stand as a train passes) in the tunnel when trains are running.

67 The Rule Book (paragraphs 28 and 30) requires anyone working on or near the line to be in a position of safety at least 10 seconds before a train passes them. For line speeds below 100 mph (161 km/h), a position of safety should be a minimum of 1.25 metres from the nearest running rail.

68 The distance between the tunnel wall and the nearest running rail of the down line where the track workers were walking is about 1.6 metres. The available space between the tunnel wall and the passing train was between 1 and 1.15 metres (figure 15).

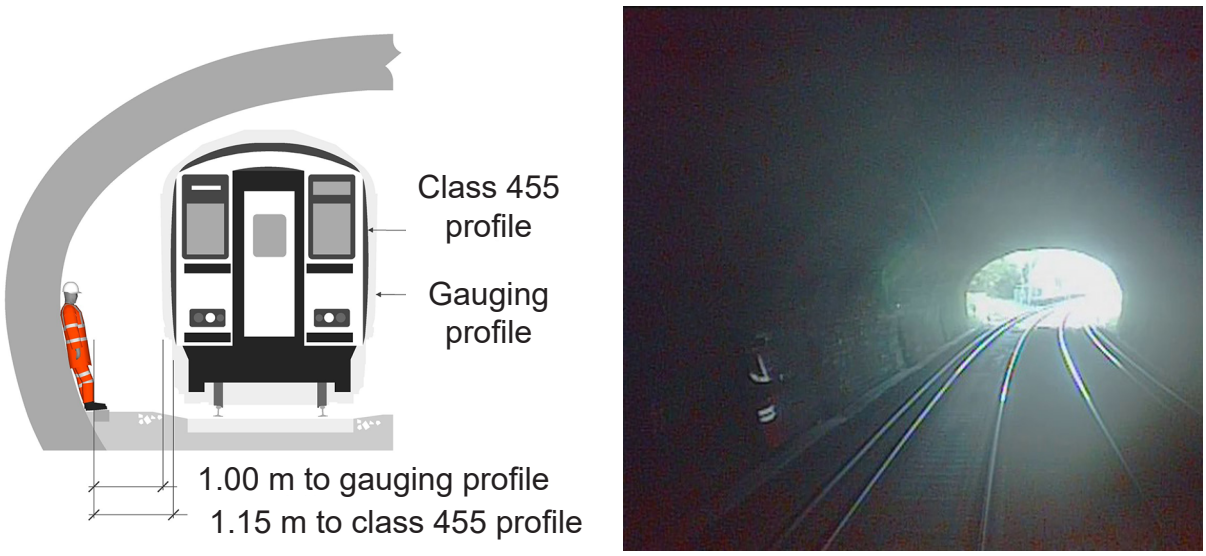

Figure 15: Position of track worker inside the tunnel as the train passed, based on gauging information from Network Rail (left-hand image) and from FFCCTV (right-hand image, courtesy of South Western Railway).

69 The length of time the track workers had between becoming aware of the approaching train and positioning themselves against the tunnel wall or in the refuges is unknown from the FFCCTV footage. Witness evidence, however, indicates that, due to the track curvature and because the train approached the group from behind, the track workers only had seconds to react when they became aware of the train. Knowing that they were in a tunnel of limited clearance, the track workers moved to either put themselves against the tunnel wall (as one did) or move into a refuge before the train passed (as the other two did).

70 Due to the track curvature, the sighting distance for the driver of the approaching train to the tunnel portal was approximately 150 to 200 metres, a distance which the train would have covered in 10 to 14 seconds based on the speed the train was travelling at the time. Witness accounts vary as to exactly where the driver sounded the horn and the use of the horn is not recorded on the on-train data recorder (OTDR, sometimes referred to as the 'black box') fitted to the train.

71 Rear-facing CCTV footage shows the track workers moving clear of the refuges and tunnel wall and following the train in the direction of Bookham station after the train had passed them.

Identification of causal factors

72 The incident occurred due to a combination of the following causal factors:

a. The track workers were walking in a different location to that which had been blocked to trains (paragraph 73).

b. The train was signalled towards the group as there was no line blockage in place (paragraph 101).

Each of these factors is now considered in turn.

The location of the line blockage

73 The track workers were walking in a different location to that which had been blocked to trains.

74 Voice communication records show that the PIC initially telephoned the signaller at Wimbledon to take a booked line blockage at 11:00 (paragraph 54). The PIC took this line blockage to enable the track workers to move through Bookham Tunnel from west to east, using the details of the line blockage from SWP A. Having then taken the same line blockage at 11:39 (paragraph 62), the team was returning to the access point at Bookham station when the near miss occurred.

75 Although the PIC and signaller had come to an agreement regarding the details of the booked line blockage, they did not come to a clear understanding of the location of the work, and neither the PIC nor the signaller realised that the line blockage and the work were at different locations.

76 The entry blocking points for both Bookham and Mickleham Tunnels are both at Leatherhead Junction (figure 16). The blocking points are very similar, with 860 diamond crossing used for Bookham Tunnel and 860 points for Mickleham Tunnel. However, the exit blocking points are different, with signal CA186 used for Mickleham Tunnel and signal GD623 for Bookham Tunnel.

77 This causal factor arose due to a combination of the following:

a. The planner confused two locations, and this led to an error in the SWP that was issued to the PIC (paragraph 78).

b. The planner and the PIC did not work together to plan the work (paragraph 85). This is a possible causal factor.

c. The error was not noticed during any of the mandated checks (paragraph 91).

Each of these factors is now considered in turn.

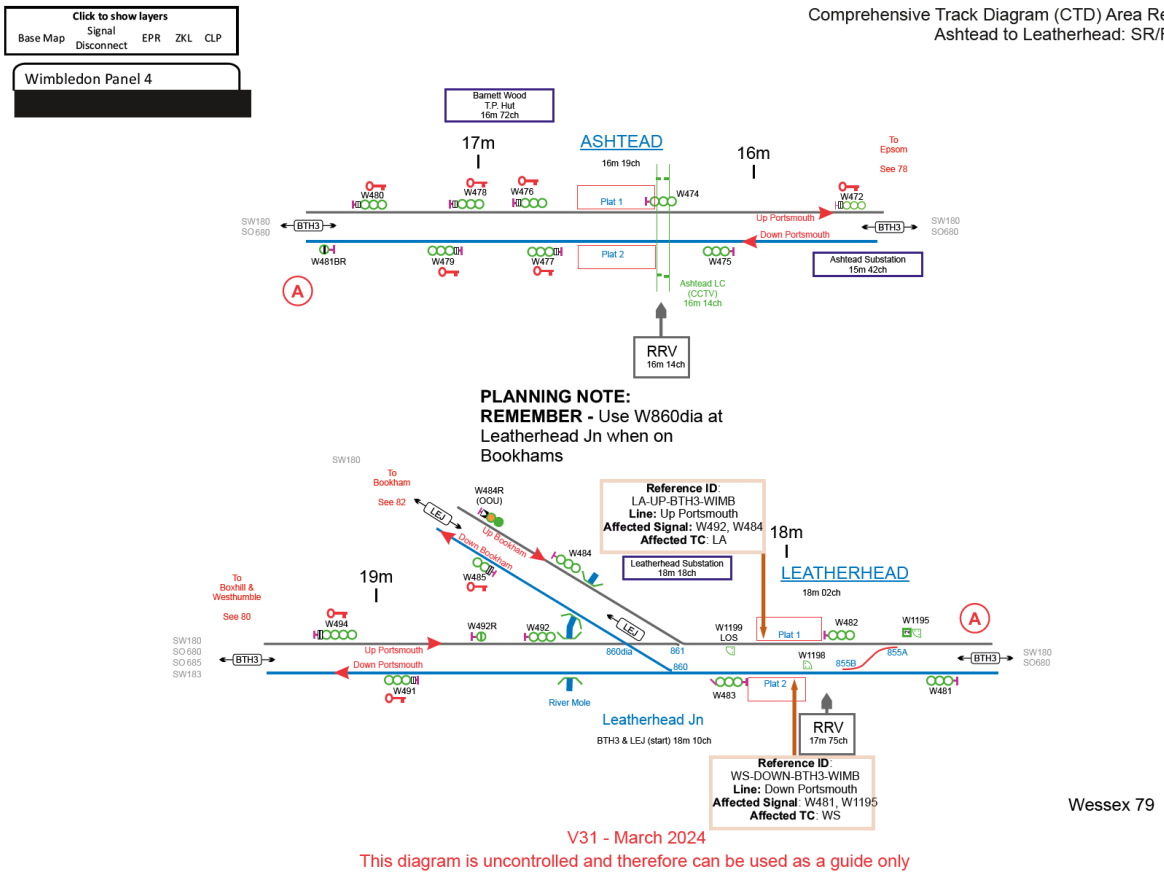

Figure 16: Track diagrams for Leatherhead Junction (courtesy of Network Rail).

Work area transposed to another location

78 The planner confused two locations, and this led to an error in the SWP that was issued to the PIC.

79 Following the PDR meeting on 21 April 2025, two SWPs were created (paragraphs 39 and 40). An SWP requires an individual with a planner competency to create it in the RailHub system (paragraph 33). The RailHub system requires the planner to input the details of where access is required, what protection arrangement is being used, and the basic details of the task being undertaken. The creation of an SWP involves the planner also looking at other sources of information such as existing line blockage availability, the asset location, and the work required to be undertaken. The process of generating SWPs therefore relies on the manual transfer of a large number of data sources from different systems.

80 The Ellipse asset management system (paragraph 26) details the type, location and any inspection and maintenance work that is required for an asset. It is an entirely separate system from RailHub and the process used to take information from Ellipse to allow SWPs to be generated in RailHub is not formally documented.

81 It was during this manual transfer process that the planner for the Wimbledon S&T team misread the information downloaded from Ellipse, which was in the form of a spreadsheet with multiple tabs. As a result of this, they incorrectly assigned both the track circuit and telephone maintenance tasks to the same location, Mickleham Tunnel. This resulted in both SWP A and SWP B being assigned line blockages for this location (paragraph 39). Network Rail's lack of a specific process for managing the transfer of data between different asset management systems is discussed further in paragraph 117.

Planner workload

82 The planner had been on annual leave between 14 and 20 April 2025. Before taking leave, they had created plans for both the week they were on leave and the following week to ensure that required inspection and maintenance work could be undertaken. There was no spare planner resource available to cover the planner's leave.

83 During the week that the planner was on annual leave, a number of planned works were cancelled due to a major infrastructure failure at Raynes Park, which required the reassigning of resources. This was not an unusual occurrence, as work is frequently replanned due to changing priorities.

84 The planner was unaware of the issue until returning to work on 21 April. This meant that, on their return to work, the planner had an increased workload: they needed to plan work as normal for the coming weeks, including the work on the telephones at Bookham Tunnel (paragraph 37), but also replan the cancelled work lost due to the infrastructure failure. The requirement to plan and replan a larger volume of works in an accelerated timescale meant the planner felt under time pressure to produce the SWPs required. This higher workload may have increased the likelihood of making an error during this task.[4]

PIC involvement in planning the work

85 The planner and the PIC did not work together to plan the work. This is a possible causal factor.

86 Network Rail standard NR/L2/OHS/019 (paragraph 31) states that the planner and PIC shall collaborate and create the SWP together (figure 17). Previous versions of the standard had allowed for a PIC not undertaking the work to be involved in the planning phase, but this had been removed from the version of NR/L2/OHS/019 which was current at the time of the incident.

87 The planner normally worked a 35-hour shift from Monday to Friday during office hours at both the Wimbledon S&T offices and from home. The PICs in the Wimbledon S&T team worked a mixture of three shifts comprising early, day and night turns dependent on their roster, qualifications, annual leave, training and other absences. This is needed to ensure that staff could respond flexibly to business requirements. As a result of this difference in working patterns, the planner and a particular PIC may not see each other for extended periods of time.

[4] Li W and Bai Y, 'A Human Factors Analysis of Railway Timetable Planning Tasks', Safety Science, 129, 104800 (2020).

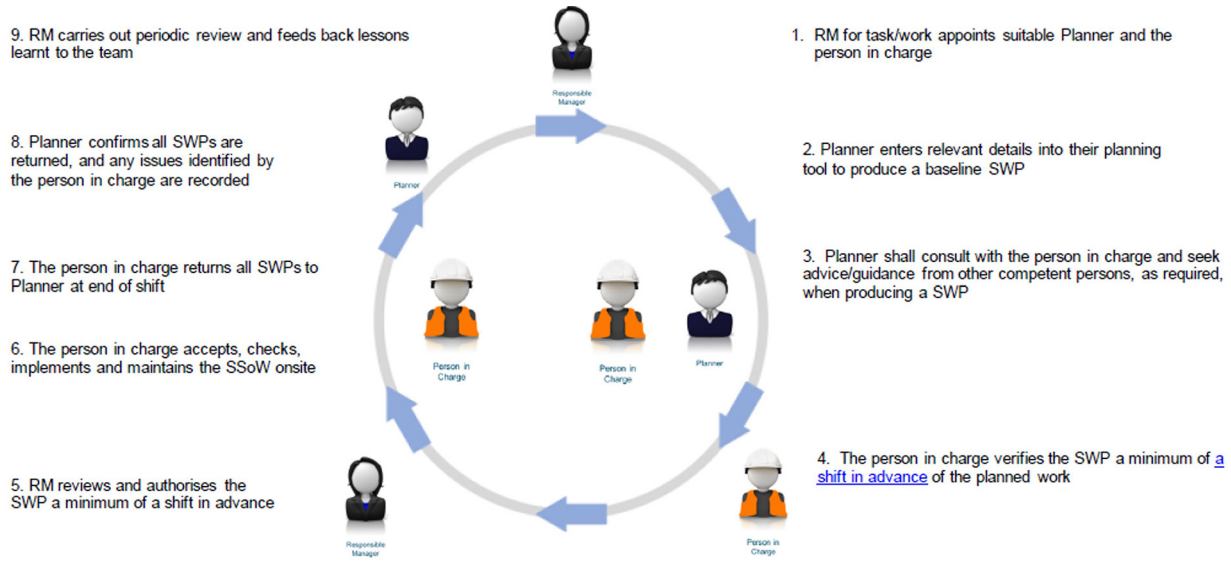

Figure 17: Workflow diagram for NR/L2/OHS/019 (courtesy of Network Rail).

88 The planner would, therefore, regularly undertake the planning of work tasks and their associated SSOWs without the input of the PIC who delivered the work. Had the PIC been involved during the planning stage, it is possible that the discrepancy between the location of works and the location of the SWP would have been identified at this stage of the process.

89 The knowledge requirement for planning works for different disciplines and different teams becomes more apparent when planners move teams or plan works for other teams. Technical knowledge can vary widely between individual planners, and without the specific knowledge a PIC can provide, issues can occur. For example, some of the work detailed within SWP A involved working within a separated SSOW, with a team of more than two people. In this case, a site warden (who watches the limits of the safe area and warns anybody who attempts to stray beyond those limits and too close to an open line) was required to be appointed in accordance with the Rule Book. The planner was not aware that three people would be attending site and hence was unaware of the need for a site warden to be appointed.

90 RailHub provides a collaboration function that enables a planner, PIC and responsible manager to comment on an SWP as it is being created. This allows PICs and planners to work more collaboratively on SWPs when they rarely physically see each other. The function requires a planner to tag the person they wish to contact (PIC or responsible manager) who will then receive an email alerting them that an issue has been raised. The person tagged needs to go into RailHub to resolve the issue and then alert the planner that it has been addressed. The planner stated that, due to the number of plans that are generated and the number of emails the system creates, they did not use that function during the creation of SWP A.

SWP checking

91 The error in the SWP was not noticed during any of the mandated checks.

92 Network Rail standard NR/L2/OHS/019 defines a number of mandatory checks that must be carried out following the creation of an SWP by a planner:

a. The PIC must verify the SWP a minimum of a shift in advance of the planned work.

b. The responsible manager must review and authorise the SWP, again a minimum of a shift in advance of the planned work.

c. The PIC must accept, check, implement and maintain the SSOW described in the SWP while on site.

93 In the case of this incident, the PIC verified SWP A 5 days after it was issued to them by the planner. They did not realise that SWP A contained an error when they did so. Due to the way data is timestamped in RailHub, it is not known how long the PIC spent verifying this pack before it was sent on to the responsible manager for review and authorisation. However, there is evidence suggesting that SWP B was sent by the PIC to the responsible manager for review and authorisation only 4 minutes after SWP A had been sent, suggesting that the verification process took only a short amount of time. As SWP B was 39 pages in length and SWP A 40 pages in length, 4 minutes is unlikely to have been enough time to have effectively verified it.

94 Witness evidence from Network Rail suggests that the time spent by a PIC verifying an SWP varied depending on the selected SSOW. If the SWP contains a one-off or more complex arrangement, then a PIC may spend more time understanding exactly what is needed to be done to take the line blockage and check the accuracy of information in the SWP.

95 In contrast, if the SWP is for an area the PIC is familiar with, then the verification checks may be more cursory, as staff would know the location, hazards, and protection arrangements (the case with the PIC involved). Consequently, a PIC would normally complete the verification of an SWP for a routine SSOW in a relatively short timescale and may not comment on its suitability or accuracy.

96 Witness evidence indicated that Wimbledon S&T staff carrying out the role of PIC were not allocated any specific time during their working day to verify SWPs, and that PICs were generally expected to carry out these verifications when they had some spare time.

97 The PIC had a second opportunity to check SWP A when they came to implement it on site. Although the work was at Bookham Tunnel and the PIC knew that they, and the team, were at that location, the PIC did not notice that SWP A mentioned Mickleham Tunnel in multiple places, including on the line blockage form they used in their conversation with the signaller. The line blockage form also contained a different line name (the Down Portsmouth line) to the one at Bookham Tunnel (the Down Bookham line).

98 Witness evidence was that the PIC's usual practice was to read an SWP in detail shortly before leaving for, or on their way to, site. In this instance, before leaving for site, the PIC was busy familiarising themself with the relevant sections of the signal maintenance testing handbook for clearing the faults on the telephones rather than checking the SWP (paragraph 48). The PIC then drove track worker 1 to Bookham station, and so did not read through the SWP on the way.

99 NR/L2/OHS/019 requires that, once a PIC has verified it, the SWP is authorised by a responsible manager. This requires the responsible manager to confirm that the most appropriate protection or warning system has been chosen in accordance with the hierarchy of control of operational risk and that all site, tasks and operational risk have been considered, and control measures identified. It is a requirement that the SWP be authorised at least one shift (a minimum 8 to 12 hours) in advance of the planned work. The SWP was sent to the responsible manager on the afternoon of 28 April, the day before the work was due to take place.

100 There is a further requirement within the standard that the responsible manager discusses the SWP with the PIC to ensure there are no omissions or errors. This was not done. However, there is no requirement for the responsible manager to check any work details that have been added to the SWP. This exclusion would apply to the additional detail referring to Bookham Tunnel (paragraph 39). The process by which SWPs are planned, verified and authorised is discussed further in paragraph 120.

The effects of the lack of correct line blockage

101 The train was signalled towards the group as there was no line blockage in place.

102 Train 2D23 was scheduled to call at Bookham station at 11:41. It was signalled towards Bookham, as normal, after making a scheduled call at Leatherhead station.

103 The signaller had paperwork for the pre-booked line blockage for Mickleham Tunnel (paragraph 56). They were aware that this line blockage would be taken that day. Although the time for the line blockage was later in the day, the signaller was expecting a line blockage with the reference number given by the PIC. When the signaller spoke to the PIC, the signaller confirmed the blocking points that were given in the line blockage documentation that the PIC held.

104 Train running data on the day of the incident shows that, when the first line blockage was taken, no trains were signalled towards the track workers as no services were timetabled on the Down Bookham line at that time. When the second line blockage was taken, a timetabled service, train 2D23, was due to go via the Down Bookham line. This was the service involved in the near miss.

105 No additional protection was specified in the SWP other than the line blockage. The site was a transient one with two separate locations of work with the line blockage being used to enable the team to walk between them. The line blockage was also given up in between these times meaning that any additional protection used would have to be able to accommodate the movement of the team. This would have effectively prevented the use of a track circuit operating device, a common form of additional protection, which needs to be physically placed and removed from the track.

106 The only way to provide additional protection to the site would have been via a signal disconnection of the signal beyond the 860 diamond crossing (figure 16). This would potentially have meant a further SWP and additional staff resources to undertake this action.

107 This causal factor arose because neither the signaller nor the PIC realised that the group was in a different location to the line blockage (paragraph 108).

The exchange of information between the PIC and signaller

108 Neither the signaller nor the PIC realised that the group was in a different location to the line blockage.

109 The signaller was initially contacted by trackworker 1 at 10:56 to test the telephone at the western end of Bookham Tunnel (paragraph 53). When an incoming call is received from the Bookham Tunnel telephones, there is an audible ring on the concentrator phone, and the button labelled 'Bookm Tnnl E' or 'Bookm Tnnl W' flashes (figure 11). This indicates where the call is coming from. To answer the call, a signaller needs to lift the receiver and press the flashing button. Although the buttons on the concentrator for the two tunnels are positioned relatively close together on the concentrator (figure 11), the signaller was provided with information to show that the call was coming from Bookham Tunnel. The signaller saw the incoming call on the concentrator but did not immediately answer the call as they were busy. During the follow-up call, trackworker 1 also confirmed they were at Bookham Tunnel. The signaller and trackworker 1 spoke again on the Bookham Tunnel west telephone at 10:57.

110 When the PIC contacted the signaller a few minutes later to take the line blockage for the first time, they stated they were at Bookham Tunnel and were requesting a blockage on the Down Portsmouth line. The PIC then gave the line blockage reference number from the SWP which related to the Down Portsmouth line. Even though the PIC had mentioned Bookham Tunnel, the signaller did not realise that the PIC had given a different location for a block.

111 When the signaller granted the line blockage, they did not reconfirm the blocking points for the line blockage with the PIC, nor confirm the PIC's location. The signaller also did not ask the PIC to repeat back the full line blockage information and only asked them to repeat the authority number and call back time.

112 Once the first line blockage was given up, the PIC contacted the signaller on a mobile phone to inform them that the next call would be from the lineside telephone at the east end of Bookham Tunnel. The PIC then rang the signaller on the lineside telephone to confirm that it was working. Once these works had been completed, the PIC rang the signaller to take the line blockage again so the work group could return through Bookham Tunnel back to where they had accessed the infrastructure initially. The near miss happened shortly afterwards.

113 After the second line blockage was given back, the PIC called the signaller to hand back the line blockage before telling them that a train had gone past them. The signaller recognised the blocking points the PIC gave as being for Mickleham Tunnel. The signaller had been using the information that was contained on the line blockage form and assumed that the PIC was at the correct location for it. This was despite the PIC giving information to the signaller that they were at Bookham Tunnel in two of the previous calls they made to the signaller.

114 Witness evidence suggests that Tuesdays were seen as busy days for the signaller on duty at Wimbledon as they handled a greater number of preplanned requests compared to other days. This is supported by analysis of incoming calls to the signaller on the day of the incident, which showed an increased workload compared to any other day (figures 18 and 19). Although Network Rail had recently carried out an assessment of the signaller's workload at this control panel, it did not show any issues with signaller workload. This assessment had been done on a Wednesday.

115 Witness evidence indicates that the period leading up to the incident had been busy for the signaller, with many phone calls from different locations (paragraph 53). The signaller was dealing with phone calls regarding four other line blockages and possessions before and during the line blockage associated with the near miss. Witness evidence showed that, at times of increased workload, the main check carried out by the signaller was that the information supplied matched the details given in the paperwork when a line block was being taken.

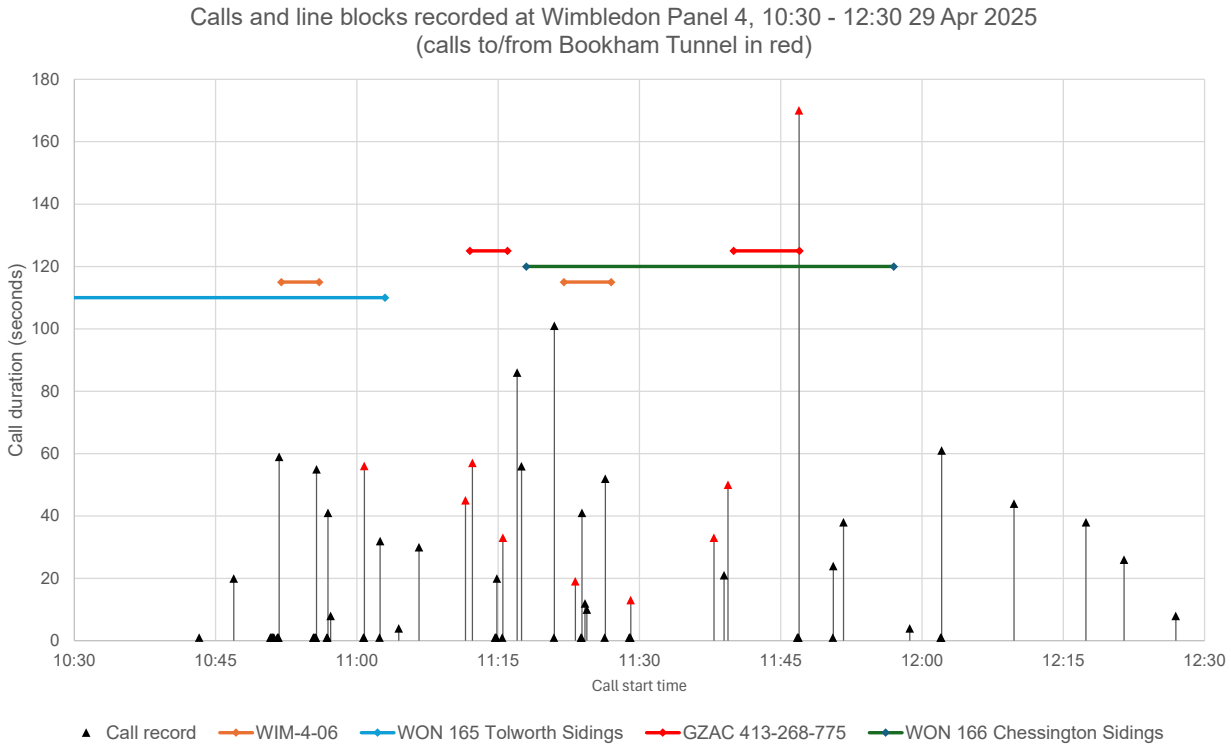

Figure 18: Telephone calls being dealt with by the signaller at the time of the incident.

116 Signallers typically use signal and point numbers to identify and confirm locations, while trackside staff are often more familiar with geographic locations such as access points and structures like bridges and tunnels. The current Rule Book states that the location for the work should be given in conversations with the signaller, but it does not specify what format this should take. There is also no requirement in the Rule Book for the signaller to gain an understanding of where the person requesting the line blockage is located, in relation to the line blockage they have requested.

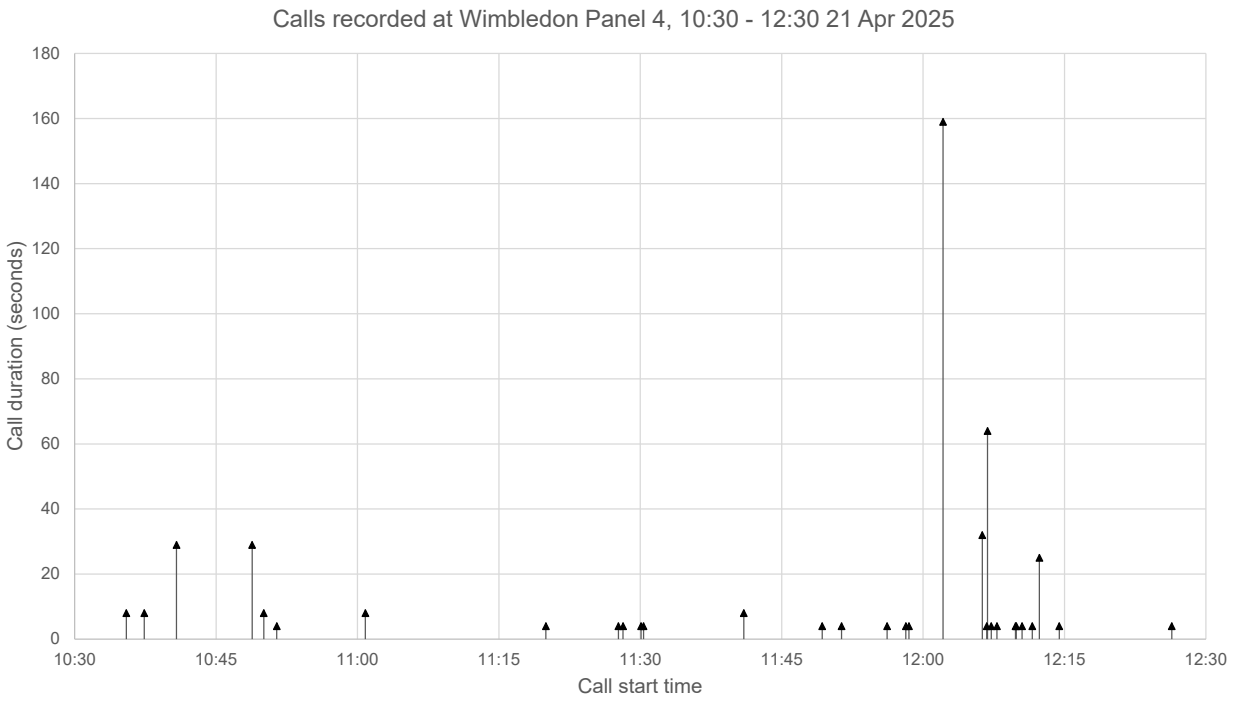

Figure 19: Telephone calls being dealt with by a signaller on a typical day.

Identification of underlying factors

Transfer of data between Network Rail's systems

117 Network Rail's lack of a specific process for managing the transfer of data between different asset management systems leaves it susceptible to the introduction of errors, as occurred in this case.

118 Network Rail uses a number of different systems and processes to help its staff manage the inspection and maintenance of assets and to plan site visits to assets that require inspection or maintenance. These systems and processes (such as Ellipse, the fault management system, PDR meetings and RailHub) are separate and are not linked to each other (paragraph 80). There is no set process in place to define how information is transferred between systems, including how work tasks are transferred from Ellipse into RailHub.

119 In this instance, an Excel file of backlog and cyclical items that needed to be completed was produced from Ellipse. This was used in conjunction with other locally created spreadsheets around staff rosters and possession availability. The use of such a wide number of data sources from different systems increases the chances of errors being introduced into the process of producing an SWP in RailHub.

Adherence to NR/L2/OHS/019 process

120 Steps in the process described in Network Rail's standard NR/L2/OHS/019 are either routinely not carried out or not carried out effectively.

121 Network Rail's standard NR/L2/OHS/019 states that the planner and PIC shall collaborate and create the SWP together (paragraph 86 and figure 16). This did not happen in the cases of SWP A and SWP B, and the PIC did not play an active role in deciding how the work would be carried out and what SSOW would be used (paragraph 85).

122 RAIB has previously investigated other track worker accidents and incidents where the PICs or COSSs on site were not actively involved in the planning of the work. These include a near miss with track workers in Dundee (RAIB safety digest 11/2018), a near miss at South Hampstead (RAIB report 20/2018) and track workers being struck by a train at Margam (RAIB report 11/2020).

123 It is difficult to actively involve staff who carry out the PIC role in the planning stages, as these staff are often working on site, or on different shift patterns to those doing the planning. The process described in standard NR/L2/OHS/019 does not account for these difficulties nor does it indicate what sufficient collaboration should look like. A collaboration function on RailHub is available (paragraph 90), but witness evidence suggests that it is not universally used by those involved in the planning process in Wessex route.

124 Standard NR/L2/OHS/019 states that the PIC should have time to review and verify the SWP. In practice, the amount of time required to check, verify and authorise an SWP by the planner, PIC and responsible manager is dependent on the individuals in those roles and their view of the complexity of the SWP involved (paragraph 94). Although checklists are provided in the standard to guide individuals in what they should be examining in SWPs, the size and quantity of SWPs that need to be issued can mean that these controls lose their effectiveness at finding errors and become more perfunctory.

125 There are differing views within Network Rail regarding the reasons behind the lack of adherence to the process described in standard NR/L2/OHS/019. Some believe that the process is adequate and that the issue is in its implementation. Others believe that the process cannot be implemented with the resources available to them. In any case, the evidence from this and other RAIB investigations suggests that the process does not always result in the risk to people working on the track being sufficiently controlled.

Observations

RailHub's use for assurance purposes

126 Network Rail's ability to interrogate its version of RailHub for assurance purposes is limited.

127 Network Rail's version of RailHub is limited in terms of the queries that can be searched to undertake assurance checks on the SWPs produced. Data to enable such queries to be run is collected by the RailHub system at various stages of the RailHub approval process, but search queries have not been set up for Network Rail to allow that data to be easily retrieved. In contrast, the version of RailHub that is used by companies in the wider supply chain has an increased capacity for the creation of assurance queries.

128 As a result, Network Rail can find it difficult to look at trends to enable effective assurance of activities relating to the production of SWPs using RailHub. For example, Network Rail was unable to provide RAIB with data showing how many packs are typically rejected by PICs at the verification stage, even though data to undertake such analysis is present on the system. This could, for example, show how many errors are being caught at the planning stage or how many PICs feel comfortable in rejecting SWPs they feel contain errors or are inappropriate.

Other SWP error

129 The SWP for the separated element of the work was not planned or implemented correctly.

130 The PIC had two track workers with them when they first went on or near the line (paragraph 52). To implement the separated SSOW included in the SWP for the walking elements to the sites of work, and for working on the location cabinets and telephones on either side of the tunnel, the Rule Book requires a site warden to have been appointed. Although a COSS (or PIC acting as COSS) can act as a site warden, this is limited to circumstances where only the COSS plus one person is present. The SWP noted this arrangement as '*COSS+1-only*'.

131 The requirement to appoint a site warden for groups that contain more than two people was known by the planner. However, the understanding of the work that was required, and how it would involve more than two people, was not communicated to the planner, who envisaged that the PIC would be on site with only one other person.

132 Having not been involved in the planning (paragraph 85), the PIC only recognised on the day that a site warden would be required. They thought they could appoint one of the two track workers as a site warden when they arrived at site. However, they soon realised that they could not do this and still undertake the work required. They made the decision that they could still work safely under the planned SSOW by not appointing a site warden. Neither of the track workers, despite both being COSS competent, raised any concern with this proposed course of action. However, this was not a causal factor in the near miss.

Previous occurrences of a similar character

Near miss with track workers at Dundee, 10 July 2018

133 At around 00:30 on 10 July 2018, four track workers were involved in a near miss with a train about 2 miles west of Dundee (RAIB safety digest 11/2018). The track workers were working on a bridge over a footpath when the train approached them travelling at 72 mph (115 km/h). Two of the track workers were on the bridge at the time. One of these climbed through the bridge handrail to get clear of the train, while the other pulled himself towards the handrail, with very little space available between them and the train. Nobody was injured, but the train struck a portable generator being used by the track workers.

134 The incident occurred due to a number of people not realising that the location of the work, and the location where protection of the work from moving trains had been planned, were different. Lines had been blocked to allow the work to be carried out, but this line blockage was about 2 miles east, rather than west, of Dundee station. Crucially, railway mileages increase both to the east and west of Dundee, from zero datum points either side of Dundee station. Therefore, the mileage at the site of the work appeared to be consistent with that for the line blockage; however, these mileages referred to different sections of line. This confusion arose at several points in the planning process.

Near miss with track workers at Morton Junction, 27 November 2024

135 At about 07:26 on 27 November 2024, a passenger train travelling at around 78 mph (125 km/h) was involved in a near miss with a group of track workers (RAIB safety digest 02/2025). The incident took place near Morton Junction on the Erewash Valley line, approximately 2.4 miles (3.9 km) north of Alfreton station. At the time of the incident, the train was travelling on the Up Erewash line towards Alfreton.

136 The workers involved were a COSS and two track workers who were part of a larger group preparing to correct a track fault. As the train approached and sounded its horn, the COSS and the two track workers moved clear of the track and out of the swept path of the approaching train. FFCCTV footage shows that they moved clear of the track around 2 seconds before the train passed.

137 When the line blockage was being arranged, neither the signaller nor the COSS realised that the group was not at the location that was to be blocked by the protecting signals. The COSS reported that they had unknowingly used an SWP for a different location to that where the work group was actually located.

Summary of conclusions

Immediate cause

138 The track workers were in an unsafe position, in a tunnel with limited clearance, as the train approached them (paragraph 65).

Causal factors

139 The causal factors were:

a. The track workers were walking in a different location to that which had been blocked to trains (paragraph 73). This causal factor arose due to a combination of the following:

   i. The planner confused two locations, and this led to an error in the SWP that was issued to the PIC (paragraph 78), **Recommendation 1.**

   ii. The planner and the PIC did not work together to plan the work. This is a possible causal factor (paragraph 85), **Recommendation 2.**

   iii. The error in the SWP was not noticed during any of the mandated checks (paragraph 91), **Recommendation 2.**

b. The train was signalled towards the group as there was no line blockage in place (paragraph 101)**.** This causal factor arose due the following:

   i. Neither the signaller nor the PIC realised that the group was in a different location to the line blockage (paragraph 108), **Learning Point 1.**

Underlying factors

140 The underlying factors were:

a. Network Rail's lack of a specific process for managing the transfer of data between different asset management systems leaves it susceptible to the introduction of errors, as occurred in this case (paragraph 117), **Recommendation 1.**

b. Steps in the process described in Network Rail's standard NR/L2/OHS/019 are either routinely not carried out or not carried out effectively (paragraph 120), **Recommendation 2.**

Additional observations

141 Although not linked to the incident on 29 April 2025, RAIB observes that:

a. Network Rail's ability to interrogate its version of RailHub for assurance purposes is limited (paragraph 126), **Recommendation 3.**

b. The SWP for the separated element of the work was not planned or implemented correctly (paragraph 129), **Learning Point 2**.

Previous RAIB recommendations relevant to this investigation

142 RAIB has previously undertaken several investigations into accidents and incidents involving track workers. The following recommendations made by RAIB as a result of its previous investigations, have relevance to this investigation.

Accident at Margam 3 July 2019, RAIB report 11/2020, Recommendations 2 and 7

143 Recommendation 2 reads as follows:

> *The intent of this recommendation is to improve the level of monitoring and supervision of planners and track workers so that safe planning and site behaviours are cultivated and maintained.*
>
> *Network Rail should carry out a detailed investigation at delivery units and depots of how management is monitoring and supervising section planners and staff working on or near the track, to check that safe work plans are being generated, and implemented safely on the ground. It should then use the findings to develop and implement improved procedures on monitoring and supervision, and assess and address any related staff resource requirements.*

144 In February 2024, the Office of Rail and Road (ORR, the health and safety regulator for railways in Great Britain) informed RAIB that Network Rail planned to improve the monitoring and supervision of planners and track workers via three main pieces of work. These were the training of planners, the roll out of RailHub and safety audits to improve the assurance that the delivery units were planning work in accordance with NR/L2/OHS/019. Network Rail had also provided a sample of evidence of supervision and monitoring of planners and track workers compliance to NR/L2/OHS/019 through planned assurance work. As a result, ORR concluded that Network Rail had taken the recommendation into consideration and had taken actions to close it.

145 Recommendation 7 reads as follows:

> *The intent of this recommendation is to improve the effectiveness of Network Rail's management assurance processes related to the safety of staff working on or near the track, so that it provides a more realistic assessment of the extent to which track worker safety arrangements are embedded, and being correctly applied, in practice.*
>
> *Network Rail, in consultation with its main contractors and staff representatives, should commission a project to improve the way its management assurance system operates in areas directly affecting the safety of track workers. The review should include each of the following:*
>
> *a) the identification of improved systems for collecting reliable data on how mandated processes are being applied in maintenance depots, and within track worker teams (to supplement or replace the existing Level 1 management self-assurance)*
>
> *b) improved mechanisms for collating, analysing, tracking, and presenting the findings of audits, investigations and other management assurance activities.*

The project should also consider ways of expanding the scope of management assurance activities to provide better intelligence on the underlying reasons for the non-compliances that are identified during audits, including consideration of the views of auditors and other relevant staff. The improved management assurance arrangements that are identified should be endorsed by the Network Rail board before implementation in accordance with a structured and validated programme for change.

This recommendation may apply to other Network Rail management assurance processes.

146 In October 2022, ORR informed RAIB that Network Rail had reviewed the assurance of first and second lines of defence and established a risk-based control and assurance framework. This was owned and developed by Network Rail's Technical Authority (who are accountable for setting technical guidance within Network Rail) to ensure that assurance focuses on risk, meaning Network Rail get better data on compliance in key risk areas.

147 Network Rail had also re-established business assurance committee (BAC) meetings as a means of informing management on assurance outcomes, such as non-conformance reports. The Network Rail Safety Task Force (STF), with the involvement of trade unions and suppliers, introduced automated SSOW planning and line blockage activities with the built-in capability to provide assurance data. The STF programme identified a suite of metrics around compliance with NR/L2/OHS/019, which would provide much better monitoring of compliance with SSOW.

148 Network Rail also established a monthly working group to share best practice, lessons learned and identify trends to help improve understanding of the reasons for non-compliances. The Network Rail Executive Leadership Team endorsed the actions which addressed the requirement in the recommendation for approval at a senior level. ORR concluded that Network Rail had taken the recommendation into consideration and taken actions to implement it.

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

149 Network Rail's Wessex route has undertaken a 'safety stand down' (where staff are taken off their scheduled duties to be briefed on an issue of concern) using this incident as an example. The brief focused on the importance of checking SWPs, following safety-critical communication procedures and using additional protection when taking a line blockage. The attendance of staff at such events is recorded and encouraged so the widest possible coverage is obtained.

150 The brief covered some of the factors that led to the near miss at Bookham Tunnel. It also highlighted that, both across the region and nationally, there have been 17 significant irregularities in the last year where staff have been in the wrong location or working on an open line, which could have resulted in loss of life.

151 In December 2025, Network Rail standard NR/L2/OHS/019 was revised and is now at version 13. The revised standard now makes it more explicit that the planner shall work with the PIC who is undertaking the work to develop the SWP.

Recommendations and learning points

Recommendations

152 The following recommendations are made:[5]

1 *The intent of this recommendation is to reduce the risk of errors being introduced when using information from other systems to produce an SWP in RailHub.*

Network Rail should review how its various routes handle the transfer of information from its asset management systems, internal meetings and locally developed processes into RailHub. As part of this review, Network Rail should identify areas of good practice and where improvements can be made to reduce the opportunity for errors to be introduced into safe work planning (paragraphs 139a.i and 140a).

This recommendation may apply to other organisations that plan work on or near the line on Network Rail managed infrastructure.

2 *The intent of this recommendation is to improve the implementation of Network Rail's process covering work taking place on or near the line.*

Based on the issues identified within this investigation, Network Rail should undertake a review of the way in which standard NR/L2/OHS/019, 'Safety of People at Work On or Near the Line' and its associated processes are being implemented in practice. This review should particularly focus on:

a) whether it is possible in practice for planners and persons in charge to work together to develop SWPs, and if sufficient time is allocated to do this

b) whether sufficient time is allocated for responsible managers and persons in charge to undertake effective checking and authorisation of SWPs

c) the effectiveness in practice of the checking and authorisation process

d) how important safety information within SWPs is identified and highlighted

[5] 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.

e) how SWPs are reviewed to ensure that adequate resources have been assigned to implement them safely.

Based on the results of this review, Network Rail should develop a timebound plan to implement suitable improvements to its business processes, standards, and working practices (paragraphs 139a.ii, 139a.iii and 140b).

3 *The intent of this recommendation is that Network Rail improve its assurance activities using information that the RailHub software is capable of providing.*

Network Rail, working with its suppliers, should review and understand what information is available from RailHub which might support its assurance and trend monitoring activities and make them more effective. This review should include consideration of:

a) what information is currently collected by RailHub and how Network Rail can access it

b) good practice among its suppliers and how they use RailHub for data assurance activities

c) what further information RailHub may be able to collect which may make assurance more effective.

Based on the results of this review, Network Rail should develop a timebound plan to implement suitable improvements to its assurance activities and to the version of the RailHub software that it uses (paragraph 141a).

Learning points

153 RAIB has identified the following important learning points:[6]

1 Track workers and signallers undertaking safety-critical communications are reminded of the importance of clarity, effective listening, and reaching a clear and unambiguous understanding of what has been agreed (paragraph 139b.i).

2 Staff who plan work on or near the line, and staff who then deliver that work are reminded of the importance of coming to a clear understanding about how all the planned activities, including the walking and working elements, should be undertaken (paragraph 141b).

[6] '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	Full term
COSS	Controller of site safety
ORR	Office of Rail and Road
OTDR	On-train data recorder
PDR	Plan, do, review
PIC	Person in charge
PTS	Personal track safety
RAIB	Rail Accident Investigation Branch
RSSB	Rail Safety and Standards Board
S&T	Signalling & Telecommunications
SSOW	Safe system of work
SWP	Safe work pack

Appendix B - Investigation details

RAIB used the following sources of evidence in this investigation:

- information provided by witnesses
- information taken from the train's OTDR
- forward-facing CCTV
- site photographs and measurements
- weather reports and observations at the site
- rail industry logs
- signalling data
- recorded voice communications
- documentation related to the task taking place on or near the line
- information provided by Network Rail 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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