MINISTRY OF TRANSPORT

RAILWAY ACCIDENT

Report on the Collision that occurred on 11th January 1967 at St. Anne's Park, Bristol

IN THE
WESTERN REGION
BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE
1968

MINISTRY OF TRANSPORT,
ST. CHRISTOPHER HOUSE,
SOUTHWARK STREET,
LONDON, S.E.1.
28*th December* 1967.

Sir,

I have the honour to report, for the information of the Minister of Transport and in accordance with the Order dated 16th January 1967, the result of my Inquiry into the following collision between two express passenger trains that occurred at about 14.10 on 11th January 1967 at St. Anne's Park near Bristol in the Western Region, British Railways.

The trains involved were the 11.45 Class 1 Paddington to Bristol, which had been brought to a stand at Bristol East Depot Main Line Down Home signal, and the 12.00 Class 1 Paddington to Swansea, which had been diverted to run via Bath because the direct route via Badminton had been obstructed by the derailment of a goods train at Westerleigh East Junction.

The second train was irregularly accepted into the block section between Foxes Wood Intermediate Block Home signal, controlled from Keynsham and Somerdale West signalbox, and Bristol East Depot Main Line signalbox and collided at a low speed with the tail of the train ahead. The signalman at Bristol East Depot Main Line had forgotten the Bristol train and when offered the diverted Swansea train by the signalman at Keynsham and Somerdale West, and finding his block instrument standing at "Train on Line", assumed he had omitted to send "Train out of Section" for a light engine which had passed his box some minutes earlier. Accordingly he cleared his block instrument and accepted the Swansea train at Line Clear. He was able to do this because the Bristol train had not, by that time, occupied the berth track circuit of his Down Home Signal which would have held the instrument at "Train on Line".

The collision resulted in very severe damage being caused to the rear coach of the Bristol train and to the leading cab of the diesel-hydraulic locomotive of the Swansea train. The Up line was slightly obstructed by a splayed-out side panel of the damaged coach with which a light engine proceeding towards Bath came into glancing contact within seconds of the first collision. It was fortunate that there were no fatalities or serious injuries. Nineteen passengers in all required first aid or medical treatment and of these eight were taken to hospital. Only one person was detained in hospital and he was discharged six days after the accident.

The obstruction of this important main line caused considerable dislocation to services already upset by the derailment at Westerleigh and many trains were cancelled or diverted. A bus service was introduced between Bristol and Bath until the lines were re-opened, the Up line at 20.35 and the Down line at 20.50 the same evening.

The day of the collision was fine, with good visibility.

DESCRIPTION

Site and Signalling

1. The Western Region Main line from Paddington to Bristol follows the valley of the Avon between Bath and Bristol on a gently falling gradient of 1 in 1320. Approaching St. Anne's Park station the line passes through two tunnels, St. Anne's Park No. 3, 1,017 yards, and St. Anne's Park No. 2, 154 yards. A distance of 363 yards separates the portals of the two tunnels and the actual point of collision was 57 yards outside the portal of No. 2 Tunnel where the line is on a left-hand curve of 156 chains radius with a steep wooded slope close to the lineside which restricts the view ahead on the Down line to about 300 yards from the portal of No. 3 Tunnel. The maximum permitted speed for passenger trains on the Down Main line between Keynsham and St. Anne's Park is 75 m.p.h., with a further restriction to 60 m.p.h. through St. Anne's Park station.

2. The signalling in the area is on the absolute block system and the adjacent signalboxes are Keynsham and Somerdale West, 2¾ miles away in the Up direction, and Bristol East Depot Main Line, ½ mile in the Down direction. The locations of the relevant signals on the Down line are shown in the attached plan.

3. Keynsham and Somerdale West signalbox, which contains a mechanical lever frame having 30 working levers, is situated on the Down side of the Main line at the London end of Keynsham and Somerdale station. There was formerly another block post known as Foxes Wood signalbox between Keynsham and Somerdale West and Bristol East Depot Main Line signal boxes. It was closed in 1960, and replaced by Intermediate Block Section signals for both Up and Down lines.

4. The Down IB Home signal, which is of the 2-aspect colour light type, is worked from Keynsham and Somerdale West, and is situated on the left side of the line, 2,483 yards from the controlling signalbox. There is a co-acting 2-aspect colour light Distant signal situated 1,230 yards to the rear of the Home signal and the line is continuously track circuited between the Down Main Advanced Starting signal, which is 678 yards from Keynsham and Somerdale West, and a point 440 yards in advance of the IB Home signal. Lever No. 36 which controls the Down Main Advanced Starting signal can only be pulled when this track circuit is unoccupied and the IB Home signal and its co-acting Distant are showing a red and yellow aspect respectively.

5. Lever No. 35, controlling the Down IB signals can only be pulled when Line Clear has been received from East Depot Main Line. The IB Home signal is replaced to danger automatically when a train occupies the track circuit immediately ahead of it and it cannot be cleared again until lever 35 has first been replaced

to the normal position and then pulled for the second time. This is only possible when a further line clear release has been obtained from East Depot Main Line. Should a train pass the IB Home signal whilst it is in the danger position a buzzer is sounded continuously in the controlling signalbox until an acknowledgement plunger is depressed by the signalman.

6. Bristol East Depot Main Line signalbox, which was brought into service in 1960, is situated on the Down side of the main line. It contains a mechanical lever frame having 69 working levers, which are operated by the signalman standing with his back to the line. The whole of the Up and Down Main lines through the area controlled by the box are track circuited.

7. The Down Main Distant signal, which is worked by lever 44, is of the 2-aspect colour light type and is situated on the Down side of the line, 2,373 yards from the box and 1,797 yards to the rear of the Down Main Home signal. The aspects of the signal are repeated in the signalbox.

8. The Down Main Home signal, worked by lever 45, is a lower quadrant semaphore 576 yards from the signalbox and 93 yards from the mouth of St. Anne's Park No. 2 Tunnel. It is located on the Up side of the line to enable it to be sighted through the tunnel. The position of the arm of the signal is repeated in the signal box and there is a berth track circuit 220 yards in length to the rear of the signal.

9. 500 yards beyond the home signal is the Down Main Inner Home bracket signal situated between the Up and Down Main lines, and carrying two arms worked by levers 48 and 46 respectively. Signal 48 reads over a left hand diverging junction on the Bristol side of the signalbox, leading from the Down Main to the Down Relief line, whilst signal 46 applies to the through route along the Down Main line to the Down Main Starting signal, worked by lever 47. This signal, which is also situated between the Up and Down Main lines is 310 yards beyond the signalbox. The Inner Home signals and the starting signal are all of the lower quadrant semaphore type, and the position of their arms is repeated in the signalbox.

10. The absolute block system of working is in force through the section from Foxes Wood Intermediate Block Home signal to the Down Home signal for East Depot Main Line. The block instrument in this box applying to the Down line is of the standard Western Region 3-position commutator type. Its controls are such that the lever of signal 45 must be locked in its normal position, the arm of the signal must be at danger, signal 44 must be displaying a caution aspect, and the track circuits to the rear of signal 45, and between that signal and the Inner Home signals must be unoccupied, before Line Clear can be given to Keynsham and Somerdale West.

11. The occupation of the berth track circuit of signal 45 automatically places and maintains the block instrument at "Train on Line" if it is not already in this position, but no "Welwyn" or "One acceptance" block control is provided. Thus, with the controls described above it is still possible for the signalman at Bristol East Depot Main Line to restore his Down line block instrument from "Train on Line" to "Line Blocked" whilst a train is in the section and then to accept a second train from Keynsham and Somerdale West, provided that the first train has not yet occupied the berth track circuit of his outermost stop signal.

The trains

12. The 11.45 train from Paddington to Bristol was formed of 13 bogie vehicles and hauled by "Western" Class type 4 diesel-hydraulic locomotive, No. D 1067. It was 923 feet long and its weight, including the locomotive, was 554 tons with a calculated brake efficiency of 77·2 per cent. With the exception of the last vehicle, which was a 2nd class corridor coach of former GWR design of timber construction on a steel underframe fitted with side buffers and screw couplings, the coaches were of modern construction and were buckeye-coupled throughout. Its last booked stop was at Bath from where it had departed 7 minutes late at 13.52, conveying 204 passengers.

13. The 12.00 train from Paddington to Swansea, was formed of 12 bogie vehicles and hauled by locomotive No. D 1071 of the same class. This train was buckeye-coupled with the exception of one vehicle, a bogie van marshalled immediately behind the engine. The train was 851 feet long and weighed 518 tons, with a calculated brake efficiency of 78 per cent. This train had been diverted from its normal route to run via Chippenham and Bath on account of a freight train derailment which had obstructed the Main line to South Wales at Westerleigh. Its last stop had been at Swindon, from where it had left 2 minutes late at 13.19 conveying 197 passengers.

The effects of the collision

14. The last vehicle of the Bristol train bore the brunt of the collision. Its timber framed body was splintered and burst open at the rear end and the end vestibule, lavatory compartment and the two adjacent passenger compartments, which were fortunately unoccupied, were completely wrecked. The lavatory compartment at the leading end of this coach was also badly damaged, the fittings being torn from their mountings by the impact. Damage to the remainder of the Bristol train and to the coaches of the Swansea train was mainly confined to couplers and internal fittings such as lamp shades, mirrors, etc.

15. The locomotive of the Swansea train, No. D 1071, received extensive damage to its leading cab. The control desk was pushed back to within 20 inches of the bulkhead in the centre of the cab and the windscreen was shattered. There was also minor damage to exterior fittings on the leading bogie but the bogie frame and locomotive main frame tubes were not damaged.

16. Only very minor damage was sustained by the diesel-hydraulic locomotive running light on the Up line, No. D 864, which came into glancing contact with the splayed out body panels of the last coach of the Bristol train, a few moments after the first collision.

17. The driver of the Bristol train was *Driver H. W. Murrell*, who had worked the train from Paddington. He said that he had been checked by signals at Keynsham and Somerdale East, where the Distant signal was on. He made a brake application but the Home signal was off and the Distant arm for Keynsham and Somerdale West, below it on the same post, came off as he passed under it at a speed of less than 30 m.p.h. He then ran under clear signals, reaching a speed of 40 m.p.h. or perhaps a little more, until coming to the Bristol East Depot Main Line Distant signal which was in the On position. He brought the train to a stand at the Home signal, released the vacuum brake on the train, holding it on the engine air brake, and was about to send his secondman forward to the signalbox when he felt the impact of the collision, the engine lurching forward and jerking his head back over the seat. Within seconds of the collision and while still somewhat dazed by the jolt he saw a light engine passing on the Up line but was unable to do anything about stopping it.

18. Murrell did not think his train had been at a stand longer than about a minute when the collision took place. Since the Home signal was well out of sight of the signalbox and no signalpost telephone was provided he considered it advisable to send his secondman forward to carry out the provisions of Rule 55 without waiting the full 2 minutes prescribed.

19. *Secondman P. E. Davies*, confirmed his driver's evidence of the events leading up to the collision and said that he had then gone to the Bristol East Depot Main Line signalbox to call for assistance, laying detonators to protect the Up line as he went.

20. In charge of the Bristol train was *Guard C. T. Keys*. He had taken over the train at Swindon and was travelling in a brake compartment in the 6th coach which came to a stand in the tunnel when the train stopped at the Bristol East Depot Main Line Home signal at a time he estimated as 14.09. He confirmed that the train had been checked at Keynsham and had run slowly from there.

21. After about a minute he felt a considerable impact and heard the noise of the collision. He climbed down on the six-foot side and went back and met the driver of the Swansea train running forward. The latter shouted to him to stop an engine which was coming through the tunnel on the Up line and Keys had exhibited a red hand signal. He then ensured that both lines were properly protected.

22. The Swansea train was being driven by *Driver K. D. Stoneham* who was acting as conductor to the booked driver because the train was diverted via Bath. He had joined the train at Reading and driven from there. The train was not stopped at Bath, running under clear signals from Thingley Junction until approaching Keynsham and Somerdale West, where the Distant signal was at Caution. Stoneham had almost brought the train to a stand when the Home signal came off. As they came through the station the IB Distant was at Yellow and he was prepared to stop at the IB Home signal. The latter was clear, however, when he sighted it and he accelerated to about 40 m.p.h. before coming to the Bristol East Depot Main Line Distant signal which was at Caution. Stoneham then shut off power and coasted through the tunnel. As they emerged from the tunnel at about 35 m.p.h. the secondman shouted "Whoa", and almost immediately he saw the tail of the train in front and made a full emergency brake application.

23. Stoneham told me that until the last moment he thought his train would stop short but when they were only a short distance from the train ahead he realized that there would be a collision, so he and the two men with him in the cab moved back into the centre body of the locomotive. He himself was last out of the cab and was just through the doorway when the impact occurred at a speed he estimated at between 10 and 15 m.p.h.

24. *Secondman R. C. Bennett* confirmed the driver's evidence and estimated that it might have been about 2 seconds after he shouted "Whoa" to the driver that the latter made a full brake application. He himself thought from the first moment that they would hit the train in front and he agreed with Driver Stoneham's estimate of the speed at the moment of collision.

25. The guard of the Swansea train was *Passenger Guard T. C. Crowley*. He described the impact as giving him the impression the train had "hit a brick wall". It threw him to the floor and he received minor head injuries. When he picked himself up and looked out he saw the light diesel locomotive standing on the Up line. He thought that this was within $\frac{1}{2}$ minute of the first collision.

26. The driver of the light diesel locomotive was *Driver D. L. F. Williams*. He had seen the Bristol train standing in St. Anne's Park station as he ran into the tunnel. His engine was under power, in notch 2 and he estimated his speed as about 30 m.p.h. When in the tunnel he saw a red light on the track ahead and at once made a brake application but the engine did not come to a stand before making slight contact with the splayed-out side panel of the last vehicle of the Bristol train some 55 yards outside the tunnel mouth. His engine was not materially damaged and after a brief discussion with the secondman of the Swansea train he ran on to protect the Down line and to report the accident. He stopped at the Up IB signal, from where he spoke to the signalman at Bristol East Depot Main Line and then continued to Keynsham and Somerdale West where he reported to the signalman at 14.20.

27. The signalman on duty at Keynsham and Somerdale West was *Relief Signalman E. C. W. Champion* working the 14.00 to 22.00 turn. The early turn signalman had left the box at 13.55 at which time Champion had taken charge. He described to me the sequence of trains he had signalled on the Down line from then on until the collision took place.

28. At 13.55 the Down line block instrument for the section between Foxes Wood IB signal and Bristol East Depot Main Line showed "Train on Line" for a freight train and at 13.58 the trainmen of a light engine had carried out Rule 55 by reporting on the telephone from Signal KW 35, the Down IB signal. He received "Train out of Section" for the freight train at 13.59 and was immediately given "Line Clear"

for the light engine. The 11.45 Paddington–Bristol passed his signalbox at 14.01 but he did not receive "Train out of Section" for the preceding light engine until 14.03 when he was also given "Line Clear" for the Bristol train.

29. Signalman Champion then told me that at 14.05 he received a telephone call from Relief Signalman Slee at Bristol Depot Main Line to ask about a light engine movement to Westbury and at the end of the conversation he told Slee that the 12.00 Paddington–Swansea, which had passed the signalbox at 14.05, was running up towards the IB signal. According to Champion, Slee replied, "I haven't knocked out for the London" and almost immediately gave "Train out of Section" on the Down line block instrument. Champion then asked and obtained "Line Clear" for the Swansea train. The time was then 14.06.

30. The next signal received from East Depot Main Line was "Obstruction Danger" at 14.15 when Slee told him there had been a collision between the Swansea train and a light engine. At 14.20 the light engine arrived and its driver told him of the collision between the two passenger trains.

31. At Keynsham and Somerdale West the signalman maintains a full train register book, and all the times given to me by signalman Champion were supported by entries in his register.

32. At Bristol East Depot Main Line, *Relief Signalman S. T. Slee* was covering the 14.00 to 22.00 turn. He had worked the same turn on the previous day and was well acquainted with the box having worked it on many occasions during his 6 years as a Special Grade Relief Signalman in the district. Like Signalman Champion at Keynsham and Somerdale West, he had arrived in the box a minute or two early and had actually taken over at about 13.55 at which time the Down line block instrument stood at "Train on Line" for a freight train with the signals lowered for it to proceed into East Depot on the Down side. The freight train was followed by a light engine and Slee could not remember giving "Train out of Section" for it or accepting the following train which was the 11.45 Paddington–Bristol. He recalled that at about the time the light engine on the Down line passed his signalbox, he was asked for a movement of another light engine from East Depot to Westbury. His immediate thoughts had been concerned with whether he had time enough to let this light engine away in front of the 14.15 Bristol–Paddington and while he was dealing with this question he had a telephone call from Keynsham and Somerdale West to tell him that the diverted Swansea train was approaching the IB Home signal and that he had not cleared his Down line block instrument for the train.

33. Signalman Slee told me that he had completely forgotten that he had accepted the Bristol train and when he saw the instrument standing at "Train on Line" assumed that he had not given "Train out of Section" for the preceding light engine. Accordingly he had cleared the block instrument for the Down line and accepted the Swansea train at "Line Clear". While crossing the Westbury light engine to the Up line he noticed that the berth track circuit of the Down Outer Home signal was showing occupied and his only thought at the time was that the Swansea train had come through the section very quickly. A few minutes later he received a telephone call to the effect that there had been a collision and that a coach was badly damaged. Even then he had not appreciated that there were two Down trains in the section and assumed that the collision had been between the Swansea train and the light engine on the Up line.

34. Signalman Slee, who was 46 years of age, was a frank and open witness but he was quite unable to explain his mistake. He told me he was a very fit man for his age, that he had enjoyed a good night's sleep and that he had no family worries or other preoccupations. As far as he was concerned the 11.45 Paddington–Bristol had never existed. He did not deny that he must have accepted the train but he could not remember having done so. He was quite definite that, during his telephone conversion with Signalman Champion, he had said "I have not cleared the engine" and had not referred to "the London".

35. The signalman at Bristol East Depot Main Line is only required to keep an abbreviated train register, and does not record the passage of booked trains running normally, and thus the train register was of no assistance to him as a reminder that there was a train in section.

36. Full tests of the signalling controls in both Bristol East Depot Main Line and Keynsham and Somerdale West signalboxes were carried out on the day of the collision. Everything was found to be in order and it was not possible for the signalman at East Depot to accept a train from Keynsham and Somerdale West and thus allow the signalman at the latter place to pull off the Intermediate Block Home signal, unless both the berth and overlap track circuits at the East Depot Outer Home signal were clear and both this signal and the Down Distant signal in the ON position.

Conclusions, Remarks and Recommendations

37. This collision was the direct result of irregular block working on the part of the signalman at Bristol East Depot Main Line in that he gave "Train out of Section" to the signalbox in rear whilst the 11.45 Paddington–Bristol express passenger train was in section between Foxes Wood Down Intermediate Block Home signal and Bristol East Depot Main Line and accepted the following train, the diverted 12.00 Paddington–Swansea, into the occupied section at "Line Clear". He was able to restore his instrument to "Line Blocked" and give a further "Line Clear" to the signalbox in rear because the Bristol train had not, at that time, occupied the berth track circuit of his Down Outer Home signal.

38. How an experienced special class relief signalman should come to make this serious error has not been fully explained. He was rested and in good health but had so completely forgotten his acceptance of the first train that, when he saw the Down line block instrument standing at "Train on Line" he did not wait for an instant to consider why this was so, but at once assumed that he had forgotten to give "Train out of Section" for the preceding light engine. I can only imagine that, during the first few minutes of his

turn of duty, during which time he would have been reading his notices and apprising himself of diversions and other special workings, he had carried out the routine function of accepting the Bristol train so subconsciously or automatically that he had failed to impress it on his memory.

39. This accident would not have occurred if full block controls including "Welwyn" or "One acceptance" control had been installed on the Down line at Bristol East Depot Main Line. This control, which requires the berth track circuit at the outermost stop signal to have been both occupied and cleared before a second "Line Clear" can be given, is so-called because its introduction was recommended in the Report on the serious collision that occurred at Welwyn Garden City on 15th June 1935.

40. Since that time, this form of block control has been increasingly provided as a means of improving the standard of protection on main lines signalled on the absolute block system, though it did not become the policy of the Western Region to provide it until late in 1960, after the renewal of the signalbox at Bristol East Depot Main Line. From then on, however, when it become apparent that, owing to restrictions on capital expenditure, rapid progress towards the provision of complete track-circuiting with multiple-aspect colour-light signalling could not be maintained, "One acceptance" block controls have been provided in the Western Region at all new signalboxes or wherever major renewals have been undertaken at existing signalboxes, taking into account the classification of the line concerned.

41. A multiple-aspect signalling scheme has now been prepared for the Bristol area, including the main line between Bristol and Bath but if, for any reason, the implementation of this scheme is abandoned or delayed, I recommend that special consideration be given to the installation of "One acceptance" block controls at those main line signalboxes in the Bristol area not now so equipped.

I have the honour to be,

Sir,

Your obedient Servant,

I. K. A. McNAUGHTON.

Lieutenant Colonel.

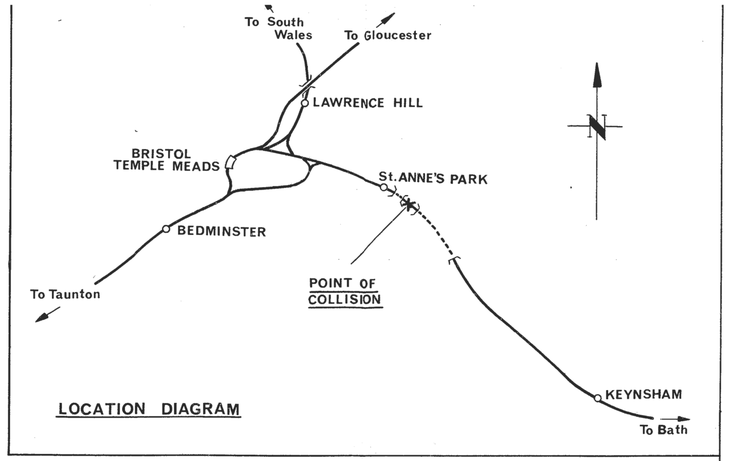
The Secretary,

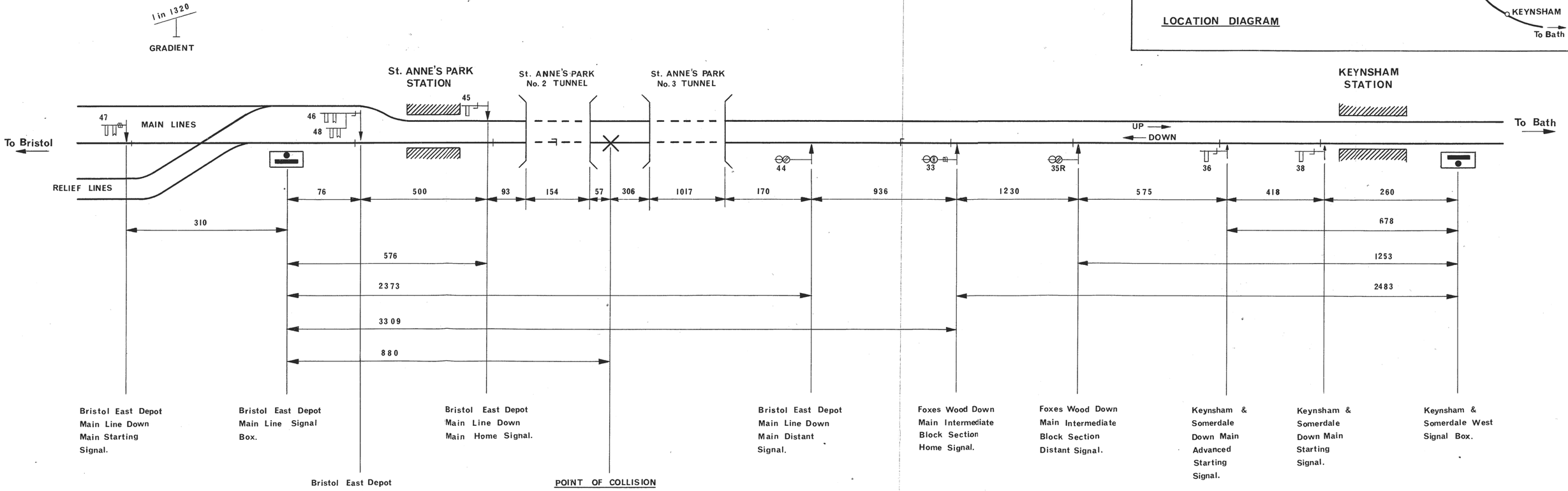
Ministry of Transport.

(97129) Dd. 138261 K.9 3/68 Hw.

COLLISION AT St. ANNE'S PARK, BRISTOL

11th. JANUARY, 1967





ALL DISTANCES GIVEN IN YARDS

NOT TO SCALE