



DEPARTMENT OF TRANSPORT

RAILWAY ACCIDENT

**Report on the Collision and
subsequent Derailment that
occurred on 26th July 1986
at Lockington Level Crossing**

IN THE
EASTERN REGION
OF BRITISH RAILWAYS

HER MAJESTY'S STATIONERY OFFICE

DEPARTMENT OF TRANSPORT

RAILWAY ACCIDENT

**Report on the Collision and
subsequent Derailment that
occurred on 26th July 1986
at Lockington Level Crossing**

IN THE
EASTERN REGION
OF BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE

© Crown copyright 1987
First published 1987

ISBN 0 11 550832 5

Her Majesty's Stationery Office

Standing order service

Placing a standing order with HMSO BOOKS enables a customer to receive other titles in this series automatically as published.

This saves the time, trouble and expense of placing individual orders and avoids the problem of knowing when to do so.

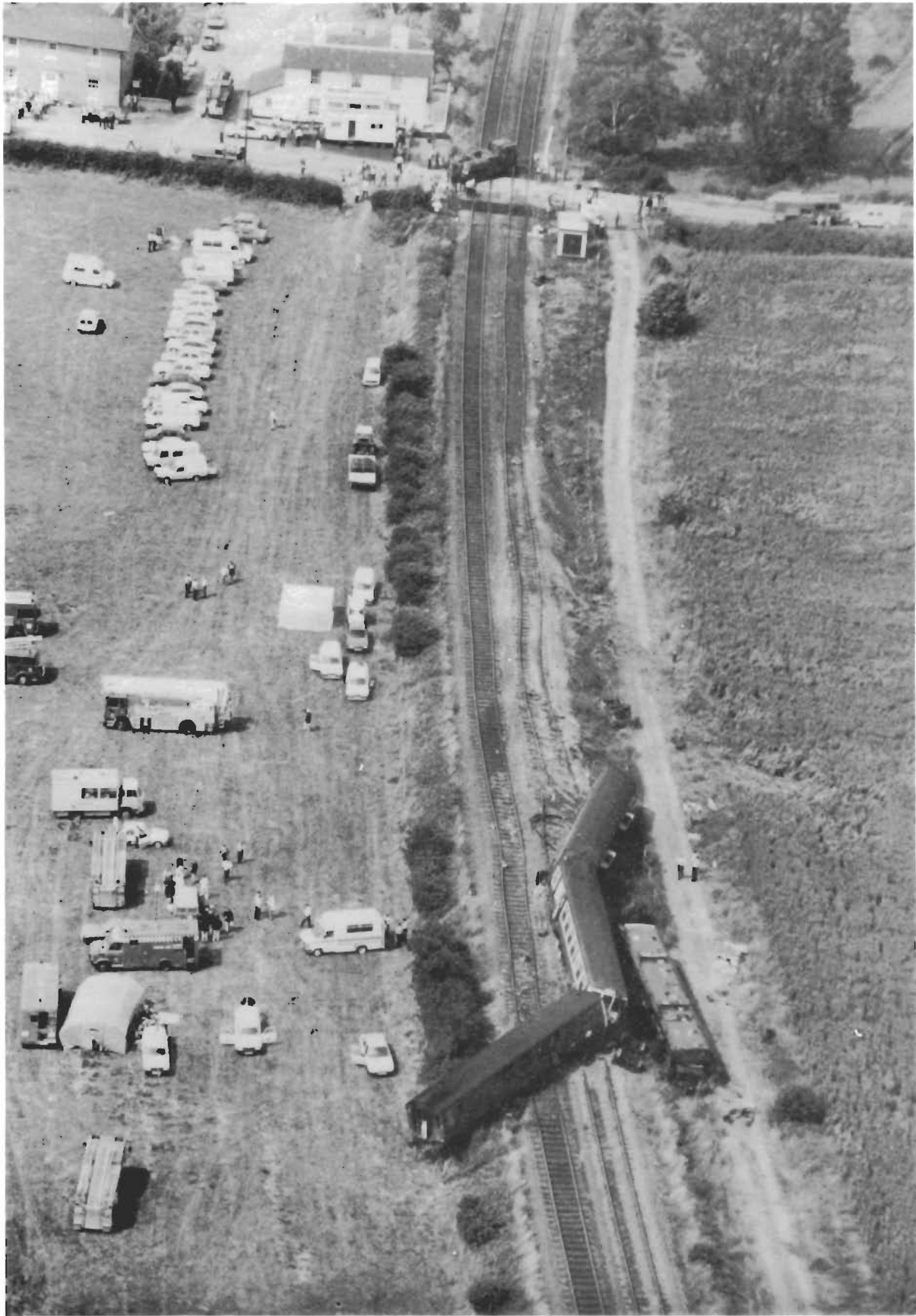
For details please write to HMSO BOOKS (PC 13A/1), Publications Centre, PO Box 276, London SW8 5DT, quoting reference X03.06.08.

The standing order service also enables customers to receive automatically as published all material of their choice which additionally saves extensive catalogue research. The scope and selectivity of the service has been extended by new techniques, and there are more than 3,500 classifications to choose from. A special leaflet describing the service in detail may be obtained on request.



View looking south from crossing. Crossing equipment can be seen at bottom left-hand corner. Leading coach of train is on its side separated from other coaches and facing back towards Bridlington.

(Photograph courtesy Yorkshire Post)



View looking north towards crossing. Exit from which Mr Ashley drove the van is between the white station house and the adjacent house and is occupied by a Fire Brigade vehicle. At the time of the accident the forecourt of the station house was unoccupied.

(Photograph courtesy Yorkshire Post)

SIR,

I have the honour to report for the information of the Secretary of State for Transport, in accordance with the Direction dated 31st July 1986, the result of my Inquiry into the collision between a passenger train and a Ford Escort van and the subsequent derailment of the train that occurred at about 10.00 on 26th July 1986 on Lockington Level Crossing on the line between Bridlington and Hull in the Eastern Region of British Railways.

As the 09.33 Bridlington to Hull 4-car diesel multiple-unit (2F21) travelling at about 50 mile/h closely approached the crossing, which is of the type known as an Automatic Open Crossing Remotely monitored (AOCR), at which trains initiate the steady yellow and twin red flashing road traffic-light signals, the van was driven onto the crossing against the red lights. The left hand buffer of the train (in the direction of travel) struck the near side of the van behind the passenger seat and as the left hand lifeguard and leading wheel ran into the floor of the van it was ripped into five pieces and slewed to the left. The left hand leading wheel of the train attempted to run up over the van's axle and both leading wheels of the train were derailed to the left as they departed from the crossing.

Derailed was then progressive as the wheels ran down to the left of the embankment on which the line runs. The leading coach jack-knifed, turned on its side, and was dragged along backwards with the leading end of the second coach being forced over the adjacent track. The two following coaches were both derailed but remained upright.

The emergency services were requested almost immediately and reacted very speedily. A police car arrived at 10.10, the first Fire Brigade appliance arrived at 10.13 and the first ambulance at 10.19. Hull Royal Infirmary was alerted and the first casualty was taken into the hospital at 11.09. I very much regret to report that eight passengers in the train and a passenger in the van lost their lives and 59 people, including the train and van drivers and two firemen, were taken to hospital, of whom 10 were detained.

Because some casualties had resulted from passengers in the train being thrown through the windows, it was necessary to obtain heavy lifting equipment to raise the leading coach, which was lying on its side, to confirm that no one was trapped beneath it. Whilst the level crossing equipment and surface were undamaged, the coaches of the train were badly damaged and there was considerable track damage. The line was not fully re-opened to traffic until Tuesday 29th July 1986. The crossing was operated under local control until 8th August 1986.

At the time of the accident it was dry and there was some cloud, but it was generally a bright and sunny day. The railway line over the crossing lies approximately north to south and is crossed, at right angles, by a minor road which carries traffic from the main A164 Beverley to Driffield road to a number of isolated communities including Aike.

DESCRIPTION

The Level Crossing Arrangements

1. Before its conversion to an AOCR Lockington Level Crossing on the double-track Bridlington-Hull railway line between Beverley and Hutton Cranswick Signal Boxes was protected by lifting barriers operated from a signal box beside the crossing. On the railway approaches there were Stop signals interlocked with the barriers.

2. British Railways applied for an Order to permit the modernisation of the crossing on 8th July 1985. The Order, made under Section 1 of the Level Crossings Act 1983, came into effect on 1st December 1985 and required the British Railways Board to provide modern protection at the crossing. This was to be in a form known as an Automatic Open Crossing Remotely monitored (AOCR). The crossing was inspected on 5th February 1986 and found to comply with the Order. Certain minor matters required improvement but only one matter was outstanding at the time of the accident and that was that the check rails required securing.

3. Full details of the crossing and layout are given in the Department's printed Requirements, the Order, and the plans at the back of this report.

4. Salient points of the arrangements are:—

- (a) The line speed is 70 mile/h. Trains are signalled between Beverley and Hutton Cranswick under the Absolute Block Regulations.
- (b) Whistle boards are positioned about seven seconds running time at line speed from the crossing. Train drivers are required to sound their whistles at these boards between the hours of 07.00–23.30.
- (c) On both sides of the road on both sides of the crossing are steady yellow and twin red flashing road traffic-light signals mounted on a backing board surmounted by a double St Andrews cross in red and white.
- (d) When a train approaching the crossing occupies a track-circuit and operates a treadle there is a delay of 10 seconds and then an audible warning sounds and the yellow shows for three seconds followed by at least 24 seconds of alternate flashing red lights (wig-wags) before a train travelling at 70 mile/h reaches the crossing. The flashing red lights are not extinguished and the audible warning does not cease until the train has passed clear of the crossing.
- (e) Traffic signs to Diagram 538 in the Traffic Signs Regulations and General Directions are placed on the road approaches to the crossing about 130 m from the wig-wags. A supplementary plate to Diagram 537.4 is attached to each sign and reads 'Automatic Control (No Barriers) STOP when lights show'.
- (f) Other road traffic signs given instructions to the drivers of large or slow vehicles and, so that they and others may contact the monitoring signal box, telephones are provided on both sides of the railway.
- (g) The crossing equipment is monitored continuously at Beverley Signal Box with that of Beswick, Kilnwick, and Watton AOCR. The crossing's electrical equipment is operated from a 24 Volt battery that is continuously charged from a local electricity supply at 240 V AC. A 50 V battery, similarly charged, operates the line circuits to adjacent crossings and Beverley Signal Box. In the event of a mains failure the battery is sufficient for 12 hours normal crossing operation and an audible and visual alarm operates in the monitoring signal box.
- (h) The flasher unit operates continuously on a dummy load until it is switched to operate the lights. A second audible and visual alarm operates if the flasher unit fails at any time; if all the red traffic-light signals on one road approach to the crossing fail to illuminate when required to do so; if the red traffic-light signals flash continuously for more than four minutes; or if the local control unit at the crossing is operated. Because trains may pass in either direction over both lines the directional control relays are monitored as are the time release relays. However the alarm does not differentiate between these different failures.
- (j) The track-circuits are low voltage (1–2 volts) DC.

5. Lockington is the most southerly of four closely-spaced AOCR and lies to the north of an occupation crossing protected by miniature red/green lights and user operated barriers. There is some common use of track circuits between the different crossings. The controls for the AOCR are arranged so that the crossing operates normally during single line working although a reduced speed limit is imposed for wrong-direction movements. These controls and those for 'Another train coming', which keep the wig-wags flashing and cause a special sign to flash if the crossing would be open to road traffic for less than 10 seconds between the departure of one train and the initiation of the stop sequence for a second, were not involved in the accident.

6. The road over the crossing is of tarmac. On either side of the crossing it has wide grass verges bordered by hedges and ditches. A footway or made-up ground one metre wide is provided on both sides of the road over the crossing and standard cattle-cum-trespass guards are fitted across the railway outside the footway. The railway track over the crossing is 95 lb/yd bullhead rail secured in cast-iron chairs with steel keys on wooden sleepers. Check rails are fitted inside the running rail in double chairs and the tarmac is separated from both running and check rails by timbers laid longitudinally alongside them and coach-screwed to the sleepers.

The Train and Van Involved

7. The two cars of the leading diesel multiple unit (DMU) were both of Class 105, of Craven manufacture, and 17.5 m long. The leading vehicle, No. 54434, was a Driving Trailer Composite weighing approximately 24.5 tonnes, the second vehicle, No. 51278, weighed 31.5 tonnes and was a Driving Motor Brake Second powered by two AEC engines with a guard's brake compartment. The two cars of the second unit were both Class 114 manufactured in British Railways Derby Works in 1956. The third vehicle, No. 53016, weighing 39.7 tonnes and powered by two Leyland Albion engines was a Driving Motor Brake Second. The last vehicle, No. 54034, was a Driving Trailer Composite weighing 30.6 tonnes. The total train weight was about 126 tonnes. The British Railways two-pipe quick-release vacuum brake system was in operation. The brakes

are applied normally by the driver's valve but are also applied, after a delay, if the driver's safety device (DSD) incorporated in the throttle is released.

8. The leading vehicle of the train, which was lying on its side, lost both bogies and all the underfloor equipment in the derailment. There was some damage to the front end where fittings had been knocked off when it had dug into the field. There was some damage to the right-hand side where it had rubbed across the rail top and damage caused by striking the boundary fence concrete posts but the passenger compartment had in the main retained its integrity. Of the 63 seats only five cushions were dislodged although every window in the right-hand side of the unit had been broken. This was probably through passengers being thrown through them or the vehicle side striking ballast and the ground whilst being dragged along. The second vehicle was upright but derailed across the Down Line. It had some damage to the left-hand side of the passenger compartment and had lost much underfloor equipment. However, only three window panes were broken and of 52 seats, only three cushions were dislodged. Damage to the outside of the driver's cab of the third vehicle was caused when it collided with the underframe of the overturned leading vehicle. There was however only one broken window whilst all the cushions were in position. The same was true of the last vehicle, 54034, in which the passenger compartment had only one broken window. Views of the crossing and derailed train are at the front of the Report.

9. The van involved was a Ford Escort, registration number GWX 475T, which was four-wheeled with a front-mounted engine and rear-wheel drive. It had only a driver's and passenger seats. The cargo portion of the van had no windows and the speedometer recorded a mileage of 62,684 miles.

10. The Ford van was torn apart in the accident into five separate parts. These were the rear floor section of the van from behind the driver's and passenger seats with the rear axle still attached; the front of the vehicle from just behind the seats forward with its front wheels attached; the full off-side badly buckled with part of the rear door assembly; the roof which was on its own; and the front near-side door and door pillar with the side and a section of the rear door post and door.

EVIDENCE

As to Events Leading up to the Accident

11. *Signalman C. A. Walker* was on duty in Hutton Cranswick Signal Box on the morning of the accident. He confirmed that he had checked the signal box clock and that it was correct. It had been his place of work for nearly three years. He described how he signalled the 09.33 from Bridlington and said that it left his station on time at 09.57. He knew Driver Brown on the train and exchanged a few words with him. The driver appeared to be his normal self. Walker was expecting a train on the Down line but at 10.05 the Beverley signalman telephoned to say that he had a failure indication for Lockington Level Crossing. At 10.08 he was sent six bells (the obstruction danger bell signal) and the Beverley signalman telephoned again to say that there had been an accident between a road vehicle and a train on the crossing.

12. In the signal box at Beverley on the morning of the accident was *Signalman D. P. Bayram*. He came on duty at 06.00 and checked that there had been no overnight telephone calls or failure indications from any of the level crossings monitored in his signal box. When he opened up, everything was normal and the signalling equipment was operating correctly. Shortly before 10.00, he signalled 2F21 and a train in the Down direction from Beverley to Bridlington in the normal manner. The first intimation that he had that something was wrong was at 10.05 when there was a failed indication from Lockington. His attention was attracted by the audible warning and then he noticed that the white light had gone out and that a red light indicating a crossing failure was illuminated. The other indicator for Lockington showed that the power supply was working correctly. He telephoned the signalman at Hutton Cranswick and told him that there was a failed indication at Lockington; this was so that trains would be cautioned into the section.

13. He tried to get in touch with the Signal and Telecommunications staff who were working at Beverley North to go and correct the failure but he was unable to contact them on that occasion. Then at 10.08 the guard of 2F21 telephoned from Lockington Level Crossing to say that his train had struck a vehicle, that there were casualties, and he required the emergency services including ambulances. Signalman Bayram sent the emergency bell signal to Hutton Cranswick, explained on the telephone to the signalman there what was wrong, contacted Beverley Station booking office and asked them to summon the emergency services, and carried out the remainder of the emergency procedures. The guard of the Down train from Beverley to Bridlington then telephoned from Scarborough Occupation Level Crossing, explained what had happened, and said that he thought that the emergency services were required.

14. Mr Bayram confirmed that his signalbox clock was showing the correct time. He said that he could not recall having had very many technical failures of the level crossing at Lockington nor had there been very

many requests from road users with heavy or slow moving vehicles or herds of animals asking for permission to cross. He recalled one occasion, on 27th June 1986, when there was a failed indication from Lockington Level Crossing at 09.10 and he had requested the attendance of technical staff in order to carry out repairs if necessary. Subsequently there were a number of telephone calls from road users to say that the red lights were flashing for a long time with no train coming. He replied to each call saying that he knew of the failure and that the technical staff were on their way to correct it. If they asked he was only permitted to tell them whether a train was or was not approaching. They were not specific requests to cross and so he had not recorded them in either the Train Register Book or the Book for Lockington. He had been advised in advance that the power supply was due to be cut off by the local Electricity Board.

15. He recalled one other telephone message, which was from a BR employee, on 13th May 1986 reporting that a train had passed over the crossing and that he thought the crossing lights had not operated. On that occasion there was no indication on his control panel of any failure at the level crossing. He said that he had recorded all the occasions on which the telephones had been tested either by the Patrolman or by the Signal and Telecommunications staff. He had heard nothing either from the public or from railway staff to indicate that there was any particular problem with the Lockington crossing apart from the two occasions which he had mentioned. He was asked to check the Train Register Book to see if there were any entries for either 9th or 30th May 1986 when, it was claimed, a Mr Hillaby had telephoned to complain that the lights were flashing for a long period when no trains had passed. There were no entries on that day and he could not remember that name. Before the accident he did not know the names of any of the callers; a few of them were now known to him.

16. *Signalman B. Sutcliffe* also worked in Beverley Signal Box. He was not on duty at the time of the accident. He had worked in that signal box for about 10 years. He confirmed that when the level crossing telephone was tested, whoever carried that out, a record was made in the Train Register Book and that Lockington Level Crossing was not used very much for heavy or slow moving loads. During the time when he was on duty he could not recall any telephone calls from road users at Lockington, up to the time of the accident, complaining that the crossing was not working properly or that the red lights were flashing for a long period. He could recall one call from Beswick reporting that the lights had been flashing for a long time without a train. If he had received any such telephone calls he would have recorded them. He was the signalman on duty late on Friday 25th July, the night before the accident. He confirmed that when he left the signal box, all the equipment and crossing indications were in a normal state. If they had not been he would have waited and called for technical assistance.

17. *Mrs Curtis* lives at No. 2 Railway Cottages, Lockington, next door to Mr M. Ashley, the driver of the van involved in the accident. Her home is about 150 m from the road over the crossing, which is reached by a gravelled road that forms part of the old station yard. This road enters the road that passes over the crossing about 25 m to the west of the white vehicle and pedestrian Stop lines of the crossing. She never uses the crossing but understands what warnings are given. On the morning of the accident, at about 10.00, she was sitting in her home awaiting the arrival of her daughter when she heard a car door slam. She stood in her porch and saw Mr Ashley getting into his van in which his son was already seated. He seemed to be his normal self and started up the van and backed it out. She watched the van begin its movement and then went back into her house and sat down reading a magazine.

18. The van's departure was normal and was usual for a Saturday. About four or five minutes after Mr Ashley had left, Mrs Curtis looked up and saw, through the window of her house, a train going past. She did not think the driver had sounded the whistle and she gained the impression the train was slowing down because she heard a noise which she described as "iron on iron". She heard no sound of a collision or any unusual noise and it was not until her daughter arrived that she learned of the accident.

19. *Mr P. P. Quinn* was a passenger on the train seated immediately behind the driver's compartment and adjacent to the aisle. I interviewed him privately because his wife and her parents, with whom he was returning from holiday, were killed in the accident. The blind behind the driver's seat was up and he had a good view of the driver. He travelled once a year on the train and had some idea of the controls of the DMU. He could not see the speedometer but thought they were travelling at about 50 mile/h when, as the train was about 40 feet from the crossing, the van moved out slowly in front of it. He claimed that the van came from the left but in view of the other evidence I believe he was mistaken and recalls the van being hit by the left-hand front corner of the train. Mr Quinn said that the train driver put his right hand on the brake handle and moved it, did something with his left hand, and then shielded his face with his left arm just before the impact.

20. The Guard of 2F21 was *Guard P. Sturdy* based at Hull Botanic Gardens. He knew the line to Bridlington well. He had booked on duty at 05.00, travelled to Bridlington, and then acted as guard with Driver Brown, who seemed his normal self, on a train to Hull and return to Bridlington.

21. The train forming 2F21 departed from Bridlington on time at 09.33 and the journey was uneventful. He was travelling in the brake compartment in the third car and as the train approached Lockington Level Crossing he felt a lurch or bump and almost immediately saw the vacuum brake gauge needle drop. He was sure there was no brake application before the bump. The coach began to vibrate, he braced himself, and when the train stopped he calmed passengers and got out on the Down Line side.

22. Having looked around he realised that he would be unable to contact his driver. He knew that there would be a train on the Down Line so he climbed through the second car and started to run towards Scarborough crossing. He gave a stop signal when he saw the other train approaching, it passed him braking heavily, and came to a stand short of the derailed train.

23. He explained to the driver what had happened and asked him to go to the derailed train to shut down the engines and afford protection while he went to the crossing telephone to call for the emergency services. The accident had occurred just after 10.00 and he told the signalman that it was serious and that the emergency services were required. After that he went to stay with Driver Brown whom he found semi-conscious in the driving cab. He helped a few people off the train, went to the ambulance with Driver Brown, and did his best to reassure him. While he was with him in the ambulance Brown was semi-conscious and kept asking if they were still at Nafferton, north of Driffield. He did not think Brown was in any position to tell him what had happened. He remembered calling Mr Jefferson (the Assistant Traffic Manager at Hull) over to the ambulance but could not recall any conversation or questioning taking place. He thought there were about 120 people on the train which he estimated was travelling at 60–70 mile/h as it approached the crossing. It was his opinion that Driver Brown drove the train as he should.

24. *Mr G. Isles* is the owner/operator of a haulage firm. On Saturday 26th July 1986 he had delivered a load of fertiliser to Bath Hill Farm at Aike at about 09.30. He drove a 3-axle rigid vehicle with a high cab. He left the farm shortly before 10.00 to return to the main road over the crossing and had just passed the turning to Wilfholme when he noticed the red lights at the crossing flashing on and off more than a mile away. He could see them because the countryside was flat and the cab of his vehicle was high up. He could not remember seeing the yellow light but he knew the sequence of the lights and had seen the crossing working before. It is clear flat country and he looked either side of the crossing for the train which he saw coming from his right, from Bridlington.

25. He drove on down the road towards the crossing at about 25 mile/h. He did not watch the lights all the time because he had to look at the road but he saw the train go behind the trees and pass over the crossing with the lights still flashing. This was about a minute after he had first seen the red lights and when he was approaching the two cottages on the right about $\frac{1}{2}$ mile from the crossing. He continued on towards the crossing, noticing a cloud of dust to his left which he thought was unusual, but it was not until he drew up at the crossing with the lights still flashing and the yodalarm sounding that he realised there had been a serious derailment. He had not seen the lights go out and come on again and he thought it was about 3–4 minutes from the time the train passed over the crossing to his arrival there.

26. The postman, whom he knew was ahead of him, had parked beyond the crossing and Mr Isles walked over. A lady came out of the station house and said that she had summoned the emergency services. It was not until he turned back towards his lorry that he saw Mr Ashley, his son, and the remains of the van lying by the side of the railway. He comforted Mr Ashley and saw the guard of the train come running up to telephone. When he drove his lorry over the crossing shortly after that, he saw the lights on the west side of the crossing were flashing. He was quite sure that when he first saw the lights flashing the train was to the right of the crossing as he faced it and that the lights were still flashing as the train passed over the crossing.

27. *Postman B. E. Mellonby* had just completed a delivery to Carr House Farm and was driving away towards the road leading over the crossing from Aike when he noticed the train on the Hull side of the crossing with what he thought at the time was an engine on fire but which was the black ballast dust being thrown up. He saw the front carriage rear up and fall back on itself so he immediately accelerated and got to the line as quickly as he could. The red lights on the Aike side were flashing when he got there.

28. He went to the station house, knocked on the door, and asked the lady if she would ring for the emergency services which she was doing as he arrived. He knew the crossing well and how it was supposed to appear to a road user when a train was approaching. The weather was bright and sunny at the time of the accident and he recalled Mr Isles driving up behind him. He knew that it took him about 1 to 1½ minutes after the accident to arrive at the crossing although he didn't take any notice of what time after that other vehicles arrived.

As to Events after the Accident and Early Investigations

29. *The Assistant Traffic Manager at Hull is Mr E. Jefferson.* He had served on the railway for 35 years and was currently responsible for the Hull-Bridlington line. Having been called out he arrived at Lockington Level Crossing at about 10.40 approaching from the main A164 road. The road traffic lights facing in that direction were flashing and the audible warning sounding as he arrived. He had no difficulty in seeing the flashing red lights but he did not cross over and look at the lights from the Aike side. The Signal and Telecommunications team arrived shortly after him. At the site he was told by Driver Whitehead of the train from Hull to Bridlington that Driver Brown of the derailed train was in an ambulance and so he went to see him.

30. He found Driver Brown lying back on a stretcher, quite coherent, holding a dressing to a cut in his head. Mr Jefferson said to him "Did you see anything as you came up to the crossing". The reply was "No, I did not see anything until the car came onto the crossing". Driver Brown was then asked "Could you see if the lights were flashing" and replied "Well, I think so but I can't be sure". (It was established that in daylight the flashing red lights at Lockington cannot be seen from the cab of an approaching train). Mr Jefferson also enquired of both Brown and his Guard Sturdy if there was any chance of the lights being obscured by the bright sunlight. Their opinion was that, although it was bright, the sun was not shining sufficiently brightly to interfere with the flashing stop lights.

31. On his way to see Driver Brown he told the S & T technicians to switch off the crossing stop lights and to test and see if everything was in order. They turned off the lights and audible warning using the local control cabinet and told him that as far as they could establish everything at the crossing was in working order. He was then very busy endeavouring to evacuate passengers to the stations on either side and did not spend a lot of time at the level crossing.

32. Before the accident he could not recall being told of any complaints by letter or by telephone from the public about the lights not working when a train had passed over the crossing or about the lights flashing for long periods when a train had not passed over. He was however told about an incident on the 13th May 1986 when a BR lorry driver had complained about the crossing. He and an Area Inspector visited Beverley Signal Box frequently in the course of their duties and looked at the Train Register Book. He could not recall seeing in that book, or being involved in any way with, any complaints to which reference was made. His attention was drawn to a number of letters and complaints by telephone about both Lockington and Lowthorpe crossings. He could not recall having heard of any of those. Before the day of the accident he had not been aware of any public disquiet or anxiety about the operation of the level crossing. After the accident a log of these reports had been introduced so that all were recorded with full details. From his knowledge of the line and the driver's duties he was sure that there was nothing that Driver Brown could have done to avert a collision because as he approached the crossing from the Bridlington side his sighting was limited and if anything had come onto the crossing after it came into view, there would have been insufficient time for him to prevent the accident although he might have been able to alleviate its severity by reducing speed.

33. *Regional Traction Inspector W. G. Scott* arrived at the site of the accident at about 14.20. He first examined the approaches on the Up Line to the site. The whistle board was a new standard white reflectorised board with a black W. Whilst the actual crossing was completely visible from a distance of 260 m the view of the road approach to the crossing was obscured. Approaching in the Up direction a vehicle inside the road traffic-light signals on the west side could be seen by a train driver at a distance of about 75 m but on the east side the road approach was completely obscured. The only requirement for a train driver on approaching an AOCR, apart from keeping a sharp look-out, is to sound the whistle at the board except between the hours of 23.30–07.00.

34. At the request of the Police he examined the controls in the leading cab. The throttle was closed and, obviously, the DSD released. The throttle was not spring-loaded and he believed that it would have been a driver's instinctive reaction to close it on seeing a vehicle on the crossing. The gear selector was in first gear, which was unusual for a train running at 50–60 mile/h, he would have expected it to have been in fourth gear. It was not spring-loaded and he inferred that it had been moved when the driver was thrown about in the derailment or by those rescuing him. The forward/reverse handle was in position and forward was selected. The driver's brake valve handle was in place and in 'Release', the normal running position. He did not think the handle could have been put in that position by the violent motion of the derailed train nor by those releasing the driver because it was beyond the point where there was a projection of the handle over the edge of the driver's console. He pointed out that the brake application seen by Guard Sturdy on the brake gauge could have been due to damage to the leading brake pipe when it struck the van on the crossing. He believed that the driver had had no time to apply the brake.

35. He thought that the train could have been travelling at 65–70 mile/h approaching the crossing and said that, in his experience, drivers were usually very careful about complying with the whistle boards. If the

road vehicle had driven onto the crossing in front of him, the train driver could have done nothing to avert a collision. If the vehicle had been stationary on the crossing when it came into the train driver's view he could not have stopped the train but could have reduced speed, although that did not appear to have been the case from the position of the brake handle.

36. The evidence from *Leading Trackman S. Pickering, Permanent Way Supervisor S. Williams and the Area Civil Engineer for Doncaster, Mr W. Martin* indicated that the telephones at all the level crossings were regularly tested on the days on which the line was patrolled. It was clear that none of the patrols preceding the accident had found any defects in the permanent way that could have caused the accident or have made the outcome worse. None of them had heard of any complaints from people living locally about the crossing misbehaving or malfunctioning in any way. No one had complained to them, when they were patrolling or wearing their high visibility vests, about the way in which the crossing operated. The track gauges which they all used were wooden or insulated and suitable for use on lines that were track-circuited so that they could not cause a false operation of the level crossing. The records of the track recording car from its last trip over the line on 4th July 1986 showed that there were no defects in the Lockington area that required immediate attention nor was there anything that required eventual maintenance.

37. Mr Williams said that he could not recall whether there were any special instructions for him or his staff when they were working on lines that were track circuited. Mr Martin commented that the standard of track was very good for a rural line and that he was quite satisfied with a line speed of 70 mile/h. When he was first advised of the accident he remained at home to co-ordinate the demands for staff and material for the reinstatement of the track. He went to the site however at about 17.30 but did not carry out a full survey because a member of the Area Mechanical and Electrical Engineer's staff was doing so. However he did notice that the first marks of derailment were of a wheel flange on a sleeper some 5 m from the edge of the level crossing; this indicated that the wheel had lifted and was moving on a left-handed path. From that point the marks continued along the sleepers for about 15 m until the wheel struck the left hand rail in the direction of travel. This was on the Hull side of the cattle-cum-trespass guards. He said that he had been a railway engineer for 36 years and had seen the results of a number of collisions, mainly on accommodation level crossings, between trains and either tractors or cars. In his experience what normally happened was that the car was pushed forward in front of the train, the distance depending on speed, and normally then slewed to the left. He could recall only one occasion when the train had been derailed as a result of such an accident. He considered that all the damaged permanent-way components, including the broken fishplates, resulted from the derailment. I asked Mr Martin and *Mr W Cunningham*, representing the *Regional Civil Engineer*, whether they were satisfied that the standard of track was perfectly adequate and did not contribute in anyway towards the accident and they agreed that this was the case.

As to the Operation and Installation of the Crossing Equipment

38. *Mr D. Holland, a Senior Project Assistant with the Regional Signal & Telecommunications Engineer* gave details of the equipment at the crossing and explained how it was operated by the trains. Because they were not directly involved in the movement of the train before the accident he did not include an explanation of the wrong direction controls or of the 'Another Train Coming' arrangements. He explained that the position of the CD treadle at Beswick and the leading end of BF track-circuit were such that a train approaching in the Up direction would reach Lockington Crossing, if it was travelling at 70 mile/h, 37 seconds after striking the treadle and operating the track circuit. Ten seconds after the operation of either the treadle or the track circuit the yellow lights at Lockington are illuminated and show for three seconds with the yodalarms beginning to sound at the same time. When the yellow lights cease to show, the red road traffic-light signals start to flash and, at the line speed, the head of the train would be at the level crossing 24 seconds later. He explained that the CD treadle operates both BF and BH track circuits. The operation of the treadle and of BF track-circuit causes BF track-circuit relay to become de-energized and this causes a second relay to become de-energized in circuits which could not become energized again until the train had reached the level crossing. This was to ensure that, however momentary the operation of the treadle or track circuit, the crossing equipment would operate. Moving towards the crossing the train would operate a second treadle shown as BE/BF and occupy BE track-circuit adjoining BF track-circuit and leading up to and over the level crossing. The operation of BE track-circuit, either by the second treadle or by its occupation by a train would also, independently, cause the operation of the level crossing traffic-light signals and maintain the crossing in operation until BE track-circuit was cleared by the train.

39. He then explained how the traffic lights were switched off by a combination of operations. At the level crossing the front wheels of the train operate a second CD treadle and that operation is stored. Passing over the crossing the wheels occupy BD track-circuit operating another relay. Then when the train is clear of both BF and BE track-circuits and proved completely over the level crossing, the combination permits the lights and yodalarms to be switched off. He explained that if a train approached at 50 mile/h instead of 70 mile/h the same 10 second delay would operate from the initiation of the crossing equipment, there would be

three seconds of the yellow lights but the red flashing lights would operate for a longer period until the train reached the crossing.

40. Because the crossing will operate for trains in either direction over either line to allow single-line working without the need to man the crossing, the relays must differentiate between a train in the normal direction leaving the crossing (or striking-out) and the occupation of the strike-out track-circuit by a train approaching the crossing in the wrong direction on the same line striking-in. These directional control relays are monitored and if they are not in the correct position after a train has passed over the crossing then a failure indication is given to the monitoring signal box.

41. Similarly if a strike-in track-circuit is shunted or operated by something other than a train, for instance by a road vehicle with metal tracks passing over the crossing, by a slight interruption in the power supply, or maliciously, the relay would normalise directly the shunt was removed but, in the absence of a strike-out, the crossing lights would continue to operate until a timing relay re-energises two minutes after the shunt is removed. This resets the track-circuit follower or memory relay, turning off the lights and yodalarms, and de-energising the timing relay. The position of these timing relays is monitored to ensure that they are de-energised and if they are not, a failure indication is given in the signal box.

42. Mr Holland explained two occurrences that had been noted. The metal tracks of a caterpillar tractor or the steel runners of an agricultural sledge had connected the two rails as they passed over Beswick crossing on the road. This had the same effect as the wheels and axles of a train and would illuminate the lights by operating a track-circuit. The second occurrence was when the Electricity Board supply failed at Scarborough on 27th June 1986. One treadle (AB) was fed incorrectly from the mains and not through the battery. Because of the fail-safe circuitry the loss of power to the treadle resulted in BD track-circuit being operated by the treadle as if a train proceeding in the wrong direction towards Lockington on the Up line had struck in. The Lockington Level Crossing lights began to operate and continued to do so while the supply to the treadle was interrupted (about 2½ hours). This caused the failure indication, described by Signaller Bayram, to be given at Beverley.

43. Mr Holland explained that for the crossing equipment not to operate for an Up train, the train would have to fail to operate two treadles and two track-circuits. He personally did not believe that this was possible. The 10 seconds interval between strike-in and illumination of the yellow lights was required to provide the minimum crossing open to road time when trains approach the crossing from opposite directions.

44. To ensure that the operation of the traffic-light signals commenced, the timing relays for this 10 second delay are duplicated and run in parallel. There is a third checking relay. When either timing relay de-energises after 10 seconds operation this starts the traffic-light signals cycle but if one fails to de-energise, the checking relay will cause the lights to continue to operate and this would result in a failure indication in the signal box after four minutes. He also explained in detail how the flasher unit and the number of red lights displayed in either direction along the road are monitored.

45. *Mr R. A. J. Howard, an Electrical Engineer in the Department of Transport Regional Office Leeds,* deals with the highway aspects of the modernisation of level crossings in the Yorkshire and Humberside Region. He attended the planning meeting in 1985 and the inspection of the crossing on 5th February 1986. On the latter occasion his duties were to assist the Inspecting Officer and check that the carriageway markings, signs, and traffic-light signals were correctly installed and to ensure that the alignment of the lights made them adequately conspicuous to all road users.

46. He explained that he tried to aim the primary (nearside) signals to be seen best at a point on the road about 100 m from the crossing to allow a driver braking distance from road speed and each duplicate primary (offside) at a point some 50 m away to reinforce the warning of the primary and to give an adequate view of the signals for those leaving side turnings and driveways close to the crossing. In doing this he had made some allowance for the exit from the farm and the old station yard. He aligned the signals while they were being operated by a technician although he liked to see them later operated by a train. He felt that any complaints that there might have been about poor visibility of the signals due to sunlight or poor alignment would have been passed to him by British Railways.

47. During the inspection and again when he visited the crossing after the accident in September, he checked all the signs on the approach to the crossing to ensure that they were in accordance with the Requirements, clearly visible, of the required height, and that there was nothing likely to obscure them. The signs were correctly installed except that the pedestrian stop line, a short dotted line at the start of the made-up ground, was due to be replaced. It had no effect on road traffic. He was satisfied that a clear view of all the signs was possible for those approaching along the road. It was his opinion that the installation at Lockington was such

that no driver approaching the crossing could fail to miss any of the signs or road markings. I pointed out to Mr Howard that approaching from the Aike side and some way from the crossing there was one place at which, over a short distance, the two large blue signs giving instructions to the drivers of heavy and slow vehicles obscured both the traffic-light signals facing that direction. He said that he felt that it was over such a short distance that an adequate warning was given to a driver both before the lights were obscured and afterwards.

48. *Mr A. J. Major* is the *Signal and Telecommunications Maintenance Technician* looking after the equipment on the section including Lockington and the other level crossings. He was told of the accident at about 10.40 and arrived at the crossing just after 11.00. He and the other two technicians with him approached in their van from the A164. As they came to the crossing they could see that the traffic-light signals were operating and so they crossed to the other side, checked the signals on that side and were satisfied that the yodalarms were operating. He reported to Mr Jefferson and was told that he could turn the lights off, which he did. The telephone was then used to check that it was operating and to talk to the signalman at Beverley and he thought that at that stage they told the signalman that the local control unit had been used to switch the lights off. He thought that when they arrived the weather was clear. The satisfactory use of the telephone indicated that the cable route to the signalbox was intact even though one of the derailed coaches was lying on top of it. By switching to local control he did not think that he would have disturbed the state of the equipment in the relay room thereby making it difficult to test the crossing afterwards, but he was not absolutely certain. They then tested track circuits BE and AG by using a wire shunt on the track circuits while he went into the relay room and observed the relays drop and pick-up as the shunt was applied and removed. In both cases the shunt was applied at the relay end of the track circuit. He had then been unable to do any further testing because the police sealed off the road and the relay room.

49. While he was at the crossing he had not climbed up to inspect or to take any measurements at the traffic-light signal heads and he did not think that his staff had done so although he was not with them all the time. They would not have needed to remove the bulbs from them because they had seen the lights working when they arrived. If they wished to check the voltage they would have done so at the junction box at the rear of the signal head. To remove a bulb it was necessary to slacken off three bolts, lay them back and to hinge out the lens and the filter. He could not think of any reason why anyone should want to do that. He did not think that on that occasion or on any of his weekly visits to the crossing he would have been likely to have altered the alignment of the traffic lights. The alignment was not checked on the weekly inspections, only the fact that the signals were operating correctly.

50. On his weekly inspections he would normally hope to watch a train go through and have people on either side of the crossing to watch the 'wig-wags' operate. The resistance that would shunt the track-circuit was checked every three months and recorded on the track-circuit cards maintained either in the relay room or in the location cabinet. His previous weekly visit had been on 23rd July 1986. Whether a train or a shunt was used, they would have the relay room door open to hear the initiating relay dropping and they could then count the 10 seconds delay until the yellow light was illuminated for three seconds. He used a shunt on the Up line which he then removed. He waited for the yellow and red light sequence to start, crossed over the crossing and cancelled the 'wig-wags' by operating the CD treadle and operating the BD track-circuit with his shunt. This represented a train passing over the crossing except that it did not strike in on BF track-circuit. He was quite sure that he would not have left the crossing on the 23rd July in a state which might lead to a train passing over it without the 'wig-wags' operating. He said that during his visits he might have made slight adjustments to the track-circuit voltages in order to get a reasonable shunt but he did not think that he had altered the bus-bar voltages. If he had had to alter the voltage, it would be recorded.

51. He kept a personal book to indicate the details of the maintenance of the crossings and a separate record was kept at the equipment room giving the date on which the crossing was tested. If they arrived at a crossing in time to see a train go through they would check that the light sequence was operating for at least 27 seconds before the arrival of that train. He agreed that it was possible by operating a track-circuit at Lockington, when using a shunt wire to cancel out the sequence, to initiate the warning sequence at Beswick Level Crossing. If this was done, even though the sequence at Lockington was cancelled, the lights at Beswick would continue to flash for two minutes before being automatically cancelled by the level crossing equipment. In turn, testing at Beswick using a shunt wire could in certain circumstances initiate the light cycle at Lockington. Prior to the accident there were no instructions about warning road vehicle drivers to wait during testing nor about safety precautions if the lights at another crossing might be initiated by the use of a shunt wire. Since the accident they had been told not to use shunt wires for testing. He had not been given any extra training to deal with the AOCR, although the circuits had been explained to him. He said that he would have liked a proper explanation of the circuitry but admitted that he did have a circuit diagram.

52. He could only recall one previous failure at Lockington on 13th May 1986 when a report was passed to the Beverley signalman that the lights were not working correctly. Mr Major was told that someone had

reported that they had not seen the lights work for a train and he went directly to the crossing. He agreed that it would have helped him in checking the crossing to know what had been reported but he was not told. On arrival at the crossing on that day he simulated a train, the lights worked as they should, and he telephoned the signalman to say that the crossing was in order and that there was no need to caution further trains. He did not think that he had sent in a fault card for the failure that was reported on 13th May but he had made a record in the book at Lockington Level Crossing that he had checked the lights that day.

53. He recalled an occasion when there was a report that the lights at Lockington had operated without a train passing. He thought this was in December at a time when they had been testing Scarborough. Shunting track circuits there could also initiate the light sequence at Lockington and he had concluded that, because they had used a shunt wire, that was the cause of the report.

54. He also attended Lockington relay room on 27th June 1986 when the loss of Electricity Board power led to the operation of the lights at Lockington as described by Mr Holland. This was recorded in his record book. He thought that over the past 20 years he had only found two defective bulbs in road traffic-light signals. He had seven crossings to inspect each week and said that Lowthorpe was included. He said that on more than one occasion he had been asked to investigate incidents there when it was alleged that a train had passed without the lights operating, but he had never found a cause or any defect.

As to Testing after the Accident

55. *Mr D. Holland* was recalled to describe the testing with which he was involved after the accident. He arrived on the site at 14.45 and, because the police had sealed off the relay room, he made a visual inspection of the area. He was told that AG and BE track-circuits had been shunted and found in order and also that BF track-circuit and CD treadle at Beswick had been checked. He confirmed that switching the unit to local control in order to silence the yodalarm and shut off the road traffic-light signals would only have affected one relay in the relay room and this would have been de-energised when the local control box was opened and the switch operated causing an alarm in the signal box. It would not have affected in any way the state of the relays in the equipment room that might have made it difficult to do the testing.

56. He provided a list of the relays and the positions in which they were found when he was allowed to examine them at about 17.00 on the day of the accident. Considering the position of the two trains and the operation of the local control unit, he only found one relay de-energised which he expected to have found energised and that was the timing release relay for BD track-circuit known as the DJR/JPR. He later discovered that this relay was not operating correctly and it was removed from the installation. When it was investigated it was found that one of the contacts over which the relay can remain correctly energised had a high resistance due to a coating on it. He confirmed that this relay plays no part whatsoever in normal direction movements over Lockington Level Crossing and its defects had no bearing at all on the accident. This relay was the only one that was in an abnormal position considering the positions of the two trains.

57. I asked Mr Holland if he thought that the traffic-light signals might have gone out for a very short while after the passage of the derailed train before their operation was initiated again or whether he thought that they would have continued to operate throughout. He said that he felt that there might have been a short period when the crossing lights went out before they were initiated by the damage to the track, by the approaching train in the opposite direction, or by the damage to the feed to other track-circuits caused in the derailment. I asked him to consider Mr Isles' evidence and suggest a way in which the lights on one side could have been flashing while those on the other were not. He believed that any defect causing this would have resulted in an indication in the signalbox and would have been detected in the testing because it would have required all four red bulbs on one side to have failed, or all four links to the lights to have been disconnected or each individual fuse to have failed. He was certain that, as there had been no indication in the signalbox that the flasher unit was not working and the lights on one side of the crossing were working, then the lights on the other side of the crossing must also have been working as they were indeed seen to be shortly after the accident.

58. He then described the remainder of the testing which he had carried out. This included the bus-bar voltages of all the batteries. It was usual for the nominal 24 volts to be set at 29 to allow the battery to run down and still operate. The figure of 70 volts for the external circuits was rather high and he had asked for it to be reduced to nearer 55 volts. These voltages and any alterations which he found necessary would not have affected the operation of the crossing equipment in any way. He explained that in each circuit there are links which may be removed to isolate that circuit and he tested all these for security and checked all the fuses, drawing each one in turn and testing them with his meter to find them intact. He carried out the complete test that was required by his standing instructions including the voltage between the positive and negative links on the cables that feed into the traffic-light signals. This was the output voltage so that any high resistance that might be caused by a loose termination or a dry contact would have been taken account of.

59. Whilst he conducted the tests he deliberately 'picked up' AF and BD track-circuits so that he was free to simulate the movement of a train by operating the relays in the relay room. He arranged for the voltages of the yellow lights to be tested and these were found to be correct at about 25 volts. This was done by removing the cover from the termination box at the rear of the signal backboard and testing there. He also proved the operation of the road traffic-light signals by operating them and timing the yellow light period at three seconds before the red flashing lights began to operate. He personally looked at the CD and AB treadles at Lockington, they were intact and the arms were not bent, the other treadles had been checked by Mr Major. The rail heads were in a good condition and clean. I referred Mr Holland to an incident in the Scottish Region where there was a high resistance in the feed to the flashing red road traffic-light signals. This led to the illumination of the red lights being so poor that they were virtually invisible to a road user. He commented that at Lockington they were using a different type of termination to the ones used on the Scottish Region in which the high resistance occurred and that his inspection of the red lights operating convinced him that they were at full brilliance. He felt that an intermittent high resistance would have been most unlikely and that any high resistance would have been detected during his testing.

60. I asked Mr Holland if he had considered all the ways in which the flashing red road traffic-light signals could have been operated, such as a test using a shunt wire, the irregular operation of a track-circuit or treadle, and the passage of two trains in a variety of circumstances in opposite directions over the level crossing and whether some combination could possibly lead to a situation in which the red lights were flashing for less than 24 seconds before the arrival of a train. He assured me that he had given these factors detailed consideration and the only way in which it could happen would have required an exit treadle to have jammed in the operated position thus storing the fact that a train had gone through and the treadle had not reset. As a result of his tests, he was quite satisfied that there was no way in which the red traffic-light signals could have failed to function for the requisite time on the approach of a train. He considered that the level crossing equipment was in good working order on the approach of the train involved in the accident.

61. *Mr P. Gibbs* is the *Signal Works Engineer* responsible for the installation of the modern equipment at Lockington Level Crossing and at the other crossings on the Bridlington-Hull railway line. He is not responsible for their maintenance but on the weekend of the accident he was on call and so he responded, arriving at the scene of the accident at about 11.00. On arrival he was able to look at the equipment in the relay room but then had to leave when the police cordoned off the site. He was able to check the cable route to see that there was no damage to the cables and tested to ensure that there were no faults or earth leakage of stray currents which could have hazarded those involved in the rescue operation. While he was in the relay room he was able to check that Beswick crossing was not affected and that the fuses were intact so that the road traffic-light signals were not operating there. Later in the day he and his staff checked through from the Bridlington approach to the level crossing and found that the treadles were intact and undamaged. Tests were also conducted on the track-circuits and he was with Mr Holland when the tests began of the road traffic-light signals. At one stage at about 17.00 his men were checking the continuity of the cables to the traffic-light signal heads and testing for earth faults. They did this by putting a ladder up to the front of each signal, removing the bulbs in turn after unfastening the front portion containing the lens and the coloured filter and using a test meter on the contacts inside. This was done because they were not sure whether the cables were safe or whether they might have been damaged when the van had been hit and knocked off the crossing. On other occasions when there had been accidents the car had hit the traffic-light signal post and damaged the cables.

62. He had been involved with two sets of modifications which were carried out to the crossing. One resulted from the Railway Inspectorate's inspection and led to the traffic-light signals being extinguished as soon as the rear of the train had passed over the crossing. The other modifications resulted from the incident on 27th June 1986 as a result of the Electricity Board supply being cut off and provided a battery supply for a treadle. In both cases they received proper drawings for the modifications, the work was done in accordance with those drawings, the test section attended and tested to ensure that they were correctly done, and the work was signed off with a certificate. Although he was aware of incidents or failures at other level crossings to which he had been called out when on duty, he had never been called to Lockington before. While he was supervising the installation at Lockington and indeed at other locations, a variety of views were expressed by members of the public. Some people had told him that they were pleased with the change because it speeded up movement by getting rid of the gates, some said that his moral standards were not good because he was working for the firm that was putting this equipment in, and others had insulted him. At the Lockington inspection it was Mr Gibbs' opinion that everybody who attended was satisfied with the installation.

Evidence of the Alleged Incorrect Operation of the Crossing

63. *Mr D. Leech* and his wife were driving from the main road towards Lockington Level Crossing at about 19.00 on 23rd July 1986, the Wednesday before the accident. He was conversant with the level crossings in the Doncaster area where he lived, and at other places in the country, and had used the road over the Lockington crossing about twice a week since February 1986. He could not recollect seeing a train pass over

the crossing on any of his journeys before the one he described. He did not wear glasses and he thought that it was a reasonable evening but could not remember whether it was bright and sunny or not. He agreed that there was a good view of the crossing from quite a long distance away. Approaching the sign that says something about no barriers he was travelling at about 25 mile/h as it was not a good road and was slowing down because of the crossing. As he started to slow down he said that the red lights began to flash and in seconds a train appeared and as they moved towards the crossing quite slowly the train passed over it and was gone. He did not see any yellow light preceding the red flashing lights. He estimated that the red lights flashed for about 10 or 15 seconds before the train appeared on the crossing. This time he described as "not a long time at all". He was sure that it was not more than 15 seconds and not less than eight seconds. When the lights began to flash he slowed down further by braking but thought that they trickled towards the crossing rather than stopping and as the train passed clear he drove over. He could not be certain that he had actually seen the red flashing lights go out but thought that he had virtually stopped, then waited until the lights went out, and then went across.

64. He and his wife exclaimed as they were travelling towards the crossing how quickly the train had appeared when the lights had flashed. As they went over the crossing his wife said "This is dangerous. There should be some kind of half-barriers". He did not think that there was any other road traffic about and could not remember how many carriages there were on the train although he thought that it was a passenger train. The windows of the car would have been up and he thought that he would probably have had a radio playing. He was sure that he had not heard a train whistle, not even subconsciously. Although they felt that it was not right to have such a short warning time he had assumed that the crossing was working normally even though it seemed dangerous. He agreed that although both he and his wife thought the crossing was not working correctly it was not until after the accident, when he was told it was the crossing that he had been using, that he decided he should report his experience and make a statement. He thought that as he approached the crossing his attention would have been on the crossing and the first lights that he would have seen flashing would have been on the right-hand side of the road. He confirmed that the crossings that he used in the Doncaster area mostly had barriers. He believed that his sense of timing was quite good and that if things had been working properly he would not have taken any notice. The fact that he and his wife exclaimed about the crossing made him feel that it was not operating properly and that they were both right in thinking that the lights were flashing for only a short time before the train passed.

65. In a statement that he had made about this incident in early August when events should have been much clearer, Mr Leech had said that they had got to the sign which warns of the crossing when the red warning light started to flash. He was sure that the yellow light did not flash. His speed was about 20 mile/h and when he got to the farm which is close to the crossing a train passed coming from Beverley to Bridlington that is from his right to left. He was surprised when the train came so quickly because it was only six to 10 seconds between the lights first flashing and the train passing. (Comment. This was the first time Mr Leech had seen a train at the crossing. The absence of any mention of the yellow light, the speed of the car, its distance from the crossing, and his timing, strongly suggest that he and his wife did not become aware of the crossing lights until some seconds after the red lights had started to flash.)

66. *Mr D. E. Wright* is a lorry driver who works for the Regional Civil Engineer. He was at Lockington to collect materials on 13th May 1986 and had parked his lorry to have his lunch break. It was backed into the lane on the Aike side of the crossing with the cab about three metres back clear from the lights so that they were not obstructed. He was in the driving seat with his window down and the window nearest the railway wound up. There was no radio playing and the engine was switched off. It was a fine day and there was no ambient noise.

67. He had just poured a drink and placed the cup on the passenger seat when he heard a train coming from Beverley whistle in the normal way. At the same time he saw a car coming off the crossing going towards Aike. Because he thought this was a bit close and that either the lights could not have been working or the car had crossed against the lights, he looked over his left shoulder. He could see the DMU one and a half to two coach lengths past the whistle board. On other occasions when he had been at the crossing the train had not been in view when the lights began to operate and so he attempted to see if the lights were operating by looking through the windscreen.

68. He could not see them or hear the audible warning so he opened his door, climbed down from the cab and walked round to the road. He tried to see if the far light was operating but could see nothing. He reached the centre of the road and glanced at the train before looking up at the lights. The train was almost leaving the crossing and the lights were not showing. He did not hear the audible warning at any time.

69. He walked over the crossing and asked a BT workman if he had seen what had happened, but the latter had taken no notice. Mr Wright used the telephone at the crossing to report what he had seen to the Beverley signalman who had not had a failure indication. He agreed to stay at the crossing until a train from

Driffield had passed over having been cautioned. When the train eventually approached the lights and audible warning operated correctly. He told the driver that all was in order now and after the train had passed, reported back to the signalman, who told him that the S & T staff were attending.

70. *Mr C. A. Precious* is a butcher who uses a van to serve established customers and travelled over the Lockington Level Crossing to reach Aike. He used that route every Wednesday and Saturday, had seen the alterations made to the level crossing, and used it at about the same time each day. He had seen trains using the level crossing before the accident and knew what the sequence of lights was although he did not know what the minimum time was between the start of the red flashing lights and the arrival of the train. He claimed that in the period between December 1985 and the accident there were six or seven occasions when he had approached the crossing with the lights operating and no train had passed over before the lights were extinguished between 30 seconds and two minutes after he had first seen them. He had not noticed the yellow illuminated but had been driving towards the crossing and the flashing red lights had caught his attention.

71. On 23rd July 1986 he was making the return journey from Aike towards the main road travelling at about 30 to 40 mile/h and was approximately 250 m from the lights, on the level crossing side of the bend which lies just to the level crossing side of the entrance to Carr House Farm, when he noticed a train travelling from Beverley towards Driffield. On seeing this he looked towards the crossing but there were no lights on either side of the crossing on the two panels. Having seen the train however he slowed down. He heard the whistle and carried on towards the crossing slowing down as the train went across without any lights flashing at all. This was at about 11.00 and he had not seen any workmen wearing yellow vests at the crossing.

72. He had been keeping his eyes on the road when he glanced across and saw the train a few seconds before it reached the whistle board and he heard the whistle. He was sure that he immediately looked back to the road and saw that there were no lights on either side. He did not think that this was at the point where the large blue notices blank out the lights. In the cab of his van he was a little bit higher than a car but not as high up as a driver of a lorry might be. He came to a stop at the crossing just before the train was completely over the road and got out of his cab and looked up and down the track to see if there was anything else coming before crossing over.

73. He agreed that this was very dangerous but he had not used the telephones at the level crossing or reported to the police until after the accident. He had commented about it to colleagues at work and to one or two customers. He did not tell anybody in authority. His reason for not reporting it was that he could remember the lights from when they were first erected "playing up from January time". He described this as "just something you lived with, a very regular occurrence with me anyway". That was the only time he had seen a train go over with no lights as opposed to seeing lights and no train. The two things were just the reverse of what he had been used to seeing and were not out of the ordinary. He did not think the train was running particularly slowly and could not recall there being a BR van near the crossing. He said that the weather on 23rd July was clear and fine, not a brilliant day but not raining at that stage. However I am informed that between 09.30 and 12.30 that day it rained heavily and continuously.

74. *Mrs V. A. Taylor* lives at Aike and uses the crossing regularly. On Friday 27th June 1986 she was returning towards Aike at between 09.15 and 09.30 when the lights were flashing. She stopped and waited and saw the occupant of Station House standing beside the crossing. This lady came over to her, explained that the lights were broken and that this had been reported and said that she would see her over because she thought that there was a train due. Mrs Taylor asked her if British Railways had asked her to do that job and she said "no", that she had "just taken it upon herself to help people". The lady walked up to the track, looked up and down and saw her across. Between 11.00 and 11.30 on the same day she approached the crossing going towards the main road and the lights were still flashing. She lowered both windows, moved up to the crossing, listened, looked very carefully both ways and went across because there was nobody about. She returned between 12.00 and 12.15 and there were men working on the lights and they had stopped flashing. She agreed that her observations were explained by the evidence about the electricity failure on that date.

75. On 17th July 1986 it was a cloudy, very windy day and between 10.45 and 11.30 she was approaching the level crossing from Aike with her three children strapped in the back of the car. The windows were up but there was no radio playing and because the children were not very well she did not think they were chattering or distracting her. As she came close to the crossing she glanced to her left and saw a train at the whistle board coming from Beverley towards Driffield. She had not seen any lights flashing as she approached the crossing or heard the train whistle. She panicked slightly, accelerated off the crossing, applied the brakes, and promptly looked down into her wing mirror. As the train more or less came into view in the mirror the lights flashed for two or three times and then went out again as the train left the crossing. There was no yellow light.

76. She had not reported this to anyone except that she told her husband about it when they returned home. She did not realise that the telephone at the crossing could be used to report failures because of the

notice which referred to the drivers of slow moving loads. She had heard of similar incidents from friends near Lowthorpe and she felt that this was not an isolated incident. She agreed that she considered it dangerous but even with the other incidents it did not make her think that there was something wrong and that she ought to do something. She felt that it was a hazard that they lived with every day because she had seen the lights flashing with no train approaching. Her son attended the school in Lockington and had been taught there how the crossing worked and what road users should do. His reaction to the incident was that he was quite outraged because he knew what should have happened. Unfortunately he was off school for a week and a report was not taken back to the school or to the teachers. She knew Mr Ashley and that he was a professional driver and believed him to be one of the most considerate drivers in the area. Her attitude to the crossing was that "it was a nuisance that we had to live with" and what she had seen on 17th July she did not "regard it as a rare occurrence to see a malfunction as we call what had happened". She said it was not something sufficiently unusual to be reported, it was simply another of those events.

As to the Sequence and Reconstruction of the Accident

77. Mr J. P. Lee is the Plant and Rolling Stock Engineer, York. He was called out to the accident and arrived at about 11.45. He made himself known to the Police Officers and then went to assess what would be needed for the recovery of the rail vehicles. Because there was little he could then do until they were able to recover the rolling stock, he carried out a thorough survey making notes and measurements of all marks on and around the track relevant to the derailment. He provided me with a detailed plan showing the positions of these marks and items, measured from the south crossing edge and opposite each a deduction or comment.

78. Because there were no clear marks of rail wheels on the crossing, nor climb marks on the rails, although there were some marks on the road caused by the van being trapped between the road and the leading bogie, he decided that the actual point of derailment was at the southern edge of the crossing. The first clear marks were 5 m from the crossing edge where there were flange marks from the leading wheels of the train on the sleepers in the '4-foot' and left-hand cess in the direction of travel. The train probably derailed to the left because the van was moving from right to left, the left-hand lifeguard and wheel were struck, and the train attempted to run up on part of the van towards the left.

79. The tendency of the left-hand wheel to run down the ballast into the cess led to the right-hand leading wheel climbing the cess rail at 18 m. The trailing wheels of the leading bogie were forced to the left off the rails at 20 m and at 40 m a fishplate in the left-hand rail was split due to the sideways force being applied to the rail by the right-hand trailing wheel of the leading bogie which then struck the now exposed facing rail end and climbed over to the left. This resulted in the leading bogie jumping and landing in the cess with the second bogie still on the rails. The beginning of this more violent movement led to the battery box covers, the batteries, and under-floor items being thrown off. The leading bogie began to run down the slight embankment to the left. Between 70 and 80 m the trailing bogie of the leading vehicle also derailed and climbed over the left-hand rail. At this point both bogies of the leading vehicle were in the cess with the leading one rather further down the embankment than the trailing one, but with the coupling still connected to the second vehicle.

80. At about 83 m from the crossing edge the leading bogie of the second vehicle was pushed off the rails to the right by the rear of the leading coach and the forward momentum of the two rear coaches, causing increasing track damage. The front end of the leading vehicle, No. 54434, then ran through the boundary fence at 96 m and the cab dug into the field with such force that the leading bogie was almost completely sheared from the mounting. The coach pivoted about the cab with the rear being pushed by the remainder of the train, to which it was still connected, and it then rolled violently onto its right-hand side with the rear of that side sliding along the rails. It was turned further so that the cab was towards the direction from which it had come and the leading bogie dropped off in an upright position at the bottom of the embankment at about 135 m also having been turned through 180°. The leading end of the second vehicle, No. 51278, was being pushed to the right and pulling No. 54434 along backwards until the coupling was pulled out of its mounting and was found deposited at about 175 m. The remainder of the train then gradually also came to a stand.

81. He found that the leading bogie of the leading coach, although it was a driving trailer and had no engines, was covered with a quantity of oil. Samples of this were taken and the BR forensic scientist was unable to identify it but could say that it was not any oil that was used in DMUs (later evidence indicates that it probably came from the van). Some of the paint on the rail head was sampled and whilst some of it was rail blue and had come from the side of the coach as it scraped along the rail, other paint was not of the same type. The left-hand leading lifeguard which is fixed to the bogie frame and runs with its tip some 50 mm above the rail and in line with it, is fairly substantial but was splayed out to the left from its normal position by some 35° and bent slightly backwards. There were new marks on it. The brake stretcher rod, which keeps the brake blocks at the correct spacing, and the safety loop had both been struck by something fairly substantial and bent backwards. During his investigation he found nothing on the rail vehicles which could have either caused

a derailment or made one worse. He had checked the wheel flanges which were not unduly sharp or rolled over. On the left-hand leading wheel there was a flattening out of the round edge of the flange which he thought had been caused when it struck something fairly hard and was trying to bite its way through it and on the right-hand trailing wheel there was damage where it had struck the rail at 40 m when the fishplate had broken. He confirmed that the maintenance records for the vehicles had been checked and no defects were found that could have contributed to the derailment.

82. Mr Lee considered that the severity of the accident was partly due to the fact that the coupling between the first and second vehicles was intact for much of the derailed running although that might have prevented an even worse outcome and that the geography of the location had been the main cause of the disposition of the vehicles. He confirmed that if the brakes had not been applied by the driver they would be automatically applied if the brake pipes were broken. Pieces of the brake piping had been left in the hole where the leading vehicle had dug into the field, and he was certain that at this point the brakes would have been applied. They might also have been applied in the collision on the crossing with the van.

83. However, he could not say with any certainty at what point prior to the coach striking the ground the brakes might have been applied. He had not looked at the wheels on the last three vehicles to see whether there were any signs of a severe brake application before the actual collision but, in view of the relatively short distances involved before the vehicles came to rest, he considered it unlikely that such signs would be evident.

84. *PC J. C. W. Morris of the Humberside Police Vehicle Investigation Branch* examined the van to determine whether it was in good mechanical condition and in motion at the time of the accident. He was concerned with all the aspects of the collision and derailment in which the van might have been involved. He arrived at the site at 17.37 and made a full examination of the wrecked van. He described where all the various parts were positioned and, from what he was able to see and a later full mechanical examination of the van, he was sure that it had been maintained in good order and was free from any defect. He concluded that some part of the train had collided with the near-side of the van immediately to the rear of the front passenger seat and he thought that this was the left-hand to centre portion of the front of the train in the direction of travel because the van had tended to wrap round the near-side of the train.

85. He later reconstructed the van and found that it had received an initial severe impact to the near-side just to the rear of the passenger seat. This had severed the connection between the front floor and the rear floor of the van. The near-side of the vehicle was forced downwards under the front of the train and this movement had caused complete separation of the rear part of the van from the front. All the panels appeared to have been torn apart as opposed to having been cut apart which he would have expected if the wheel flanges had sheared through the thin pressed steel. These two main parts of the van were then pushed along the track being further cut into several pieces and left behind on the eastern side of the track. He was satisfied from his investigations that the van was in motion at the time of the collision. It was in second gear, which would give the driver a speed of between 10 and 24 mile/h, the ignition of the vehicle was in the 'on' position, the shattered windscreen was on the eastern side of the crossing in the direction in which the van would have travelled, and all the wheel rims were badly damaged. The vehicle had clearly been very severely compressed downwards as could be seen from the dampers. If the vehicle had been stationary he would have expected the wheels to be squashed into an oval shape. In this case the damage to the wheel rims was extensive throughout the circumference which indicated to him that at the time of impact the wheels were rotating.

86. *PC B. Cundill* works for the *Traffic Department, Humberside Police* and has been dealing with major traffic accidents for 14 years; he has passed an advanced course in accident investigation. He attended the site of the accident shortly after 17.00 and carried out a full survey of the marks on the level crossing road surface, the various parts of the Ford van, marks on the track, and the position of the train. He also made a scale drawing of the elevation of the front of the DMU showing the position of the wheels, lifeguards, buffers, and driver's cab. On a side elevation of a Ford van of the same model as that involved in the accident he was able to mark the centres of damage on the van and relate them to the parts of the front of the train that had caused the damage by sliding the two elevations together. For instance, from the van roof it was possible to see that a major impact had occurred in the region of the rear cab section of the van. In the depression in the van roof were traces of yellow paint from the front of the train. The roof was further buckled to a rather lesser degree a short distance rearwards of this point indicating the point below which the left-hand side of the buffer of the train in the direction of travel had entered the near-side of the van. The left-hand buffer of the train was scraped down to bare metal, and on the inside of the van but on its off-side was a clear black greasy mark left by the buffer where it had penetrated to, but failed to puncture, that wall of the vehicle. The mark extended rearwards and upwards on the inside of the wall of the van showing how that part of the van was pushed downwards towards the train driver's left-hand side. By sliding the two elevations together PC Cundill was able to show that the lifeguard protecting the left-hand leading wheel of the train must have struck the van's rear near-side wheel. This has been snapped off at the half shaft and although the wheel was badly damaged,

as it was an alloy component and had been carried along beneath the train for some distance, there were marks on it which were consistent with it being struck by a solid object similar to the lifeguard.

87. At a point about 0.3 m from the rear near-side hub assembly the axle had been bent and directly above this point a groove had been worn in the metal with several thicknesses of sheet metal pressed into it. The groove was angled at about 45° to the road surface. He concluded that the groove had been caused by the leading near-side wheel of the train attempting to ride up over the flooring with the axle beneath it and that the van at this time was beginning to slew round with the rear off-side wheel leading. On the plan he believed that certain marks showed the path of the rear near-side hub assembly as it scraped along the crossing and that derailment occurred in the area of other marks caused by the differential in the middle of the axle as the pressure on the axle increased from the train wheel mounting it.

88. He believed that the sequence of impact would have been as follows. Firstly, the near-side buffer entered the side of the van just to the rear of the cab. Then a considerable impact occurred as the near-side corner of the train struck the van at the rear end of the driving compartment cleaving through that side of the van. This was shown by the damage to the passenger seat. Almost simultaneously the left-hand leading lifeguard snapped the rear near-side wheel off the axle and the DMU wheel immediately behind it began to compress the flooring of the van against the axle thus wearing the groove in the metal over the axle. There were rips in the flooring beyond the groove which corresponded with the position of the lifeguard in relation to the train wheel. These would account for the flooring and axle not being completely overridden by the train wheel because the lifeguard, embedding itself in the flooring, held the debris away from the train wheel.

89. He felt that the derailment was probably due to a number of factors including the load on the leading pair of wheels of the DMU, the main impact being on the left-hand corner of the train, the forward motion of the van, and the lifting effect caused as the train wheel compressed the flooring and bent the axle of the van. The shape of the buffer mark on the inside wall of the van also helped to confirm that the van was moving towards Aike at the time of the impact.

90. He had carried out theoretical examples of the movement of the train and van using different speeds and positions of approach. Intervisibility between train and van was obstructed by the station house and the fencing at the edge of the crossing. Depending upon the speeds for the train and van which he had assumed, he thought that there would have been no more than about 2 seconds for the train driver to react to the circumstances. It was quite clear that the train driver could not have done anything to avert a collision however fast he had reacted. He pointed out that if the van had been a matter of inches or a split second further on before the train struck it, then the injuries to the van's occupants might have been considerably reduced and if the lifeguard had missed the rear wheel of the van it might well have meant that the train would not then have been derailed. He had discussed his findings with PC Morris and with Mr Lee who agreed with his conclusions on the cause of the derailment.

91. With the road traffic-light signals operating he had reconstructed the van driver's route from his home to the crossing. It was about 150m from the house to the lane and he did not think that it would have been possible to have heard the yodalarm. It took about 30 seconds to drive from Mr Ashley's house to the lane where he would have had to check that no traffic was approaching from his right and then approach the lights at an angle across the forecourt of the station house. Assuming a moderate speed in second gear, by the time the van driver had checked to his right and looked towards the traffic lights, only a matter of two to three seconds would have elapsed before he reached the lights and the Stop line. Because the lights were set up high on a post to give good visibility for those approaching down the lane, they would pass quickly out of the van driver's view. He found that the duplicate primary signals were barely visible from a car approaching them from the yard at an angle and that the primary signals appeared to be of reduced intensity. He felt that the brightness of the sun had a diminishing effect on the road traffic-light signals but that there was no glare of the sun in the vehicle driver's eyes because it was high in the sky. He also felt that one pair of signals were of slightly less intensity than the others but agreed that this might have been due to them being aligned towards different points on the road.

92. In answer to further questioning PC Cundill said that the whole of the rear axle had remained virtually intact, it was just that the half shaft had snapped off at the wheel. He was told that the van had been carrying a five-gallon can of oil and agreed that the oil that was lying around might well have come from that can. He was unable to say how much the flange of the DMU wheel would have been lifted above rail level and considered that the damage to the lifeguard might well have been caused by impacts later on in the derailment after the collision. Although he had said that the traffic-light signals were high up on the posts he did not think that the van's driver would have had to have looked up as he came out of the yard to get a view of the left-hand signal; it was some distance away and would not go out of his view until he was getting quite close.

93. Mr A. G. L. Shore, British Railways' Suburban Engineer, is responsible for the specification for the construction of all new multiple units for British Railways and for the maintenance schedules for all existing units. He received reports of all derailments which were studied to see whether any features required an improvement to specifications. He agreed that the evidence from Mr Lee and the Police Constables was put together very well and gave a clear understanding of the way in which the collision had led to the derailment. He believed that the derailment inevitably became severe once the leading bogie had derailed totally into the cess. He pointed out that in the majority of derailments one pair of wheels of the leading bogie remained in the '4-foot' and the consequences were usually much less serious. He did not think that the axle load of the DMU had very much bearing on the likelihood of a derailment occurring because he felt that the half-shaft of the van alone would be quite capable of supporting 10 tonnes and that the axle would probably have derailed the most heavily loaded locomotive axle.

94. Mr Shore confirmed that in this class of DMU there was no direct connection between brakes and power so that it was possible for the brakes to be applied and power to be left on. However, the power handle incorporated the DSD and the power shaft was spring loaded back to the idle position so that although there was a delay in brake application after the release of the handle he felt that power would have been cut off at about the time of the collision.

95. Mr Shore said that for the last 10 years all vehicles have been constructed to UIC (International) standards of collision resistance. However because of the derailment at Polmont the specification for lifeguards had been re-considered. One major change is that these are no longer mounted on the bogie frame but on the axle box. Although they appear to be very substantial, because of the cantilever effect they are not as strong as they seem to be. By mounting on the axle box they are made shorter and it had been found possible to improve the strength by a factor of about five. Doing this also meant that there was no need for a spring deflection allowance between the bottom of the lifeguard and the rail and the lifeguard can be brought much closer to the rail head. An energy absorption limit for all lifeguards was now specified. He incidentally felt that the deflection of the lifeguard in this accident could have occurred in the collision because of the inertia.

96. The designers had also considered the need for animal or obstacle deflectors after the Polmont accident at which time two designs of multiple-unit were at the specification stage with a maximum speed of 100 mile/h. These are the Class 319 and the units for the Bournemouth and Weymouth trains; both will have obstacle deflectors. Obstacle deflectors were also considered for the new DMUs which have a top speed of 75 mile/h but this proved to be extremely expensive. Because most DMUs are 2-car a deflector is required on virtually every vehicle. If they are to be of any use and not to become a derailment hazard themselves they have to be immensely strong and it had been calculated that they would add about 1½ tonnes and about £12,000 to the cost. This included the strengthening of the floor to take the load from the deflector in a collision. Adding in the fuel cost of moving the additional three tonnes extra weight the total cost over the new fleet would add up to £20,000,000 and the British Railways Board felt that the risk of a very serious derailment occurring as a result of a DMU striking an animal was so low that this level of expenditure could not be sustained. Accordingly it had been decided to resort solely to improvements to the lifeguards for DMUs.

97. With the existing older DMUs the bogie and body structures were just not strong enough to accept the loads that might be imposed upon them by obstacle deflectors. It was possible to see that the bogie frame had been bent by the impact on the lifeguard in the collision with the van. As it was the intention to withdraw the vast majority of these DMUs as quickly as possible, it was concluded that there was really nothing that could be done. The class involved in the accident is due to be withdrawn from service in 1987. He said that even if it had been possible to fit a deflector to the body of the DMU involved in the accident its lower edge would have had to have been 230 mm clear of the rail which is a substantial gap and one through which the rear axle of the van might have been able to pass. He agreed that it was also possible that the deflector might have pushed the lower part of the van out of the way; it was impossible to be certain one way or the other.

98. Short of fitting seat belts and bars across the windows he did not think there was any improvement that could be made to prevent passengers being ejected through the windows as a result of the violent movement of a coach, such as that of the leading vehicle of the DMU. It was his opinion that these propositions were neither practical nor acceptable. In answer to further questions he said that the clearance between the new lifeguard and the rail top could be as little as 45 mm and that there might not have been a derailment if a deflector or lifeguard had been fitted capable of brushing aside the axle of the van although this would have been dependent upon the speed of the train, the angle of impact and the strength of the lifeguard. He agreed that with the old style lifeguards it would be sensible to give added consideration to the importance of keeping cars and trains away from each other as there is always a risk of a derailment when a train and motor car meet but he did not believe that this was a substantial risk. In the majority of collisions between rail and road vehicles no derailment results, it was a question of chance and of something being in exactly the wrong place as had happened at Lockington.

99. *Mr R. A. J. Howard* was recalled to explain the constraints which applied to the height at which the road traffic-light signals were placed because the police witness had commented that they were rather high. He commented that a person approaching in a vehicle might not necessarily be concentrating on the signals and could miss the three seconds of steady yellow light. The Department of Transport required the height of the centre of the yellow lens to be not less than 2.4 m and not more than 4 m above the adjacent carriageway and those at Lockington complied in that the red aspects of the primary were 2.75 m above the carriageway and those of the duplicate primary 3.2 m above the carriageway. He believed that the variation in height that was permitted was to ensure that adequate headroom was given to pedestrians and so that the lights could be seen above any transient obstacles that there might be such as vehicles parking or turning. He thought that where there were side turnings and accesses close to level crossings there might be some argument for changing the variation that was permitted in the regulations. He felt that the addition of a sign facing those turning out of a side road or access might just add to the clutter because it was possible to put too many signs at a level crossing and this might lead to people ignoring all of them. It was his own opinion that such a sign might not necessarily be beneficial.

100. *Mr D. Holland* was recalled having heard all the preceding evidence. He confirmed that he found it very difficult to explain the type of occurrence when it was alleged that trains had crossed and the lights had either not shown at all or only shown for a very short time. He said that the incidents in which the lights had been seen to flash and no train had arrived were not related in any way to those when a train had arrived and no lights had shown. It was not true to say that if one could happen it was just as easy for the other to happen. The crossing did not operate that way because the fail-safe mechanism was designed to commence the traffic-light signal sequence on the slightest disturbance such as a relay de-energising.

101. Having heard evidence about the way in which the level crossing equipment had been tested each week he attempted to carry out an analysis, in the course of giving evidence, of the possibility that a situation might have been left which would have prevented the next train from striking in properly. His opinion was that this was most unlikely and had certainly not happened on the day of the accident because there had been no testing on that day. Since he gave evidence he has again conducted a thorough analysis of the circuits in the knowledge of what had been done by the technicians and felt that there would have had to have been at least two other equipment failures for a dangerous situation to have arisen. He agreed that if a train failed to operate the BF track-circuit and the CD treadle on the approach from Beswick towards Lockington and it then operated the BE track-circuit and the BE/BF treadle the 10 second delay would operate and, depending on the speed of the train, there would either be no red light flashing before the train reached the crossing or a very short period. He agreed that there was a possibility that some kind of malfunction might occur but the possibility was extremely remote and in the case referred to would have required a track-circuit and a treadle not to have operated on the approach of a train. He felt that the high standards of circuit design, installation, testing, and the other safeguards would prevent a malfunction which might lead to a danger-side failure.

102. *Mr R. H. Parker the Regional Signal and Telecommunications Engineer* agreed that there had been no technicians at the crossing on 26th July 1986 until after the accident and having heard the details of the tests carried out said that they were in accordance with the requirements of the BR Board and had gone into far more detail than was actually specified as they were looking for an unknown feature. As a result of these tests he was entirely satisfied that the installation is in accordance with the drawings and was working correctly.

103. I was unable to talk to *Driver H. Brown*, who drove the derailed train, until the beginning of October because of the severity of his injuries. He was still in hospital but very cheerful despite his slow recovery. He could recall nothing about events leading up to the derailment.

DISCUSSION

104. It was only by chance and the geography of the site that this collision resulted in such a tragic derailment. If the van or train had arrived on the crossing a second earlier or later there might have been no derailment, and if the line had been level with the surrounding land, or in a cutting, the leading vehicle might have been restrained and prevented from overturning.

105. Before the accident there were a number of safe-side failures when the red traffic-lights were flashing for between two and four minutes or longer and, in one case, for nearly three hours. In some cases (the shorter periods) trains did not pass over the crossing. These failures convinced some local residents that the equipment was generally unreliable. The causes of these failures include the passage of agricultural machinery over a crossing, the testing of crossing equipment (in some cases at an adjacent crossing), work on the permanent way, and the failure of an electricity supply. In the main those who observed them did not report them at the time but after the accident the Police received many statements about events before the

accident, some of which may have duplicated others. In some reports the recollection of the date may have been incorrect.

106. Of more importance, and again after the accident, the Police received a smaller number of reports of danger-side failures that had occurred before the accident alleging that trains had passed over the crossing without the red lights flashing or with the lights only flashing for a short period. Some are included in the evidence and others were heard at the subsequent Inquest. Very few were reported to British Railways despite the existence of telephones at the crossing. I have considered them all very carefully. Where the lights are said to have flashed for a short period there is no mention of the yellow aspect being seen, and I believe that the report has arisen because the attention of the person making it has only been drawn to the red flashing lights part way through the sequence. Where the report is that the lights have not flashed at all, I think that the person on the road may not have been in a position from which the lights were visible or that the lights have in some way been obscured or, as in Mr Wright's case, the person has only been in a position to see the lights correctly when the train has actually just struck-out.

107. For some weeks after the crossing had reverted from manual to automatic operation a record was made of each initiation of the equipment. Over this period there were no anomalies and on one occasion the record was used to prove that the red lights had flashed for at least the minimum time of 24 seconds although a road user had complained that they had shown for only 10 seconds before a train passed over the crossing.

108. The analysis and design of the signalling circuits, the results of the use of the recorder, the tests conducted after the accident, and the evidence, leave me in no doubt that the red traffic-light signals were flashing as the train approached and were operating correctly at the time of each of the alleged danger-side failures. The fact that so few of these failures were reported at the time to British Railways or the police, despite the obvious danger to road users, reinforces this opinion although I am equally sure that those making the reports honestly described what they saw.

CONCLUSION

109. I am satisfied from the considerable weight of evidence that the road traffic-light signal sequence was correctly initiated by the 09.33 Bridlington to Hull train and that the red lights were flashing as it approached the crossing.

110. Mr Ashley, the driver of the van, apparently has no recollection of events leading up to the accident and I have not been able to interview him. I know that he lives close to the crossing and is a commercial and private motor vehicle driver with at least 26 years experience. I am told that he was involved in the discussions about the crossing modernization and that he used the crossing regularly at least once a week. I feel that he was therefore fully aware of the traffic-light signals.

111. The evidence shows that the van was in gear and in motion when it was struck and I can only conclude that it was driven past the flashing red lights and into the path of the train too late for the train driver to do anything more than release the DSD and possibly initiate a brake application using the brake valve.

112. This might have been done for one of a number of reasons:

- (i) Mr Ashley might have seen the lights flashing but concluded that he could cross before the train arrived. I think this most unlikely in view of his driving experience and knowledge of the crossing.
- (ii) Because he was in some way preoccupied, he did not look for the lights but for the barriers that up to December 1985, had been lowered to close the crossing. This again I think is most unlikely.
- (iii) Because there was no other traffic and he was able to drive straight out into the lane and over the crossing he gave the lights only a cursory glance which was not sufficient, with the sun behind them, for him to realise that they were flashing. This I think is possible.
- (iv) The most likely reason I think is that in the few seconds available between approaching the lane from his house and reaching the Stop line, Mr Ashley was in some way distracted and did not look at the road traffic-light signals. He had both his foster-son and his dog in the car as possible sources of distraction combined with the need to look for traffic in the lane and to turn left.

REMARKS AND RECOMMENDATIONS

113. I am concerned about three features of the crossing's construction, operation, and use that have become apparent from the evidence, from discussions with British Railways' staff and road users, and from accidents and incidents at other crossings.

114. The features require attention although I do not think they played a major part in this accident:

- (i) Under certain circumstances some motorists either do not notice the red traffic-light signals flashing or, if they see them, do not comprehend or understand the message that is given by them. This is not wilful disobedience but the fact that the message given by the signals is inadequate for some.
- (ii) Some motorists after seeing the red lights flashing, act in a most irresponsible manner at the crossings. This results from stupidity, impatience, or a lack of appreciation of the hazards.
- (iii) BR have fallen short of what they should do to record and explain unusual occurrences, to deal with safe-side failures, and to encourage reports of such incidents.

115. I have been told of the results of Professor P. F. Stott's Review of the Safety of Automatic Open Level Crossings and I am very grateful for the discussions that I have had with him. I have considered possible ways of improving the STOP signal provided at Lockington crossing and have concluded that the most effective way to reinforce the message to motorists that they must stop when the lights flash is to provide some form of barrier. The Review considers the risks, statistics, and economics of conversion and recommends criteria for selecting those crossings which should be altered and the timescale within which the work should be done.

116. At any level crossing, however protected, there is some risk of a train and road vehicle colliding. At Lockington, unlike other accidents, the geography led to progressive derailment of the train, overturning, and tragic loss of life. In the description I have pointed out that Lockington is the most southerly of four AOCR within two miles. Both to reduce the hazard and to make economies to meet the cost of conversion I further recommend that British Railways with the local and highway authorities should seek ways of closing two of the four crossings so that two may be converted to AHB. I believe from my knowledge of the crossings that it should be possible to select the crossings to be closed in such a way that the inconvenience for residents is very small.

117. There have been comments and complaints about the poor output of the red flashing lights in some circumstances and I believe that in any case the STOP message of the lights needs to be reinforced. I therefore support Professor Stott's recommendation that ways of improving the visibility of the light signals should be investigated. Should this reduce slightly the time for which battery operation is possible, provided there are arrangements to man the crossing in the event of a protracted power failure or to close it and divert traffic if necessary, I do not think this reduction in time is dangerous.

118. I found in the course of my Inquiry a most casual and thoughtless attitude among some road users of the crossing. This seems to have arisen from ignorance, distrust, and dislike of the new crossing system, despite the efforts made by British Railways to educate the public before the equipment was commissioned. I have noted that it is Professor Stott's firm view, based on his road safety experience, that a special programme of public education is not to be expected to be effective in improving the (safety) performance of AOC. Nevertheless I feel that national advertising stressing the significance of the road signs, the requirement to stop when the lights show, and the need to report any difficulties is bound to improve public acceptance of, and behaviour at, modernised crossings. I recommend therefore that the Department of Transport should undertake this.

119. The occurrence on 27th June 1986 was a safe-side failure provided the discipline of road users was good. However it took nearly 3 hours for an attendant to reach the crossing. In that time, although a number of trains passed having been correctly cautioned, I understand that several road users crossed against the red flashing stop lights and others were waved over by onlookers. While this is perhaps understandable as callers had been told on the telephone by the signalman that the crossing failure was known of, this action is illegal, dangerous, and a bad example to other road users who may follow suit.

120. There was a further occurrence on 14th January 1987, after the accident. On this occasion, because a DMU failed after running into a snow drift and occupied the track circuits between Beswick and Lockington Level Crossings, the traffic-light signals at both crossings were operating from 08.21 until 10.38. During this period the signalman at Beverley correctly received failure indications from both crossings and a number of telephone calls reporting the continued operation of the signals including one from the guard of the failed train. When questioned afterwards the signalman could not recall being asked by any caller if they could pass over the level crossing. I am informed that several car drivers did so against the red traffic-light signals and that one narrowly escaped a collision with a locomotive going to the assistance of the DMU. This kind of behaviour is totally irresponsible especially with the memory of the accident presumably in people's minds. Whilst deliberate contravention of the traffic-light signals cannot be prevented I believe that the advice given by the signalman in the monitoring signal box must be altered.

121. I am told by the British Railways Board that amended instructions for signalmen in a monitoring signalbox have been drawn up and should be issued shortly. I am assured that they emphasise the need for road

users to be told to stop at the red flashing lights and not to cross if they continue to flash. I recommend that these instructions be introduced and that signalmen's understanding of them be checked at the next visit of a Supervisor.

122. In addition to cautioning trains, the railway's Rules require the signalman monitoring a level crossing at which there is a failure to call technical staff for repairs and an attendant to take local control. The signalman is also required to advise the local police. I further recommend that British Railways, with the Department of Transport, confirm that adequate guidance is available to a police officer who may attend a failure at a crossing.

123. Similarly if the road traffic lights must be tested by operating a track circuit because no train is approaching, then road users must never be waved past the red flashing lights by those at work there. The requirement for motorists and other road users to stop should be enforced and an explanation given to the leading motorist on either side. If the closure is likely to be for more than a few minutes then the road should be closed off with pennants and a sign displayed explaining the situation.

124. At present it is a requirement for a failure indication to be given in the monitoring signal box of an AOCR only if, when a train is approaching the crossing and has struck-in, there are no red lights showing in one or both directions at the crossing along the road. I believe this is illogical because it permits a train to approach the crossing at normal speed and for no warning to be given to road users on one or both sides; although thereafter the drivers of all trains are cautioned. I believe that the failure indication should be given when the warning on one side of the crossing is reduced to one or preferably two lights. This provides advance warning of an increasingly dangerous situation whilst avoiding the difficulties of the 'cold-proving' of the lamp filament circuits. I am advised that a modification has now been introduced at all AOCR which achieves this.

125. I have looked at the section of the Highway Code dealing with level crossings and I feel that it could be made much more effective by increasing the pictorial representation of the level crossings that may be met by a road user. I therefore recommend that rules 176-185 should be revised, to take into account recommendations made both in Professor Stott's report and this one that are accepted, to improve the educational value of the document. In particular the way in which a telephone at a crossing or public telephone may be used to report incidents and failures must be mentioned. This action might help to correct the casual attitude apparent in the evidence of Mrs Taylor, Mr Precious, and others.

126. From the evidence I have taken and the discussions I have had with local residents, for which I am most grateful, I have drawn the conclusion that the residents failed on many occasions to meet their responsibilities to other road users by not reporting alleged deficiencies in the level crossing; at the same time British Railways did not have a proper system for recording complaints, and, most important of all, replying to the complainant with some explanation of what had happened. Whilst British Railways take considerable care to educate children about the way in which the crossing operates and how it should be used, the adults in the community clearly need far more education than they are receiving at present. I therefore recommend that the railways improve the publicity that they already issue with the modernisation of a crossing and include reference to a system that encourages, and deals properly with, reports of crossing incidents and failures. I am advised that a recording system was introduced on BR shortly after the accident. I also recommend that more should be done to educate crossing users in the proper use of crossings and of the way in which they work, by incorporating one or more compulsory questions about level crossing road signs in the driving test.

127. To assist with investigations and to aid maintenance staff, I believe that the system that is developed to receive reports must extricate useful information which could be passed to the maintenance staff as well as providing a way in which an explanation may be given to the complainant. Reports must also be monitored by management so that a sudden increase in the number of problems, or problems with a particular level crossing, are detected. To assist with this I recommend that facilities be built into automatic level crossings to allow monitoring of the various functions on an occasional basis. In addition to providing assistance for maintenance staff, the use of a recorder will have the benefit, as it had after the accident at Lockington, of providing evidence and information with which railway management are able to explain problems reported by road users. I am told that much of this work is completed or in hand.

128. I am very grateful for a discussion that I had with *Dr J. K. Gosnold* the *Emergency Services Consultant* at Hull Royal Infirmary. He made a number of valuable points which should be noted by the railways or passed by the Department of Transport to the Home Office and DHSS for the information of the Emergency Services.

(a) Coaches provided by British Railways to evacuate un-injured passengers appear to have left the site without the names of those conveyed or their numbers being reported. This made it difficult to establish how many passengers there had been on the train and to account for them all.

- (b) A doctor was at the scene of the accident 10.20, very quickly followed by a second doctor at 10.30. This was a considerable advantage in helping ambulance staff in the assessment of casualties. However they needed assistance with equipment and messages etc and it was fortunate that an uninjured passenger with first aid knowledge volunteered.
- (c) A 'Flying Squad Ambulance' is based at Hull and was taken to the site. It provided valuable first aid, resuscitation, and treatment facilities as well as nursing staff and more doctors.
- (d) It was difficult initially to identify the senior person from British Railways and to find a location where messages might be left.
- (e) At the site of major emergencies Dr Gosnold felt that there was a need for a doctor to monitor the physical and emotional strain under which those engaged in recovering and treating casualties are placed. On two or three occasions he had instructed emergency services staff, who were showing signs of being affected, to leave the site for a rest.

129. Because the police sealed off the relay room at the crossing for several hours after the accident, the British Railways' technicians were unable during that period to ascertain whether there was a defect in any of the equipment which might affect safety elsewhere. The consequential delay to the technicians' investigation gives cause for concern. I recommend that discussions take place between the Department of Transport, the Home Office and other relevant authorities about reconciling the conflicting interest of parties with investigation functions, with a view to minimising delays in conducting immediate checks after accidents for the purpose of securing public safety.

130. In view of the possibility of a prosecution being instituted, I refrained, at the request of Humberside Police, from taking evidence for a period of over 10 weeks after the accident. The Director of Public Prosecutions then agreed that I could commence taking evidence, although his decision not to institute a prosecution was not reached until much later. Although delays for this sort of reason are understandable, I am concerned that the interval between the accident and the taking of evidence may dull the freshness of witnesses' recollection of the events.

131. I am very grateful for the assistance that I was given by Officers of the Humberside Police and particularly Detective-Superintendent B. Lilley who was in charge of the investigation. I must also thank all those whose interest in safety led them to write to me and offer information.

I have the honour to be,

Sir,

Your obedient Servant,

A. G. B. KING

Major

The Permanent Under-Secretary of State
Department of Transport

RAILWAY INSPECTORATE
DEPARTMENT OF TRANSPORT
2 MARSHAM STREET
LONDON SW1P 3EB
August 1987

SIR,

I have the honour to report for the information of the Secretary of State for Transport that, in accordance with the Appointment dated 30th January 1987, I served as Assessor to J. T. Green Esq., HM Coroner for North Humberside and Scunthorpe, at the resumed Inquest held at the Memorial Hall, Beverley, North Humberside on 24th February 1987 into the deaths of eight passengers on the train and the passenger in the van who lost their lives in the accident on Lockington Level Crossing on 26th July 1986.

The Jury returned the verdict in each case that the deceased died as a result of a misadventure, a verdict with which I am in agreement.

I have the honour to be,

Sir,

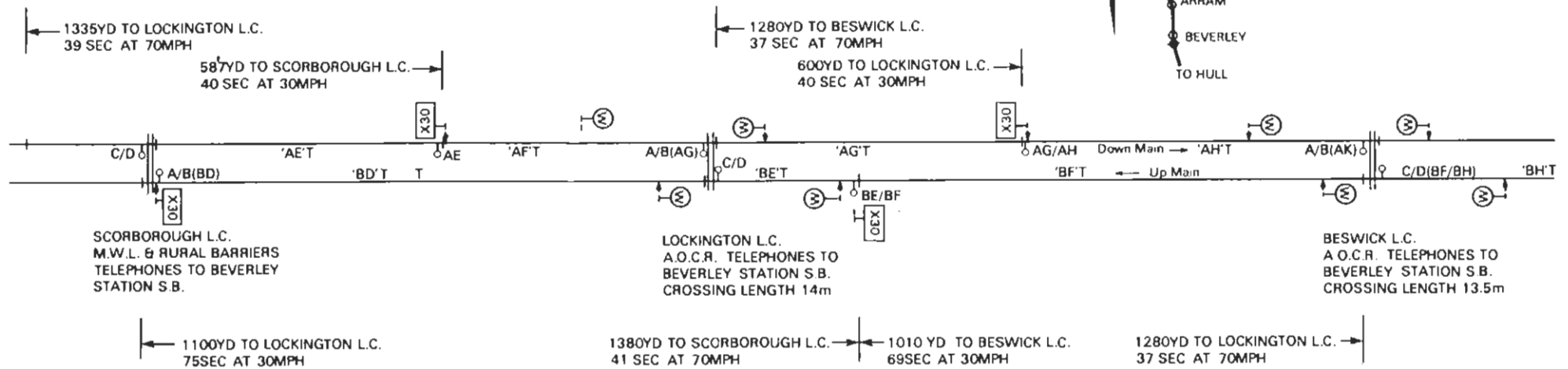
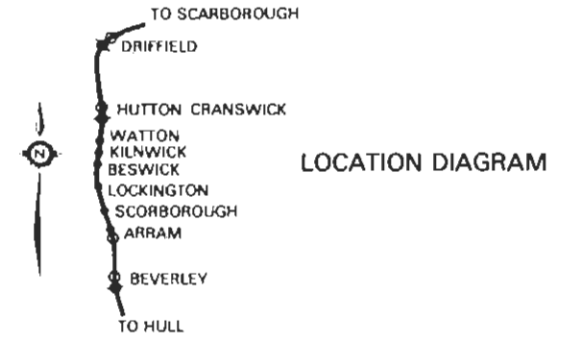
Your obedient Servant,

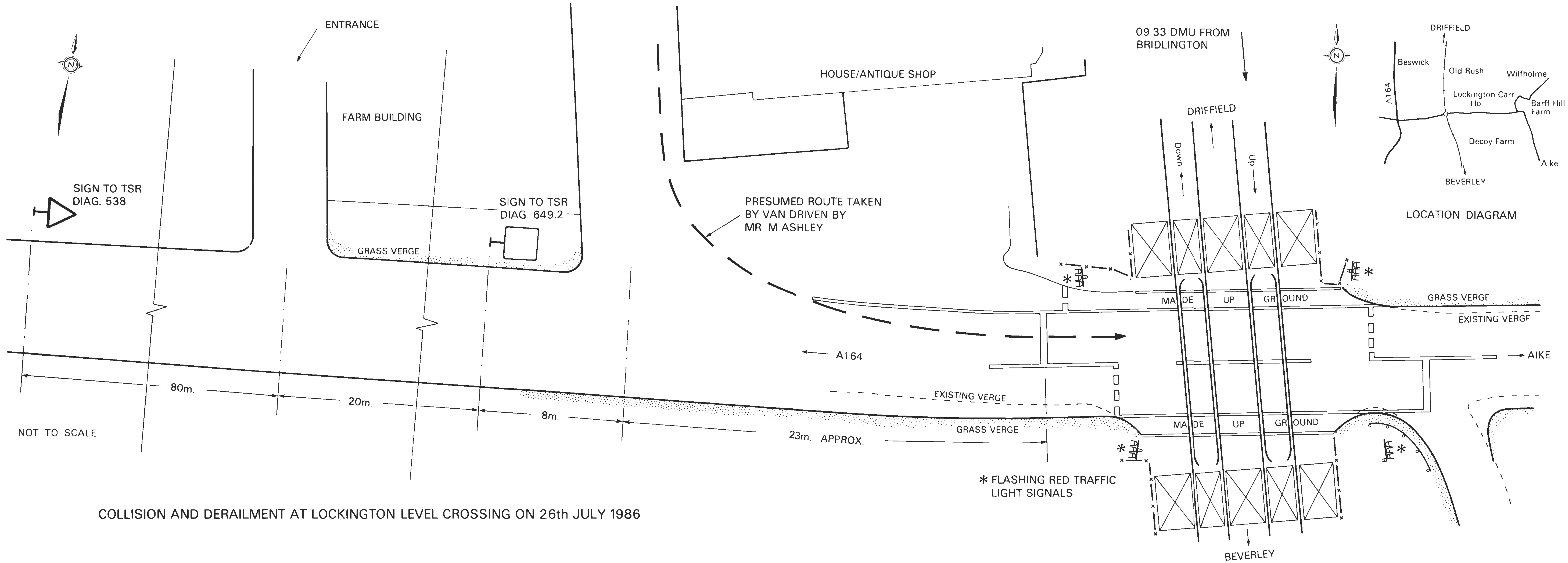
A. G. B. KING

Major

The Permanent Under-Secretary of State
Department of Transport

COLLISION AND DERAILMENT AT LOCKINGTON LEVEL CROSSING ON 26th JULY 1986





COLLISION AND DERAILMENT AT LOCKINGTON LEVEL CROSSING ON 26th JULY 1986



HMSO publications are available from:

HMSO Publications Centre

(Mail and telephone orders only)

PO Box 276, London SW8 5DT

Telephone orders 01-622 3316

General enquiries 01-211 5656

(queuing system in operation for both numbers)

HMSO Bookshops

49 High Holborn, London, WC1V 6HB 01-211 5656 (Counter service only)

258 Broad Street, Birmingham, B1 2HE 021-643 3740

Southey House, 33 Wine Street, Bristol, BS1 2BQ (0272) 264306

9-21 Princess Street, Manchester, M60 8AS 061-834 7201

80 Chichester Street, Belfast, BT1 4JY (0232) 238451

71 Lothian Road, Edinburgh, EH3 9AZ 031-228 4181

HMSO's Accredited Agents

(see Yellow Pages)

and through good booksellers

£5.10 net