



HM Railway Inspectorate

**RAILWAY ACCIDENT AT STAFFORD**

A report on a collision that occurred  
on 4 August 1990



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The Permanent Under Secretary of State  
Department of Transport

HM Railway Inspectorate  
Health and Safety Executive  
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London W2 4TF

5 January 1994

Sir

I report for the information of the Secretary of State for Transport, in accordance with the Direction dated 22 August 1990, the findings of my inquiry into the collision between a train of empty stock and a passenger train which occurred on Saturday, 4 August 1990 at Stafford Station in the then London Midland Region of British Railways. Mr C Law, an Inspecting Officer of Railways, was appointed to assist me at my inquiry which took place on the 4 and 5 September 1990.

I also include in this report in accordance with the Direction dated 8 March 1991, evidence disclosed when I acted as an Assessor to HM Coroner for Staffordshire South, R A Browning Esq, at the resumed inquest into the death of Phillip Donald Sutton who died in the accident. At this inquest held on 25 and 26 March 1991, the inquest jury returned a finding of "accidental death"; a verdict with which I am in agreement.

At about 00.30 on the 4 August 1990, in clear weather, the 22.18 passenger train from Manchester Piccadilly to Penzance, comprising nine coaches hauled by a diesel locomotive, was struck in the rear by the 23.36 train of empty stock from Stoke on Trent to Birmingham Soho Depot, consisting of a four-car Electrical Multiple Unit (EMU). The train from Manchester was standing in No 4 Platform at Stafford when the EMU was signalled into the same platform with a cautionary signal aspect. The empty stock entered the platform at an estimated speed of 20 mile/h and struck the rear of the stationary train. The leading bogie of the EMU was derailed and the driving cab crushed. The rear vehicle of the stationary train was severely damaged but it was not derailed.

I regret to report that the driver of the EMU was killed and 36 people, including three railway staff, required hospital treatment for minor injuries and shock. None of the injured people were detained in hospital and the passengers returned to Stafford Station to resume their journey at approximately 03.15.

There was no significant damage to the track, signalling or electrification equipment, but the accident caused disruption to rail services with removal of all electric traction supplies in the Stafford area of the West Coast Main Line until 01.52 on the day of the accident at which time the power was restored to all except the Up and Down Slow Lines. The track was cleared by 12.30 and traction supplies to the Up and Down Slow Lines through the station were restored at 13.22 on the same day.

D S Harland  
*HM Deputy Chief Inspecting Officer of Railways*

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**Figure 4** View from Up Slow line of Bridge No 86, Stafford 5 Signal box and Stafford Station

## DESCRIPTION

### The site of the accident

1 Stafford Station is aligned approximately north west to south east and is located some 133 miles from London on the main line from Euston to Crewe and the north. The direction of travel in the Stafford Station area is designated 'Up' for movements towards London and Birmingham and 'Down' for trains operating towards the North. From Norton Bridge, the next station to the north, there are four lines of way to Stafford. As seen travelling south towards Stafford, reading from left to right, these are designated the Up Fast, Down Fast, Up Slow and the Down Slow lines. Immediately north of Stafford Station the four lines fan out to form eight tracks through the station itself, namely the Up (Platform 1) line, Up Fast, Down Fast, Down (Platform 3) line, Up Slow (Platform 4) line, Down Slow (Platform 5) line, Up and Down (Platform 6) line and the Down Goods line. The station is approached from the North with a gentle curve to the right and the lines through the station are, to all intents and purposes, straight. The accident occurred on the Up Slow (Platform 4) line and the point of collision was some 65 m south of the north end platform ramp of that platform.

2 Immediately south of the station there is a junction where the lines to Birmingham diverge from the more direct route to London (Euston) via Lichfield. To the north of the station, in the area of the 134 mile post there are a number of crossovers to facilitate Fast Line to Slow Line interchanges. The layout of routes in the Stafford area is shown in Figure 1 at the back of the report.

3 The maximum permitted line speed on the fast lines in the vicinity of Stafford from the north is 100 mile/h, the maximum speed through the connections at the 134 mile post is 60 mile/h and the maximum speed along the Slow and Platform Lines is 50 mile/h. Immediately south of the station there is a 30 mile/h speed restriction on the Birmingham lines.

4 The railway is electrified on 25 kV ac overhead line system. In the area of the accident the traction current is supplied from a substation at Norton Bridge which is remotely supervised from a control room at Crewe.

### The signalling arrangements

5 The train movements in the Stafford area are signalled in accordance with the British Railways Board Track Circuit Block Regulations. In the station area Permissive Block may be employed in the platform lines enabling a second train to be signalled toward a train already standing at a platform. All running signals controlling main line movements are of the four-aspect colour-light type and are equipped with the automatic warning system (AWS). Permissive moves are signalled using subsidiary signals.

6 The signalling approaching Stafford from the north into the station is controlled by Stafford No 5 Signal Box, a traditional style signal box located on the west side of the line some 110 m north of the station platforms. A similar signal box, Stafford No 4, located on the east side of the line immediately south of the station, controls the signalling for that end of the station. The signal routes into the station are under joint control by both signal boxes. The signalman at the end from which the train enters the station must obtain a release from the other signalman before he may set the signal to a proceed aspect for a movement into the station. A separate release is provided for each line into the station and there are separate releases for each class of signal, main or subsidiary.

7 Above the mechanical lever frame in Stafford No 5 is an illuminated diagram which displays the track layout and indicates the track circuits occupied by trains. Internally illuminated indications located on the shelf above the lever frame show whether a release has been given, the state (lay) of the points and whether signals are showing a proceed or a stop aspect. Adjacent to this shelf is a train describer which automatically displays descriptions and locations of trains in the controlled area on a visual display screen which depicts the track layout in a diagrammatic format. The equipment provided and the method of working, at Stafford No 4 Signal Box, is similar to that used at Stafford No 5 Signal Box, with minor variations in the layout of equipment.

8 In the signal boxes at Stafford the mechanical lever frames and tappet interlocking have been retained for route setting security and a separate lever controls each signal route and each set of points. To clear a signal the signalman must first set the route required using the individual point levers before reversing the appropriate signal lever, upon which, provided all other safety checks are satisfied, the signal will clear to the appropriate proceed aspect.

9 The signal controlling the routes into Stafford Station from the Up Fast line is known as 'Stafford No 5 139' but the signal levers used are:

Routes to Platform 1 - signal lever 138

Route to the Up Fast - signal lever 139

Routes to Platform 4 - signal lever 140

Routes to Platform 6 - signal lever 141

10 This signal authorises the movement of trains into an area controlled by the signalman at Stafford No 4 Signal Box at the south end of the station. While the signalman at Stafford No 5 Signal Box may set the routes into the station and reverse the lever controlling the signal such as signal lever 140 for a movement into

Platform 4, the signal will not clear to a proceed aspect without a release given by the signalman at Stafford No 4 Signal Box. The differentiation between a main or a permissive route signal aspect into Platform 4 is achieved by the relay interlocking at Stafford No 5 Signal Box detecting whether a full release (lever SD 4 No 39) or a permissive release (lever SD 4 No 38) has been given from Stafford No 4 Signal Box.

11 The AWS provides an audible and visual reminder to the driver of a signal aspect. It is operated by magnets positioned between the rails approximately 187 m before the signal to which they apply. When the signal displays a red, yellow or double-yellow aspect a warning horn will sound. If the driver does not acknowledge the warning within three seconds the brakes of the train will be automatically applied. The same system is also used, in certain circumstances, to give warning of the approach to speed restrictions.

12 The signals on the route approaching Stafford from the North are all suspended from gantries spanning the four tracks. The driver of the train on the Up Fast line required to stop at Platform 4 would see:

at milepost 135.5 - signal 203, showing double-yellow; 1020 m later - signal 142, showing single-yellow; and 1030 m later - signal 139, initially showing red.

13 For a train approaching an *unoccupied* Platform 4 signal 139 would, as the train approached it, show a route indicator of five white lights inclined to the right and a main proceed aspect, normally single-yellow.

14 For a train to enter an *occupied* Platform 4, signal 139 would show the same route indicator, but would show a subsidiary proceed aspect comprising two white lights 250 mm apart on an inclined axis, while the main signal aspect remains red.

15 The layout of these features on signal 139 is shown in Figure 2.

16 The route onwards from signal 139 to Platform 4, with approximate distances from that signal, is as follows:

at 150 m, cross-overs begin to lead the train from the Up Fast to Down Fast line, then from the Down Fast to the Up Slow;

at 300 m - an AWS warning is received for a permanent speed restriction on the Up Slow line;

at 480 m - the warning sign for the speed restriction is passed and the end of Platform 4 comes into view;

at 640 m - Stafford No 5 Signal Box is passed on the right hand side of the line; and

at 760 m - the north end ramp of Platform 4 is reached.

## The trains

17 The train which was standing in Platform 4 at Stafford Station was the 22.18 Manchester Piccadilly to Penzance passenger train with the operating number 1V27. This train comprised nine coaching stock vehicles drawn by a diesel locomotive No 47841 which weighed 117 tonnes and had a maximum speed of 95 mile/h. The total train weight was 417.5 tonnes and its length was 204.41 m. A detailed train list is given in the summary of damage following.

18 The train of empty stock was the 23.36 Stoke on Trent to Soho Depot with the train operating number of 5G15. It comprised a four-car electric multiple unit of Class 310, unit No 310102, operating on the 25 kV overhead electrification system. Its weight was 160.5 tonnes, its length 80.72 m and its maximum permitted speed was 75 mile/h. Vehicle details are given in the list of damage following.

## Damage to the trains involved in the collision

19 Listed below are the vehicles in train 1V27, in running order, and a summary of the damage they sustained:

Locomotive 47841 - the buffers at the trailing end of the locomotive and the rear end cab were damaged.

Coach No 17124 corridor brake first - the buffers were bent on the end attached to the locomotive and the vehicle body had lifted off the bogie and displaced by approximately 50 mm.

Coach 1871 miniature buffet car - no obvious damage.

Coach 5596 open standard - the vestibule roof panel was bent.

Coach 5550 open standard - the toilet door was hanging off and its rear end buckeye coupling was damaged.

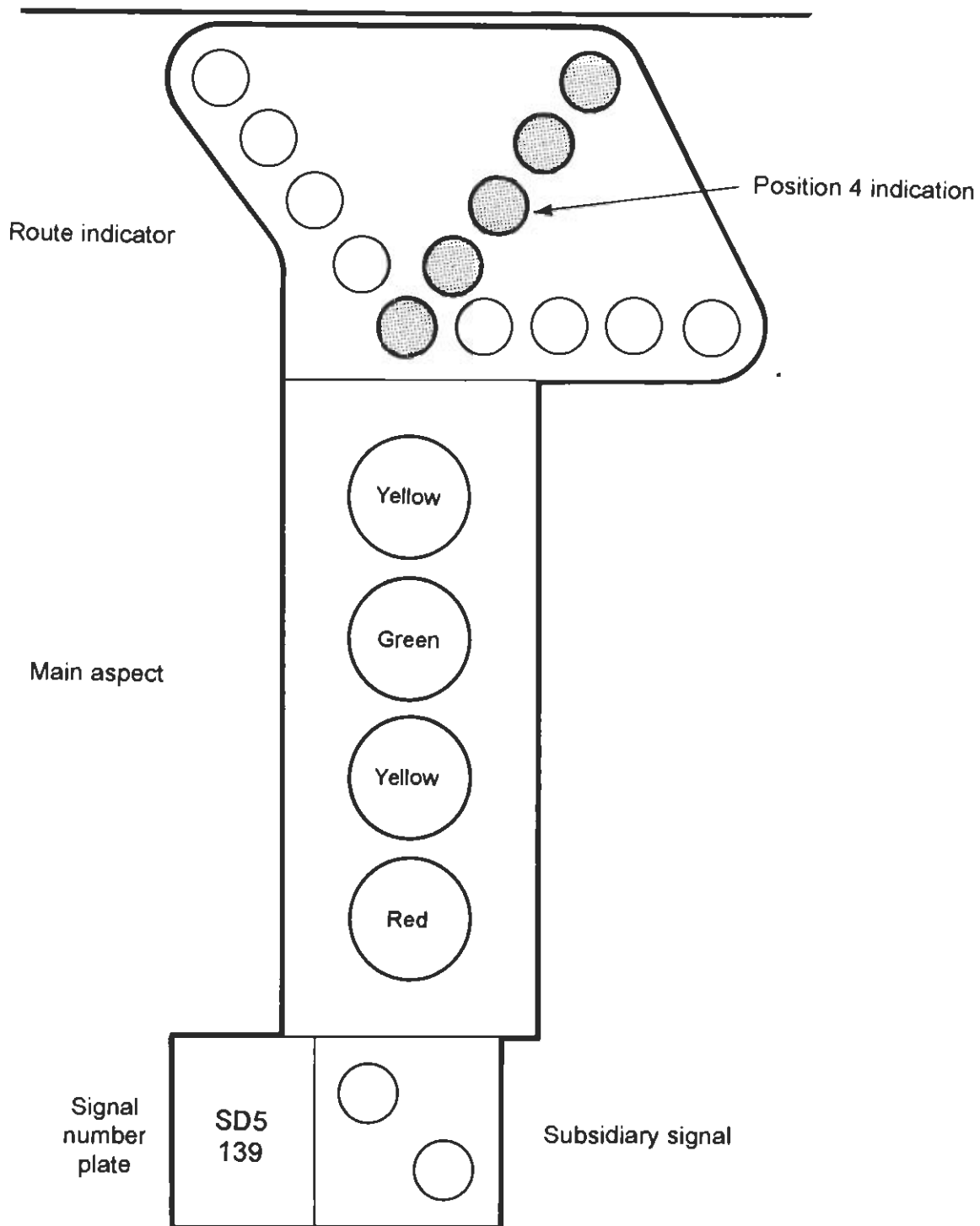
Coach 5840 open standard - the toilet bowl was broken and the buckeye couplings at both ends of this coach were damaged.

Coach 5254 open standard - some tables were damaged and the internal sliding doors were binding. The leading end buckeye was damaged.

Coach 5284 open standard - a number of the tables were dislodged from their mountings and the internal sliding doors were stiff.

Coach 5854 open standard - most of the tables were dislodged from their mountings and the internal doors were stiff. In addition the pivot pin, the buckeye support pin and the knuckle pin had bent on the rear end coupling.





*All lamp units fitted with anti-reflection hoods*

**Figure 2** Layout of Stafford SB139 signal



**Figure 3** Rear vehicle of 1V27. Coach No 17134.

Coach 17134 corridor brake first - there was considerable damage to this coach especially at the rear where the floor had buckled and the body sides rippled. The couplings at both ends were damaged, the trailing body end had been pushed inwards at the top breaking the connections between the body end structure and the roof. The roof skin had been torn away from the cantrails (see Figure 3).

20 Listed below are the vehicles in 5G15 in running order, and a summary of the damage they sustained:

Car No 76189 driving trailer, standard open - there was severe crushing damage to the leading driving cab end, the floor structure was badly distorted as far back as the cab rear bulkhead. The underframe sole bars had bent down to an angle of 50 to 60° to horizontal at their leading ends. Elsewhere, the body skin showed signs of rippling and the bogie traction rods were badly deformed.

Car No 70740 trailer, standard open - the traction rods on the bogies were broken and the top of the vehicle leading end, at cantrail level, was pushed in by approximately 150 mm with a slight rippling of the body skin.

Car No 62080 motor brake, standard open - no visible damage.

Car No 76139 driving trailer, standard open - no visible damage.

#### EVENTS LEADING UP TO THE ACCIDENT

21 On Friday, 3 August 1990 the 22.04 service 2K15: from Birmingham New Street to Stoke on Trent, booked to stop at all stations, left Birmingham New Street at 22.30 with Driver Sutton at the controls and Mr Shaitil Ahmed as the Senior Conductor. The train terminated at Stoke on Trent at 23.55 and was due to return to the Rolling Stock Depot at Soho, some three miles north of Birmingham New Street Station as an empty stock train, train operating number 5G15; with the same crew.

22 The train stood in Platform 2 at Stoke on Trent for a short time waiting for 1V27, the 22.18 Manchester Piccadilly-Penzance train, which was running some 60 minutes late, to precede it on the Up Line.

23 After 1V27 had passed through Stoke on Trent, 5G15 left to follow it along the Up Line to Stafford. The maximum permitted speed of the empty stock train was 20 mile/h lower than that of the passenger train with the result that 1V27 arrived at Stafford some minutes ahead of 5G15. 1V27 approached Stafford along the Up Fast line until, at signal 139, it was routed into Platform 4 at Stafford Station.

24 At about 00.26, 1V27 stopped approximately 40 m short of the south end of Platform 4 leaving about 64 m behind its rear vehicle to the top of the north end ramp.

25 The signalman at Stafford No 4 Signal Box had cleared a route for 1V27 to proceed on its way to Birmingham and the signal at the south end of Platform 4 was showing a green aspect.

26 The departure of 1V27 from Stafford was delayed because the buffet steward sought assistance from the station staff and the senior conductor of his train to deal with some unruly passengers. Thus, although station duties had been completed and the signal for the train to leave Stafford was showing a green aspect, 1V27 stood in Platform 4 at Stafford for some minutes.

27 Train 5G15 had followed 1V27 along the Up Fast between Norton Bridge and Stafford and it had been stopped at 139 signal for 2 to 3 minutes. The signalman at Stafford No 5 Signal Box had obtained from Stafford No 4 a release for a permissive move along the Up Slow (Platform 4) signalman and had set a route from 139 signal into the platform while it was still occupied by 1V27.

28 The driver of 5G15 standing at 139 signal would have seen a proceed aspect in the form of a subsidiary signal displayed with the red main aspect and a route indicator to signify that he was to proceed along the Up Slow line, prepared to stop short of any obstruction. The train progressed through the route towards Platform 4 but did not stop before striking the rear of the stationary train, 1V27, at 00.30 hours.

## EVIDENCE

### Working of trains

29 *Mr H A Roberts*, who was the driver of train 1V27, told me that the train was one hour late starting from Manchester due to difficulties in the provision of a locomotive. Apart from the late start Mr Roberts said that the journey to Stafford, with stops at Stockport, Macclesfield and Stoke on Trent, was uneventful and the train was still running approximately one hour late when it was approaching Stafford.

30 He told me that the train was routed along the Up Fast line between Norton Bridge and Stafford and that the signal sequences approaching Stafford were correctly, a double-yellow aspect, followed by a single-yellow aspect leading to signal SD5 139, which was red on first sight. When he approached signal SD5 139 it changed to a single yellow with a route indication signifying that he was routed into Platform 4.

31 Driver Roberts told me that he drove the train into Platform 4 and stopped it two coach lengths short of signal SD4 40, the signal which is at the south end of Platform 4. This starting signal was already showing a green aspect when the train was brought to a stand in the station at about 00.25.

32 He told me that he was holding the train in the platform with the automatic air brake in the initial position and with the locomotive independent air brake fully applied. He said the duration of the station stop was longer than usual. As he waited, at about 00.30, he heard a bang and his locomotive was pushed forward.

33 When Driver Roberts dismounted from his cab he realised that an EMU had hit the rear of his train. He went to the telephone on the platform to ring Stafford No 4 Signal Box to ask the signalman to protect his train and he then went to the rear of his train to assess the situation. When he saw the state of the EMU he went to the rear cab of the unit and lowered the pantograph to ensure that the unit was isolated from the traction supply.

34 Driver Roberts concluded his evidence by telling me that the weather on the night of the accident was clear and that there was no mist.

35 *Mr Sarwan Das Bange*, the Senior Conductor on

train 1V27, confirmed the driver's account of the journey from Manchester to Stafford, stating that it was uneventful although the train was running late. He told me that prior to departure from Manchester he had ensured that a tail light fitted to the last coach in the train was working and, in co-operation with the driver, he had carried out a brake test.

36 Having completed the station duties at Stafford, Mr Bange told me that he was about to signal the driver to recommence the journey when the steward of the buffet car, the second coach from the front of the train, called to him reporting that he was having trouble with some unruly youths in the adjacent third coach and that he needed the assistance of the station inspector. The senior conductor together with the station inspector went up to the buffet car to resolve the problem and, as the conversation with the youths was reaching a conclusion, Mr Bange told me that there was something akin to an explosion and the coach, on which he was standing, lurched forward causing Mr Bange to lose his balance.

37 When he dismounted from the coach he realised that the rear of his train had been struck by a following train. He walked back and met the guard from 5G15, ensured that the emergency services had been called and then gave assistance to the passengers in the rear coaches of his train before the emergency services arrived.

38 While Mr Bange could not tell me what the aspect on the signal at the south end of Platform 4 was when the train arrived in the station, he did confirm that at the time he was about to signal the driver to restart, this signal (No SD4 40) was showing a green aspect.

39 *Mr J Hartshorne*, a Signalman and one of three people on duty at Stafford No 4 Signal Box, told me that his duties that night were to operate the signalling at the Stafford Station end of the No 4 Signal Box control area. He explained that he was aware of the approach of 1V27 towards Stafford from the display on the train describer equipment. Platform 4 was empty at the time train 1V27 was approaching and Mr Hartshorne told me that, on request, he gave Stafford No 5 Signal Box a slot (release) for this route which had the effect of allowing the signal controlling the entrance to the station to show a main proceed aspect.

40 After dealing with 1V27 Mr Hartshorne noted that a second train, 5G15, was following it along the Up Fast line and that both trains were going onto the Birmingham branch. The signalman at Stafford No 5 Signal Box indicated, by way of the train describer transmission, that he wanted 5G15 to go onto the Birmingham Branch via the Down Slow and Platform 4. Mr Hartshorne explained that due to the interlocking and overlap requirements it was not possible to signal a train into Platform 6 at Stafford at the same time a train was

signalled from Platform 4 towards Birmingham; if such a move were possible 5G15 would probably have been routed into the empty Platform 6. The signalman then went on to tell me that he was aware that a further train was approaching Stafford from the north along the Up Fast line: train No 1A00, a Preston to Euston Express, so Mr Hartshorne gave Stafford No 5 signalman a slot for a permissive route into Platform 4 in order to clear 5G15 from the Up Fast line.

41 He explained that it was a legitimate movement to allow an empty stock train into a platform in which another train was standing but it was not permitted to signal freight trains into lines occupied by passenger trains.

42 Signalman Hartshorne went on to say that the station staff had indicated to him that 1V27 was "ready to start" by operating the Train Ready to Start (TRS) button on the station platform and that the signal at the south end of Platform 4 had been cleared to a green aspect before he gave the slot for the subsidiary move into the same platform. Train 1V27 had not departed the platform when the signalman at Stafford No 5 Signal Box contacted him on the telephone saying that 5G15 was passing his Signal Box and he did not think it would stop in time. While he was on the telephone the sound of the collision was heard in Stafford No 4 Signal Box. Mr Hartshorne confirmed that although there was a single action emergency alarm available between Stafford No 4 and No 5 Signal Boxes, this alarm was not operated at the time of the accident and that all communications were carried out by telephone.

43 The driver of 1V27 then contacted Stafford No 4 Signal Box on the signal post telephone and confirmed that his train had been run into from behind. Mr Hartshorne said that, immediately following the accident, he restored Platform 4 signal No 40 to red, checked that there were no other trains in the vicinity which required to be brought to a stand or which required protection and then he called the Area Operations Control at Crewe informing them of the accident.

44 Mr Hartshorne admitted that he had not made a record of conversations between Stafford No 4 Signal Box and other parties, eg the driver, the signalman at Stafford No 5 Signal Box, the Area Operations Control and the station, nor of any other actions taken following the accident.

45 *Mr Shaugnessy* was the signalman on duty, alone, at Stafford No 5 Signal Box at the time of the accident; he told me that the signalling of trains that night was perfectly normal. He confirmed that, in co-operation with the signalman at Stafford No 4 Signal Box, he signalled train 1V27 into the unoccupied Platform 4. The signalman confirmed that, when 1V27 had stopped in the platform, he could clearly see the flashing red tail lamp on the rear vehicle.

46 Signalman Shaugnessy went on to say that shortly afterwards he received from Norton Bridge the train description 5G15 which was also approaching Stafford along the Up Fast line. Mr Shaugnessy explained that 1V27 was only due to stop at Stafford Station for a short time and he expected it to have left the station before the empty stock arrived; in the event, 5G15 was brought to a stand at 139 signal on the Up Fast line where it stood for some two to three minutes. The signalman said that he would have expected the driver to have contacted the signal box after a couple of minutes but, in the event, this did not happen. 1V27 continued to stand in the platform for, Mr Shaugnessy estimated some three to four minutes although he could see that the platform starting signal at the south end was green.

47 The signalman then received the train description of a further train approaching Stafford from Norton Bridge along the Up Fast line. This was 1A00, a Preston to Euston Express. He passed this description on to Stafford No 4 Signal Box routing the description for the train to pass along the Up Fast through the station, a move it was not possible to carry out until 5G15 had passed from the Up Fast line to the Up Slow line. The Signalman at Stafford No 4 Signal Box reacted to the receipt of the 1A00 train description by giving a slot for a subsidiary aspect on the Up Slow and Mr Shaugnessy told me that he cleared 139 signal for a permissive move. He explained that it was a normal occurrence to use subsidiary aspects and for trains to enter a platform line which was occupied by another train and considered that the permissive facility was used about seven times per shift. Although he did stress that consideration is given to the class of train since it was not permitted to signal freight trains permissively at Stafford and, in addition, a long train would not be signalled into an occupied platform if the length of platform available was shorter than the train waiting to enter it. He said he recognised 5G15 as a four-car multiple unit and knew that it would fit into the vacant space in Platform 4.

48 Mr Shaugnessy went on to explain that when the EMU passed onto the Up Slow he restored the junction points to normal for the Euston Express after which he stood in the centre of his signal box.

49 When the EMU first came into view he considered its speed to be normal but, as it passed the signal box he formed the view that it was not decelerating nor were there any sounds of braking. He considered that the train was not going to stop safely behind the train in Platform 4; on the contrary he considered that the sound from the motor coach of the EMU was such that it was drawing power. The validity of this impression was reinforced on the second day of my inquiry when Mr Shaugnessy was recalled to listen to some recordings made at Stafford No 5 Signal Box of various train movements and he identified the recording of an EMU going by the box at a steady 25 mile/h with the

controller in notch 2, ie drawing power, as being similar to his recollection of the noise from 5G15 when it passed his signal box on the 4 August 1990.

50 The Signalman told me that when he realised the likelihood of a collision he telephoned Stafford No 4 Signal Box to warn the signalman there and while he was doing so the collision occurred. When the empty stock train hit the rear of 1V27 there was an electric flash from the 25 kV overhead catenary system and the signalman contacted the Electrical Control Room at Crewe, outlined the circumstances and asked for an emergency isolation of the traction supply. The signalman confirmed that there was a single operation emergency alarm button at the south end of his block shelf which he did not use on the night of the accident. He judged that using the telephone at the place where he was standing would give more immediate warning than walking half a length of his lever frame to the emergency alarm.

51 Mr Shaugnessy described the events following the collision during which he agreed with the signalman at Stafford No 4 Signal Box that he, Mr Shaugnessy, would ensure that the traction system was made safe, the Signalman at Stafford No 4 Signal Box would inform the Area Operations Control of the events and that the station supervisor who had contacted the signal box immediately following the collision, would call the emergency services.

52 Mr Shaugnessy told me that he had been on the same shift the whole of the previous week and his recollection was that 5G15 had had a clear run into Stafford on the previous days of the week, receiving main aspects at signal 139.

53 *Mr Shaitil Ahmed* was acting as the Trainman/Guard of 5G15 at the time of the accident. He explained that earlier, at the completion of his normal turn of duty, the train crew supervisor asked him whether he would be prepared to work an additional trip from Birmingham to Stoke on Trent and the return journey to Soho Depot. He agreed to perform this extra duty and at Birmingham New Street Station joined train No 2K15, the 22.04 train from Birmingham stopping at all stations to Stoke on Trent, driven by Driver Sutton.

54 Mr Ahmed joined the train on the platform and conferred with the platform staff as to the readiness of the train but did not contact the driver other than by giving the 'right away' bell signals.

55 Mr Ahmed said that the journey north was uneventful except for a delay at Stafford where the platform starting signal remained at red for some minutes. When the signal cleared to a proceed aspect, Mr Ahmed told me he gave the two bell signals to inform the driver that the train was ready to depart, but the

driver did not acknowledge nor react to them. This resulted in one of the station staff going to the cab to alert the driver, after which a further bell signal was given by the guard, acknowledged by the driver, and the train departed. The guard confirmed that at all station stops between Birmingham and Stoke on Trent the train stopped correctly at each station platform.

56 Upon arrival in the Down Platform at Stoke on Trent Mr Ahmed was in his van assisting in the unloading of mail when Driver Sutton left the north end cab of the EMU and walked along the side of the train to the cab which would be the leading end for the return journey. As the driver passed the guard's van, Mr Ahmed greeted him and asked what the arrangements were for the return journey to which Driver Sutton replied that they were returning direct to Soho Depot and, after a short conversation, the driver went on to his driving cab. Mr Ahmed did not notice anything unusual about Driver Sutton during their brief conversation.

57 Later, while the EMU, now operating as 5G15, was standing in the Down Platform at Stoke on Trent, 1V27 arrived in the Up Platform, and shortly afterwards departed along the Up line towards Stafford. About two minutes later the 5G15 left and followed 1V27 onto the Up Line. The guard said that, in anticipation of the propelling moves at Soho Depot, he travelled in the rear cab for this journey, but with all lights out so he could not see any of the instruments in the cab.

58 5G15 then had a clear non-stop run until it approached Stafford where the guard noted that it stopped for about two minutes at 139 signal on the Up Fast before restarting, and proceeded at, he judged, about 20 to 25 mile/h. In the journey between 139 signal and the station the guard did not notice either acceleration or deceleration and formed the impression that the train was running on clear signals. He told me that he had not looked out of his cab since leaving Stoke on Trent and hence did not know what aspect 139 was showing.

59 When his train ran into the rear of 1V27, Mr Ahmed was thrown from his seat, he got up and looked out of the window where he saw that the train had been in collision with another train in Stafford. He went to the front of the train to find out what had happened to his driver but could not locate him. He then returned to the rear cab to get a lamp and to contact the signalman at Stafford No 5 Signal Box. The guard told me that the signalman instructed him to protect his train using fog signals but one of the station staff offered to do this while he went forward again with his hand lamp to try to find his driver. He entered the front car of the EMU but had not found Mr Sutton at the time the members of the emergency services arrived, one of whom borrowed his hand lamp to continue the search while Mr Ahmed returned to the platform.

60 *Mr N Roden*, a Chargeman on Stafford Station on the evening of the 3 August 1990, said that Mr Sutton's train, 2K15, on its north bound trip to Stoke-on-Trent arrived at Stafford at about 23.10 but was delayed for over 10 minutes awaiting passenger connections from another train. He told me that when the connections had been made he signified to Stafford No 5 Signal Box that the train was ready to start. When the platform starting signal changed to a proceed aspect the guard gave the 'ready to start' bell signals to the driver but the driver did not react so Mr Roden walked to the front of the train. Mr Roden said he found the driver in a relaxed state with his feet up on the control desk of the cab; he called to the driver that the train was ready to depart and had to resort to a second call before the driver assumed a driving position. The chargeman called to the guard to repeat the 'right away' signal which was done and 2K15 departed.

61 About one hour later, 1V27 arrived in Platform 4, a station stop which is usually of about one minute duration, but on the night in question after coming to a stand the buffet car steward got off the train and explained to the station staff and his conductor that he was having trouble with some unruly youths.

62 Mr Roden together with his station supervisor went onto the train to resolve the problem and having done so, amicably, the chargeman preceded his supervisor from the train. As he was dismounting from the coach he looked along the platform to see an EMU coming into Platform 4 behind 1V27, a situation which, Mr Roden said, was not uncommon. However, this EMU struck 1V27, which was pushed forward violently. The station supervisor was knocked to the ground and dragged about three metres by the train from which he was dismounting at the moment of impact.

63 The station chargeman did not hear any sound from the EMU which suggested that the brakes were being applied but he did note that the indicator lights on the front of the train were alight and that the cab lights were off.

64 Immediately following the collision Mr Roden assisted his station supervisor to extricate himself from the coach which had dragged him along and then occupied himself with giving assistance and comfort to passengers who had been shocked or injured in the collision.

65 *Mr R Davies* was the duty Station Supervisor at Stafford on the night of the 3/4 August. He was aware of the decision to hold 2K15 at Stafford to await connections, which had been taken by the supervisor he had relieved, but while 2K15 was at Stafford going north Mr Davies was working in his office on Platform 1. Mr Davies told me that when 1V27 was in the station at about 00.30 he was on Platform 4, and when he saw

that the starting signal was clear, he signalled to the conductor of 1V27 that it was clear for the train to depart, but the conductor gave a red hand signal signifying that there was something amiss. The station supervisor went to the conductor, who was with the buffet bar steward, and learnt of the trouble with some passengers. He went onto the train with his platform chargeman and resolved the problem but as he was about to step from the coach the collision occurred and Mr Davies was thrown onto the platform, caught by the open door, and dragged along the platform when 1V27 lurched forward.

66 He told me that when he realised what had happened his first action was to call the emergency services, he then contacted the Electrical Control Room to be told they were already aware of the accident. The station supervisor then said that he attempted to contact the driver of 5G15 by calling into the wrecked cab of the EMU without success, before going on to give assistance to the injured.

#### **Events immediately following the accident**

67 *Mrs Janet Booth*, a passenger on train 1V27, joined the train at Stockport en route to her holiday, accompanied by her husband, son and two daughters and her guide dog. She was riding in the last but one coach, an open saloon type coach with tables, sitting towards the rear of the coach, with her back to the locomotive. Mrs Booth told me that the train was very late arriving at Stockport but once it arrived there was an uneventful journey up to the time of the accident. She described how the train had come to a stand at a station, being totally blind she could not tell at the time which station, but subsequently found out that it was Stafford and that the time it arrived was noted in her elder daughter's notebook as 12.28. The train had stood for some minutes when there was a tremendous bang and an impact, the shock of which threw her under the table which collapsed on top of her. She understood that the brackets from most of the tables in her part of the coach collapsed due to the force of the impact.

68 Mrs Booth said that passengers came to give assistance quickly, as did the railway staff, and she particularly complimented the efficient and sensitive way the emergency services dealt with injured passengers.

69 *Mr D Mills*, a Relief Traffic Manager, was at home but on call, available to take charge of the railway operations for serious incidents and to act as a liaison with the emergency services. He was informed of the accident by telephone at 00.32 and he arrived at Stafford Station at 00.48 where he was met by Station Supervisor Davies who appraised him of the situation. He told me he checked that the site of the accident was protected from railway movements and that there was no danger to passengers, staff, or members of the emergency services from the 25 kV traction system. He also told

me that the emergency services were there when he arrived on the site. In response to a request from the fire service, Mr Mills said that he arranged for the Penzance train to be moved forward some six metres away from the wrecked front of the 5G15 to facilitate the rescue of the driver of the EMU. He told me that he did not consider the damage to the front of the empty stock train was significantly effected by the actions taken by the fire service in recovering Driver Sutton.

### **Actions of emergency services**

70 I did not take evidence from members of the emergency services at my inquiry, but from British Railways logs of events and evidence of witnesses it was apparent that the three services were most expeditious and efficient in carrying out their duties on the morning of 4 August 1990. I was told that the fire brigade were called at 00.31 by Station Supervisor Davies and that they arrived on site with four appliances at 00.40.

71 The Area Operations Control called for the ambulance services at 00.34 and six vehicles arrived at the site of the accident, the first at 00.40, to take the 33 passengers and three members of British Railways staff to Stafford and District General Hospital where their minor injuries were treated.

72 The British Transport Police were advised of the accident at 00.38 at which time they requested assistance from the local constabulary and there was a police presence on the site from 00.40 until 15.00 hours.

### **Driver Sutton's pattern of work**

73 *Mr D Corbett*, a Relief Train Crew Supervisor, was on duty at Birmingham New Street Station on the morning of the 3 August when Driver Sutton booked off duty from his last completed shift. Mr Corbett told me that each night of the week before 4 August Driver Sutton was rostered to carry out a number of driving duties identified as "130 diagram", which contained the following programme of work:

Book on duty Birmingham New Street	21.42
Relieve Diagram 125 Driver at New Street Station Platform	21.57
Drive 2K15 stopping EMU to Stoke-on-Trent	22.04
Arrive Stoke-on-Trent	23.26
Drive 5G15 empty stock Stoke-on-Trent to Soho Depot	23.26
Arrive Soho Depot	01.25
Carry out depot duties (to supervisor's instructions)	

Take personal needs break

Drive 5K61 empty stock to Birmingham New Street 05.18

Arrive Birmingham New Street 05.28

Book off duty 05.28

I was told that, on the morning of the 3 August, after completing this "diagram" Driver Sutton was asked to carry out additional driving duties which resulted in him continuing at work until he booked off duty at 08.42. Mr Corbett confirmed that Mr Sutton appeared to be in a good state of health and well being when he booked off duty on the Friday morning.

74 I was supplied with a copy of a statement made by *Mr E Baxter*, the Train Crew Supervisor who was on duty on the Friday evening when driver Sutton booked on duty. Mr Baxter confirmed that the driver was his normal self when he took up his duties, he did not appear fatigued nor did anything appear to be amiss.

75 *Mr A Peel*, an Area Train Crew Manager at Birmingham New Street Station, giving evidence at the coroner's inquest into the death of Driver Sutton, spoke of the driver's movements prior to him taking up his duties on Friday, 3 August. Mr Peel told the coroner that on the afternoon of that Friday, he had attended a promotion party, arriving at the party at about 16.45. Mr Sutton was already at the party when he arrived and Mr Peel had a conversation early in the evening with Mr Sutton who was, at the time, drinking what Mr Peel believed to be shandy.

76 Mr Peel said that just before he left the party at about 20.00 hours Driver Sutton approached him saying he wished to report sick and to miss his turn of duty that night. Mr Peel asked the driver if he felt all right and was told that the reason for the request was that he had missed his train home to Lichfield and that he had neither his uniform nor his food for the night shift. Mr Peel went on to tell the coroner that in view of the nature of Driver Sutton's work that night he did not consider a uniform necessary and that he had told the driver this. The area train crew manager confirmed that throughout his exchanges with the driver, the driver appeared rational and acted in a normal manner.

77 *Mr H Platt*, the Assistant Area Train Crew Manager, told me that since Driver Sutton had moved to Birmingham from the Southern Region of British Railways, he had qualified to drive over various routes in the Midlands, which included the section of line from Birmingham to Stoke on Trent, and to drive a number of types of traction, which included the Class 310 electric multiple unit. He went on to tell me that the "diagrams" Mr Sutton worked would require frequent journeys through the Stafford Station area. Mr Platt told me that

the driver's performance was monitored on the 12 December 1988 and the 21 April 1990 by a traction inspector and found to be satisfactory.

78 I was told that overtime was commonplace amongst drivers at Birmingham New Street and that to run the scheduled train service with the staff available overtime was a necessity, although Mr Platt stressed that all overtime was on a voluntary basis and that the maximum allowable shift was 12 hours with a minimum of 12 hours between finishing one shift and starting the following. Mr Platt also told me that a driver's rostered (planned) duties were to work 312 hours in an eight week period, in shifts varying from 7 hours to 8 hours 59 minutes, interspersed with rest days. He said that in the five shifts up to the night of the accident Driver Sutton had worked: 8 hours, 11 hours 55 minutes, 12 hours, 11 hours and 11 hours and that these were the typical hours for a driver at Birmingham New Street. In addition, Mr Platt revealed that before the accident Driver Sutton had worked 25 consecutive shifts without a day off and that there was then no limit to the number of consecutive shifts a driver was allowed to work.

79 The train crew manager also told me that the additional journeys done by Driver Sutton at the end of the previous shift were to drive a multiple unit from Birmingham New Street to Walsall, return to Birmingham New Street and go on to Coventry with the return journey to Birmingham New Street, to complete his duty at 08.42.

### Technical investigation

80 Mr P Hodgson, a Rolling Stock Structural Engineer, employed by British Railways, in the Railway Technical Centre, Derby, presented to me the findings of a report produced by one of his colleagues, a Mr J Gray, who was not available at the time of my inquiry. Mr Gray had visited the site of the accident on the morning of the 4 August 1990 when he evaluated the damage to the rolling stock including the nature of the structural failures and hence had formed an assessment of the impact speed. Mr Hodgson told me that in carrying out his calculations, Mr Gray had taken into account resistance to movement of the stationary train against the brakes which were applied, the distance travelled by the two trains after the impact and the damage to the rolling stock of both the trains. He concluded that the speed of impact was between 16 and 21 mile/h, with a probability that the actual speed was at the higher end of this range.

81 Mr Hodgson postulated that the method of damage to the rear coach of 1V27 was that the underframe of the front car of the empty stock train had buckled under the force of the impact, which had forced the top of the cab of the EMU forward. This had damaged the vestibule plate of the rear coach of 1V27, causing the cantrail to fail resulting in the form of damage shown in Figure 3.

82 Mr Hodgson also told me that at the time the Class 310 units were designed in the late 1950s, the designed collision load for multiple unit vehicles was specified as the ability to withstand 150 tonnes force without permanent deformation, applied at underframe level, that is to the buffers and the couplers. Later this specification had been augmented to require that at 350 mm above the coupling or buffing level the cab of an EMU must be capable of withstanding a longitudinal compression force across the face of the cab of 40 tonnes and that above that level and up to the lower window sill level the unit must be capable of withstanding a force of 30 tonnes applied uniformly across the face of the cab.

83 Mr G Leach, the Acting Fleet EMU Engineer for Provincial Services, described some technical details of the Class 310 EMU. He told me there were two braking control systems on the units, the basic fail-safe two-pipe system with a main reservoir pipe and a brake pipe which, when the brake pipe pressure is reduced, causes the air from the reservoir on each vehicle to go into the brake cylinders and hence apply the disc brakes. He also explained that the passenger emergency device, the driver's safety device and the brake application from the automatic warning system or a train division or severe damage, all cause the brake pipe to vent to give air brake applications. The other system controls the brake cylinder pressures via electrically-operated valves which results in a faster and simultaneous brake application and release throughout all vehicles of the train; this system is not fail safe but it is the normal service braking system.

84 Mr Leach told me that he arrived on site at 06.00 hours on the morning of the 4 August 1990, and examined the control equipment of the EMU. He told me he found the main controller to be in a position between "notches" 3 and 4; notch 4 being the maximum accelerating position and notch 3 being a lower acceleration, lower speed position, but Mr Leach admitted that, due to the extensive damage to the cab, he did not consider that the position of the controller when he examined the cab was necessarily its position immediately before the accident. An examination of the control equipment in the motor brake vehicle (the second vehicle in the train) revealed that the components were in the position to which they would normally revert when Driver Roberts operated the "lower pantograph" control, so Mr Leach could not confirm, whether or not the unit was under power at the time of the accident. Mr Leach also carried out some site tests of the automatic warning system which, combined with subsequent tests carried out in the Technical Investigation Centre at Crewe, confirmed there were no faults in this system. Similarly the speedometer for the unit was removed to be tested at the Bletchley Depot, where no faults were found.

85 Mr Leach also presented the fault history of the unit since its last major examination on 6 June 1990.



The only significant item was that the wheel slide prevention equipment had been disconnected on the rear vehicle: the battery driving trailer. It had been disconnected on the 31 July because it was misoperating by continuously releasing the brakes on this vehicle. He confirmed that by disconnecting this device the brakes would always operate normally, and would not release should the wheel stop rotating.

86 *Mr D Nicholas*, Braking Engineer, at British Railways Headquarters, arrived at Stafford at 05.00 on the morning of the accident, having been called out. He told me that his site investigations showed that all the brake system isolating cocks were in the correct position for a four-car EMU in service, although he could not locate the cock which isolated the driver's safety device and he could not state whether this device had been isolated. He did note that the wheel slide prevention on the battery driving trailer on all four wheel sets was disconnected but confirmed that this would not impair the braking performance. He noted that the disc brake pads were in an acceptable condition and the brake cylinders and calliper assemblies all appeared to be in good order. Mr Nicholas told me that he had tested the unit's brake systems as far as practicable by isolating the controls for the damaged leading cab and testing the braking of the train from the undamaged rear cab, and he confirmed that the braking system was fully operational. He told me that later the driver's brake valve and brake control unit were removed from the damaged vehicle and substituted on another vehicle where they were found to function correctly.

87 *Mr Nicholas* also explained that the driver's safety device (DSD) is so arranged that when the master controller is in the forward or reverse position the power controller handle must be kept depressed; if it is released an emergency application of the automatic air brake is made. A pilot valve associated with the driver's safety device was also tested and found to be fully operational and sound. He was satisfied, overall, that the brakes of the EMU were in a safe operational condition before the accident. Mr Nicholas concluded his evidence by telling me that he had examined the rails of the track in the vicinity of the EMU and had formed the view that there was no evidence of wheels skidding immediately prior to the collision.

#### **Examination of the tail lamp of train 1V27**

88 *Mr Shaugnessy*, the signalman at Stafford No 5 Signal Box had confirmed that the flashing tail lamp on train 1V27 was operating immediately prior to the accident. Nonetheless, this tail lamp, No 029791, was sent to the British Railways Regional Scientist at Crewe for thorough technical examination. A copy of his report was made available to my enquiry. In summary, it confirmed that, although both the casing of the lamp and the batteries had been damaged in the accident, the

lamp was in a fully operational condition and there was no evidence of any defect existing prior to the accident.

#### **Signalling system**

89 *Mr J Baker*, the Regional Signal Engineer, described the basic operating principles of the interlocking circuitry in the Stafford signal boxes elaborating on the descriptions set out elsewhere in this report. He told me that although the signalman may attempt to reverse a signal lever to clear a signal to a proceed aspect, the lever would be locked and the signal would not clear until a number of electrical checks had been carried out. These checks would include, amongst others, that the point blades in the desired route lay correctly, fitted and were locked, and that the track sections were unoccupied by trains, with the exception of the platform lines in the case of a permissive move. Mr Baker told me that for those signals protecting the entry into Stafford Station from the north (SD5 139 etc), one of the additional interlocking controls is to ensure that the signalman at Stafford No 4 Signal Box had given a release for a train to proceed into the station. He explained that the difference between the two releases for trains 1V27 and 5G15 was due to the occupancy of the track in Platform 4. When the first release was given there was no train between signal SD5 139 and SD4 40 and the only release the signalman at Stafford 4 could give was for a main aspect by lever 39. When asked for a release for the second train, 5G15, 1V27 was standing in Platform 4 occupying the track circuit and, as a result, the only release the signalman at Stafford 4 could give was for a permissive movement using lever 38. Mr Baker also told me that at signal SD5 139 the route indication signifying a move to Platform 4 must light first before the signal will change from a stop aspect to a proceed aspect, either main or subsidiary, although he did stress that the period that the route indicator was alight before the proceed aspect was very short, of the order of one second.

90 *Mr B Long*, a Signalling Maintenance Engineer at Crewe, gave evidence relating to the initial testing of the signalling systems at Stafford No 5 Signal Box on the day of the accident. He told me that when he arrived at Stafford at approximately 03.20 there were members of the Signalling-Fault Team from Tamworth present, who had taken the initial precautions to protect traffic at Stafford by disconnecting the controls for the routes from the Up Fast into the Up Slow Platform and disconnecting the release controls at Stafford No 4 Signal Box. Mr Long confirmed that these "disconnections" were limited to the removal of tubular metal links in the control circuits and did not involve any interference with the circuit wiring.

91 The signalling maintenance engineer went on to describe the tests which he planned and managed to determine whether the signalling system was faulty. These tests were to check that:

- (a) the circuits were wired in accordance with the design diagrams;
- (b) the insulation properties of the cables and wires were sound;
- (c) the conductors in lineside cable routes from the Signal Box to the lineside apparatus case feeding 139 signal were as shown in the diagrams and were complete;
- (d) there were no earth faults on the signalling power supplies and circuits;
- (e) the train detection circuits were adjusted to specification such that they would not fail to detect a train; and
- (f) the various signal lamps on signal 139 were being fed with the correct voltages.

92 Mr Long reported that the investigations carried out under his control did not reveal any faults in the signalling system which would have caused a malfunction on the night of the accident. He added that the relays controlling the aspects of the relevant signals were sent to the British Railways Technical Investigation Centre, Crewe, for a detailed examination and that this examination did not reveal any significant faults in the relays.

93 Mr Long confirmed that there was a marked difference in the brilliance and in the colour of the signals which are being displayed to the driver of a train at SD5 139 signal when he receives a proceed subsidiary aspect to go into Platform 4 at Stafford. The five-lamp route indicator is a bright white signal and that the two-lamp subsidiary aspect was a rather dimmer light with a yellowish colour. I was told that route indicators of the type provided at signal 139 are for long distance viewing by high speed trains whereas the subsidiary signals are essentially for low-speed movements with short viewing distances.

94 *Mr A Pearson*, a Principal Technician Officer from the Signalling Technical Support Group at Nottingham, told me that he arrived at the site of the accident at 09.30 hours on the 4 August 1990 and that he led the team to carry out the tests specified by Mr Long. Mr Pearson gave me detailed evidence on the tests which were carried out, telling me that the interlocking was tested from first principles with a second person cross-checking that the tables of controls provided for Stafford Nos 4 and 5 Signal Boxes were complete. Mr Pearson told me that he and his team had also ensured that the sequences of aspects between signals were correct by physically tracing the wiring in the lineside apparatus cases. Mr Pearson reiterated the assertion of Mr Long that none of the tests revealed any fault in the signalling system which could have resulted

in a driver being presented with erroneous signal indications.

#### **Evidence given at the inquest**

95 Other than the evidence given by Mr Peel referred to in paragraph 75, the evidence given to the coroner's inquest on 25 March 1991 relating to the events of 4 August 1990 did not differ from the evidence given to my inquiry. Additional evidence was given by the Home Office pathologist Mr T A French, who gave the cause of Mr Sutton's death as multiple injuries. Mr French also read the report of Miss J M Gulliver, a Higher Scientific Officer at the Forensic Science Laboratory, Birmingham, who carried out forensic tests on the blood and urine samples taken from Driver Sutton at the time of Mr French's post-mortem.

96 Miss Gulliver reported that the forensic analysis revealed between 155 and 161 milligrams of alcohol per 100 millilitres of blood and 181 milligrams of alcohol per 100 millilitres of urine. It was further stated that the levels were consistent with the ingestion of a significant quantity of alcohol several hours before the accident and that Driver Sutton was still absorbing alcohol into his blood stream at the time of his death.

#### **RE-ENACTMENT OF TRAIN MOVEMENTS**

97 Arrangements were made by British Railways to demonstrate to me the operations which preceded the accident. This was done on the night of 5 September 1990 using the actual empty stock movement, train 5G15 from Stoke-on-Trent, in which I rode from Norton Bridge.

98 A train replicating 1V27 was positioned in Platform 4 at Stafford. Train 5G15 was brought to stand at signal SD5 139 showing a red aspect which then changed to a subsidiary aspect with a route indication for Platform 4. There was a marked disparity in the brilliance of the display given by the five-light route indicator and the two white lights of the subsidiary signal. The junction indicator showed bright white and the subsidiary signal showed a much less intense softer tone almost yellow light.

99 5G15 passed over the connections linking the Up Fast to the Up Slow and the flashing tail lamp of the train standing in Platform 4 came into view as 5G15 approached the bridge adjacent to Stafford No 5 Signal Box. When the train passed under this bridge, the light from the signal at the south end of Platform 4 (SD4 40) which had been cleared to green, was reflected along the side of the train representing 1V27, a reflection which was present throughout the rest of the movement until 5G15 drew to a stand some one metre behind the stationary train. The result was that, in addition to the general station platform lighting and the red flashing tail lamp, the driver of 5G15 could see a green light reflected by the side of the train he was approaching.

## DISCUSSION

100 I believe that the EMU No 310102 forming the empty stock train 5G15 was in acceptable operational condition and its condition did not contribute to the accident in any way.

101 The severe damage occurring to the leading cab of the EMU was to be expected considering the design parameters to which it was built, which have subsequently been enhanced for later designs of rolling stock. I do not believe it is reasonably practicable to enhance retrospectively the crashworthiness of stock such as the Class 310.

102 I am satisfied that the signalling equipment was operating as designed, and do not doubt that signal SD5 139 correctly displayed its subsidiary aspects to Driver Sutton on train 5G15.

103 As to the operation of the signalling, the evidence given by the signalmen revealed that the use of 'call on' signals as close-up signals to assist in train regulation in the area was common and was not precluded by the *British Railways Rule Book* nor by signalling regulations, nor by the signal box regulations applied to Stafford No 4 or No 5 Signal Boxes. The point was made however that the regulations forbid the use of the permissive control for freight trains. Thus a facility essentially provided to enable a signalman to signal a second train into a platform for joining a train already there or to give maximum platform use was also being used as a closing-up signal for regulating purposes.

104 It was also unfortunate that, solely because its overlap was fouled by the route set for 1V27 from Platform 4, train 5G15 could not be signalled into the empty Platform 6. Instead it was signalled into an occupied line with the attendant risks of end-on collision.

105 In view of the common practice at Stafford, I do not criticise the signalman at Stafford No 5 Signal Box for signalling 5G15 into the occupied Platform 4, nor do I criticise the way he alerted the Signalman at Stafford No 4 Signal Box of the impending collision by telephone instead of using the emergency plungers which were not immediately to hand, but would remark that the wisdom of placing emergency controls at the extremities of the signalman's working area instead of close to the hub of his work is questionable.

106 I have some criticisms of the signalmen's actions after the event since, although in practice appropriate steps were taken to deal with the emergency, the train registers from neither of the two signal boxes involved in this accident provided a record of the safety messages and events immediately following the accident nor the events relating to setting the railway to right later.

107 Although, as referred to later, Driver Sutton was probably less than *fully vigilant*, the visual signals he was presented with were not beyond criticism and I shall refer to them again in my recommendations. Firstly, at signal SD5 139 the brilliance of the five-light route indicator tended to over-power the subsidiary signal lights, although it must not be forgotten that the red main aspect remained on display. Secondly, since 1V27 had already been signalled to depart as 5G15 approached, Driver Sutton would have seen the green light of signal SD4 40 reflected along the side of the stationary train, although its flashing red tail lamp was nearer to him.

108 Sir Anthony Hidden's report on his inquiry into the accident which occurred at Clapham Junction on 12 December 1988 was published in October 1989, some 10 months prior to the accident at Stafford. During his inquiry, Sir Anthony expressed concern about safety critical staff working long hours or working for extended numbers of shifts without a day off. The report of that inquiry contains a number of recommendations, of which No 18 is:

"BR shall ensure that overtime is monitored so that no individual is working excessive levels of overtime".

In view of this recommendation, it is both surprising and disappointing that Driver Sutton was on his 26th consecutive turn of duty on the 4 August 1990, without having taken a day off work, and the turns of duty in the week leading up to the night of the accident were largely of 11 to 12-hour duration. Although at the time of this accident upper limits of hours had not been prescribed by the British Railways Board, I believe the duties Driver Sutton had undertaken before the accident fell outside the spirit and intention of Hidden's recommendation No 18. I was told at my inquiry that, even after the incident at Stafford, a system of limiting consecutive turns of duty was not in place at Birmingham, although one was planned.

109 Doubts must be raised over the judgement exercised by some managers of British Railways on the day that preceded the accident. Mr Peel was aware that Driver Sutton was at a presentation party before 16.45 until at least 20.00 hours when Mr Peel left the party. While Mr Peel was at the party, he saw the driver drinking what he "believed to be shandy". For Mr Sutton to have been at the party when the manager arrived at 16.45, his period of rest following the 08.42 completion of his shift on the morning of 3 August 1990, must have been markedly curtailed. The manager's reaction to the suggestion made by Driver Sutton that he "book off sick" was lacking in commitment to establish whether the driver was in a fit state to drive a train.

110 With the benefit of hindsight it is known that the driver may not have been in a fit state to drive a train

when he attended the booking-on point at Birmingham New Street Station, but the environment of the booking-on point and the way the booking-on task is carried out would, I believe, make it very difficult for the train crew supervisor to determine the fitness or otherwise, of a driver when he arrived to start work. Nor do I believe that the station chargeman at Stafford would have any reason to believe there was anything seriously amiss when he went to the front of the train to alert Driver Sutton on his journey to Stoke-on-Trent following a ten-minute station stop.

## CONCLUSION

111 There is evidence that Driver Sutton drove his train correctly from Birmingham New Street to Stoke-on-Trent in the outward journey and that he stopped his train at Stafford No 5 signal 139 before moving off under the authority of a subsidiary signal to approach the occupied Platform 4 in Stafford Station.

112 There is also evidence that the flashing red tail lamp mounted on the rear coach of the stationary train was visible at ample distance for the EMU to have stopped short of it. But as the EMU passed Stafford No 5 Signal Box, where the green signal at the end of No 4 platform was reflected by the side of the stationary train, Driver Sutton's train was not slowing down and was probably under power.

113 I conclude that the collision was caused by the failure of Driver Sutton to control his train approaching Platform 4 at Stafford in a manner consistent with the fact that he had been given an indication at the last signal before Stafford Station that he was entering a line already occupied by another train. I am not in a position to establish by how much the driver's judgement had been affected by the alcohol he had consumed prior to starting duty, but the fact that his blood alcohol levels were such that he would have committed an offence had he been driving a road vehicle leaves little doubt that the driver's perception and judgement would have been impaired at the time of the accident.

114 I also conclude that the actions of the area train crew manager prior to the accident were flawed when not taking positive action to establish the fitness of the driver to start duty believing that the driver had been drinking alcohol and had made a request to be excused the duty.

## REMARKS AND RECOMMENDATIONS

115 Two particular issues which may have affected Driver Sutton's fitness to drive the train in which he died have received considerable attention since this accident. They are the matters of working of excessive hours or excessive consecutive turns of duty and impairment through alcohol consumption.

116 I reiterate the recommendation made in Sir Anthony Hidden's report on the Clapham accident that British Railways should ensure that overtime is monitored so that no individual is working excessive levels of overtime. The standards adopted by British Railways Board subsequent to this accident restrict the periods of work to 12 hours in any day, no more than 72 hours per week and not more than 13 consecutive turns of duty without a day off.

117 In developing standards to ensure safety on Britain's railways in the future, the Railway (Safety Critical Work) Regulations come into force on 5 April 1994. Among other issues, they require that railway operators ensure that safety critical staff (including drivers) do not work turns of duty likely to cause unreasonable fatigue.

118 Guidance on the regulations will be available early in 1994 while more specific strategies for compliance with them will, after consultation, be published by the Health and Safety Commission as an approved code of practice.

119 With regard to the consumption of alcohol by railway employees, it has long been prohibited by British Railways rules for employees to present themselves for duty in an impaired state or to consume alcohol while on duty. This policy and the internal means of regulating it was amplified by British Railways Board in January 1992 in Train Crew Instruction No 310 'Application of rules and regulation relating to drink and drugs'. Since then specific statutory standards for safety critical staff have been incorporated into criminal law through the coming into force on 7 December 1992 of Chapter 1 of Part II of the Transport and Works Act 1992. The levels of alcohol above which a criminal offence is committed by such staff are the same as those in road traffic legislation in the United Kingdom, but British Railways have maintained an internal policy of seeking 'no impairment' due to alcohol and has reinforced the advice to supervisors and managers in handling any suspicion they may have concerning an employee's fitness for duty.

120 Most of the steps which British Railways has put into place are thorough and creditable but, as at Birmingham New Street before this accident, and as illustrated by other accidents, the failure to detect an employee's impairment of faculties at the time of booking on duty may be a weakness in the system. I *recommend* that consideration be given by British Railways as to whether any further steps are practicable to assess staff's fitness for duty at the booking-on point.

121 I must reiterate my concern at the liberal way in which permissive working was being used at Stafford. The signalling system is designed normally to allow only one train in one section of line at a time but, as at Stafford, a facility is often provided at stations to allow

two, or possibly more, trains into one platform at a time. Sometimes this procedure is necessary, such as to couple two trains together or to move a locomotive onto its train. Sometimes it is advantageous to make maximum use of the platform capacity by allowing two short trains into one long platform. At other times it may simply be convenient, as in the case of the train movements at the time of the accident, to enable one train to clear a particular line to avoid delay to another. This last use of permissive working must be called into question, as to whether the advantages gained outweigh the additional risk of allowing trains to be driven on a *line-of-sight* basis instead of fully under the control of fixed signals. I *recommend* that all permissive movements be subject to rigorous scrutiny and normally prohibited where they are not operationally necessary. Any proposal to continue the practice outside this standard must be justified as a special case supported by *risk assessment techniques*.

122 I further *recommend* that a train standing in a through platform is not signalled to move before any

second train has come to stand behind it. This would avoid the driver of a second train approaching a signal with a proceed aspect which does not apply to him. This would also overcome the dangers from a second train following too closely behind a train which is departing which was not a factor in this accident, but which has been in others.

123 I *recommend* that the intensity of signal aspects showing together should be uniform so far as is reasonably practicable. While a route indicator may need to be high intensity if it is to be seen at a distance, where the same route indicator is to be shown in association with a subsidiary signal, the significance of the signal governing the limited extent of the movement should not be overpowered by the route indication showing its direction.

124 I *recommend* that a standard be established on the method of recording events which form elements of the reaction on the part of any railway staff to accidents or incidents.

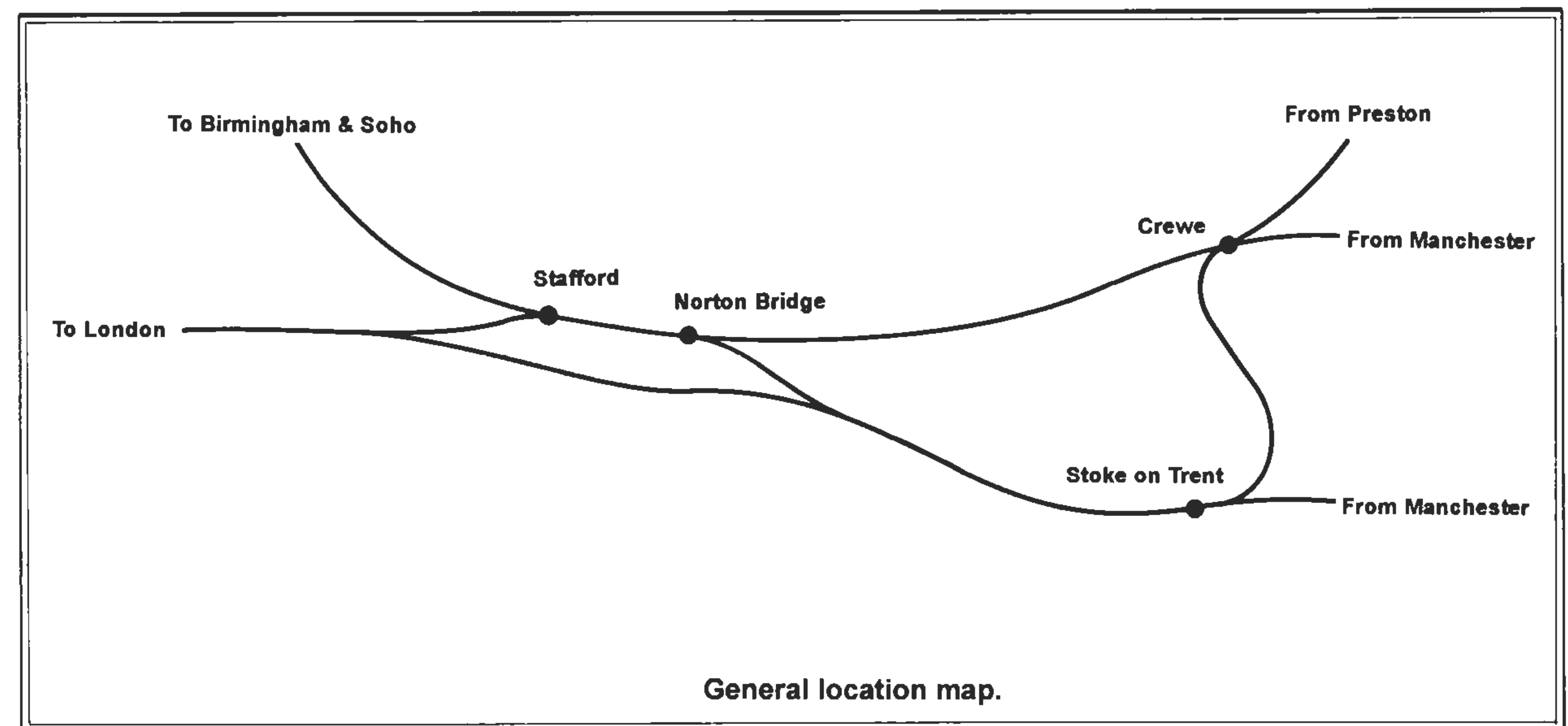
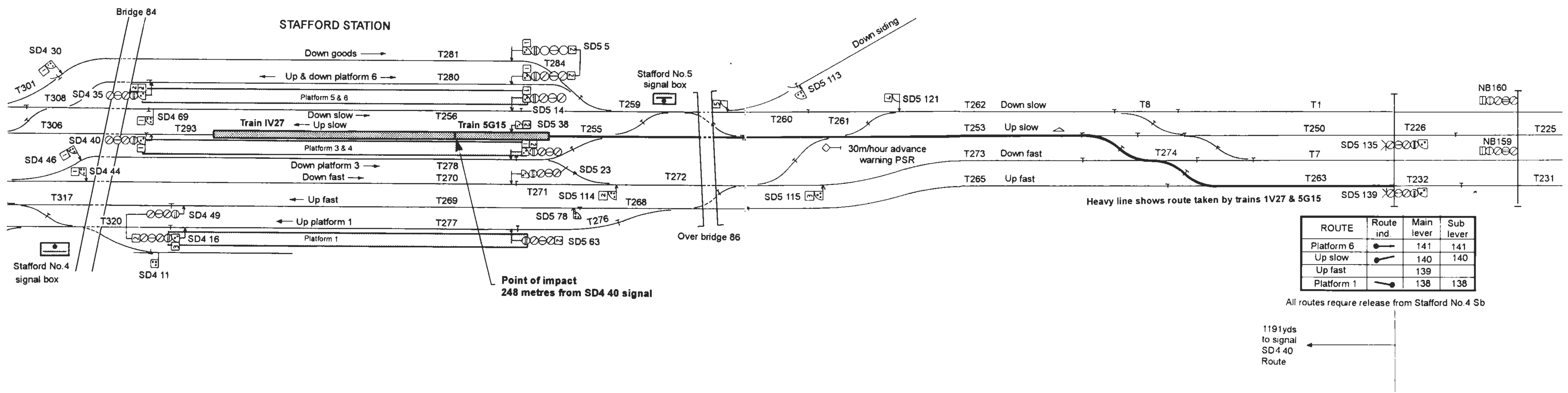


Figure 1 Layout of routes in Stafford area



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