Consultation on 'Level crossings: A guide for managers, designers and operators'

Passenger Focus comments

Introduction

Why is managing level crossing risk important?

Level crossings' misuse is the single largest cause of fatalities related to railway operations in Britain. We believe that the safe design, management and operation of level crossings can reduce the risks, have a positive effect on user behaviour and so reduce the number of fatal and serious incidents.

What is ORR's policy on level crossings?

As the safety regulator for Britain's railways, our role is to provide clear advice and enforce relevant legislation – including that which relates to level crossings. We also exercise the powers of the Secretary of State in making level crossing Orders under the Level Crossings Act 1983. The Agency Agreement made between the Secretary of State for Transport and the Office of Rail Regulation relates to functions which ORR has agreed to perform on behalf of the Secretary of State. The Agreement is on ORR's website at http://www.railreg.gov.uk/upload/pdf/mou_ORR_DfT.pdf

We believe that it is not effective or efficient for only rail companies to be responsible for managing safety at level crossings. Decisions about level crossings should involve rail companies, highway authorities and other relevant organisations as early on as possible. Relevant authorities should recognise the wider benefits that safety improvements at level crossings (for example, replacing them with bridges) can bring about, particularly for road users. If wider benefits can be achieved, the appropriate funding bodies should agree on how the costs of making safety improvements will be met.

We are also committed to helping make level crossing users more aware of what affects safety at crossings and information is available on our website.

Why have we produced this guidance?

We want our advice on level crossing safety to be accessible to everyone who has a role to play in making level crossings safer and more efficient.

We also needed to bring our technical guidance for designers and operators of level crossings up to date, and in particular to align it with developments in industry standards and recommendations from the Rail Accident ~~&~~ Investigation Branch (RAIB).

the level crossing Order process can be found later in this guidance document.

• Transport and Works Act 1992 *[or its Scottish equivalent?]* , enables the Secretary of State for Transport to make Orders that authorise the construction of a railway, including allowing it to cross the highway by means of a level crossing.

• Level Crossings Regulations 1997, make it an offence for a crossing operator to fail to comply with a level crossing Order.

• Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS), require all infrastructure managers to have a safety management system that enables them to control risk – including risk arising from level crossings. ORR's published guidance on ROGS is at www.rail-reg.gov.uk/upload/pdf/rogs-gdnce_270709.pdf.

Industry standards

The railway industry has developed standards that prescribe in detail how level crossings are designed, constructed and operated on the mainline railway. These standards are managed by the Railway Safety and Standards Board (RSSB) but responsibility for their ongoing development and maintenance will soon pass to Network Rail (as the principle *[should be principal]* duty holder in relation to level crossings).

The current Railway Group Standard relating to level crossings (GI/RT7012 Requirements for level crossings) can be found at www.rgsonline.co.uk/Railway_Group_Standards/Control%20Command%20and%20Signalling/Railway%20Group%20Standards/GIRT7012%20Iss%201.pdf.

Highways and planning law

A process for involving affected local authorities in level crossing protection arrangements is in place.

The modifications to the Level Crossings Act 1983, introduced by the Road Safety Act 2006 *[do these also apply in Scotland?]* , formalised existing good practice in securing consultation on changes to level crossings in advance of formal circulation of a draft level crossing Order. The changes also permit the Order to require both the operator of the crossing and the local traffic authority to provide and maintain any protective equipment (including barriers and traffic signs) specified in the Order.

types have been developed over the years. The detailed protection arrangements for each of these 'standard' types are described later.

7. The guidance applies when the protection arrangements at existing crossings change or, in exceptional circumstances, to new crossings. Arrangements at a level crossing on a road to which the public has access may be subject to an Order, made by the Secretary of State, to provide for the protection of those using the crossing. Level Crossing Orders, made under the Level Crossings Act 1983, usually specify the protection arrangements at public vehicular crossings.

Effects on existing level crossings

8. This guidance sets out examples of good practice appropriate for today's world. It is relevant to existing crossings where protection arrangements require improvement. Factors affecting the continued suitability of arrangements might include increased traffic levels and speeds (road and rail), new road lay-outs, and any history of misuse or near-misses *[avoid this term as it is inaccurate – they are actually near-hits]*. Where protection arrangements are specified in a Level Crossing Order, the crossing operator is required to ensure that the Order is complied with. In addition to this, however, crossing operators have general duties under the Health and Safety at Work etc. Act 1974 to ensure, so far as is reasonably practicable, the safety of all those using a level crossing. In effect, this means that crossing operators need to monitor regularly the suitability of arrangements and make changes when necessary. Where the crossing is subject to a Level Crossing Order, such changes should prompt the crossing operator to request a new or amended Order to reflect these changes. The Level Crossing Order making process is described in detail later on.

Operating conditions

9. The choice and design of the level crossings will depend not only on the guidance expressed in this document but also on the operational requirements of the railway.

10. An assessment of the continued suitability of the type of crossing at the location concerned should be made at appropriate intervals and when:

(a) circumstances at the crossing are to change (eg rolling stock, signalling, electrification, speed, etc); or

(b) circumstances at the crossing are found to have altered (eg housing or industrial developments, etc)
to ensure that the level of protection afforded by the crossing is adequate and appropriate.

11. In assessing the suitability of any proposed safety measures or arrangements, it is important to take into account:
(a) normal railway operating conditions;
(b) degraded conditions where any component or part of the railway system has failed;
(c) foreseeable abnormal conditions to which the system may be subjected;
(d) road usage, including consideration of altered or increased usage due to Incident *[what does this mean in this context?]* or regular occurrences and events;
(e) emergency situations.

Design and building

12. The guidance applies to the finished level crossing but not to the processes of designing or building. Designers and builders need to be aware of their responsibilities under the Construction (Design and Management) Regulations 2007.

Other regulations and standards

13. Works, plant or equipment at level crossings may be subject to other specific regulations, for example, the Electricity at Work Regulations 1989. In implementing this guidance, compliance with these regulations must be considered. Specific reference is made to the more significant regulations.

14. Similarly, any material or article used in the provision of the works, plant or equipment may need to comply with a specific standard. The guidance in this document does not make reference to these numerous standards, however, an indication is provided where standards may be appropriate.

Note: Any reference in this guidance to any material or article complying with a specific standard should be satisfied by compliance with any relevant standard recognised in any member state of the European Communities *[now Union?]*, providing that

Assessment of suitability

20. The suitability of the types of protection for level crossings depends on various factors, one of which may be traffic volume. Table 1 gives guidance on the factors to be considered for any given location. The choice of level crossings should avoid causing unnecessary delay to road users. The protection provided at a level crossing should be the outcome of detailed and very careful risk assessment.

Table 1

Section Type of crossing Conditions for suitability

4 Gated crossings operated by railway staff

The traffic moment and actual daily road vehicle user [should be users or usage?]should be low.

Railway signals interlocked with the gates are required so that it is not possible to clear signals unless the road is fully closed by the gates, nor it is possible to open the road unless the signals are at Stop.

5 Barrier crossings operated by railway staff

Generally suitable for any situation.

Railway signals interlocked with the barriers are required so that it is not possible to clear the signals unless the road is fully closed by the barriers, nor is it possible to open the road unless the signals are at Stop.

5A Barrier crossings operated by *obstacle detector [s?]*

This type of crossing is protected by road traffic light signals and two lifting barriers on each side of the railway. An audible warning to pedestrians is also provided. The crossing is designed to operate automatically.

Railway signals, which provide full protection to the crossing, are required on both railway approaches. These signals must be interlocked with the lifting barriers so that it is not possible to clear the signals unless the road is fully closed by the barriers, nor should it be possible to raise the barriers unless the signals are set at danger and free of *approach locking*, or the train has passed the signal and traversed the crossings.

6 Automatic half barrier crossings (AHBC)

The speed of train over the crossing should not normally exceed 160 km/h.

There should not be more than two running lines.

Appropriate means to stop any train approaching the crossing in an emergency situation are required.

Trains should not normally arrive at the crossing in less than 27 seconds after the amber lights of the road traffic light signals first show. (See further guidance at paragraph 76.) At least 95% of trains should arrive within 75 seconds and 50% within 50 seconds.

The carriage *[should be carriageway?]* on the approaches to the crossing should be sufficiently wide to enable vehicles to pass safely.

Table 1

Section	Type of crossing	Conditions for suitability
		There is no limit to the amount of road traffic, but the road layout, profile and traffic conditions should be such that road vehicles are not likely to become grounded or block back obstructing the railway.
7	Automatic barrier crossings, locally monitored (ABCL)	The speed of the trains over the crossings should not exceed 90 km/h. There should not be more than two running lines. The carriageway on the approaches to the crossing should be sufficiently wide to enable vehicles to pass safely. There is no limit to the amount of road traffic, but the road layout, profile and traffic conditions should be such that road vehicles are not likely to ground or regularly to block back obstructing the railway.
8	Automatic open crossings, locally monitored (AOCL)	The speed of trains over the crossing should not exceed 90 km/h. Normally there should not be more than one running line. The limits on the road and rail traffic are defined in Appendix A. The carriageway on the approaches to the crossing should be sufficiently wide to enable vehicles to pass safely. The road layout, profile and traffic conditions should be such that road vehicles are not likely to ground or regularly to block back obstructing the railway.
9	Open crossings	The speed of trains over the crossing should not exceed 15 km/h. There should not be more that one line over the crossing. The maximum daily traffic moment not normally to exceed 2000 or the peak hour traffic moment 30 or the maximum actual daily road vehicle user 200. The 85%ile road speed at the crossing to be less than 35 mile/h (60 km/h). *[does this mean should or must?]* The road layout, profile and traffic conditions should be such that road vehicles are not likely to ground or regularly to block back obstructing the railway.
10	User-worked crossings (UWC) with gates or lifting barriers on private roads *[why only those on private roads?]*	The speed of the trains over the crossing should not exceed 160 km/h unless additional protection is provided. There are no limitations upon the frequency of rail traffic. These crossings should only be used on private roads. There should not normally be more than two lines over the crossing. Where no additional protection *[such as?]* is provided, the warning period *[provided by what?]* should be greater than the time required by likely users to traverse the crossing length by not less than 5 seconds *[what is the likely time required by a herd of animals?]*.

Table 1

Section	Type of crossing	Conditions for suitability
11	Footpath crossings and bridleway crossings	The speed of trains over the crossing should not exceed 160 km/h unless additional protection is provided. There are no limitations upon the frequency of rail traffic. There should not normally be more than two lines over the crossing. The warning time should be greater than the time required by users to traverse the crossing surface between the *decision points* at either end of a footpath crossing on foot, or on horseback *[no mention of cyclists? If they are expected to dismount, say so]* at a bridleway crossing, unless additional protection is provided. Where miniature stop lights are provided, the warning period should be greater, by not less than 5 seconds, than the time required by users to traverse the crossing surface between the decision points at either end of a footpath crossing on foot, or on horseback at a bridleway crossing.

3 General guidance

21. This section gives general guidance on the positioning of, and equipment that applies to, all types of crossings.

Positioning of signalling and other railway infrastructure relative to level crossings

22. A crossing and its associated signalling arrangements should ensure that, during normal working, no part of a stationary train should obstruct the crossing. Where a station is near to a level crossing, special arrangements may be necessary.

23. A risk assessment should determine the positioning of protecting signals, if provided, relative to a level crossing. The assessment should consider the likelihood and consequences of a train passing the signals without authority. If it is not reasonably practicable to optimise positions, appropriate measures should be taken to reduce the risk to an acceptable level.

24. Where a crossing goes over electrified lines, additional measures are needed to protect road users. See Section 18 for appropriate warning signs.

Equipment at level crossings

25. All equipment and circuits used for the operation of crossing equipment should be designed and documented to appropriate safety standards. All crossing equipment should be installed clear of the railway structure gauge and the edge of the carriageway.

26. All automatic crossings, including those provided with miniature stop lights, should be provided with an alternative power supply to allow the crossing equipment to function normally in the event of a main power supply failure until the main power supply is restored or alternative arrangements are put in place to ensure the safe operation of the crossing.

27. Where trains run after dark, illumination of the crossing may be provided to ensure *[not possible – substitute assist]* its safe operation. If the roads to a crossing are lit, the crossing
should be illuminated to at least the same standard. Any lighting should not cause glare to either road users or train drivers, interfere with the visibility of railway signals nor *[should be or]* cause avoidable annoyance to local householders.

28. At crossings which are locally monitored by the driver of the approaching train, additional lighting may be necessary to enable the train driver to see that the crossing is unobstructed from the point at which the driver may have to brake the train.

29. Any failure or damage to the equipment at a level crossing, which may lead to incorrect or unsafe operation, should be evident to the control point, the driver of an approaching train, or the user of the level crossing within a reasonable time of the event occurring.

4 Gated crossings operated by railway staff

(For user-worked gated crossings see Section 10)

General description

30. This type of crossing is protected by gates, on both sides of the railway, which complete the fencing of the railway when closed across the road or the railway. The crossing is manually operated by railway staff who close the gates alternately across the road and the railway.

31. The normal position of the gates, either across the road or railway, may be specified in the Railway Act authorising construction of the line. Changes

may be authorised by Direction under the Road and Rail Traffic Act 1933. Directions may be issued by ORR on behalf of the Secretary of State. Where the gates do not completely fence in the railway when open to road traffic, cattle-cum-trespass guards (described later in 'Additional measures to protect against trespass') may be required.

32. Road traffic light signals may be provided to assist with the safe operation of the gates. Where they are not provided, red lamps and red retroreflective targets mounted on the gates, which show towards approaching road traffic when the gates are across the road, should be provided.

Method of operation

33. The gates may be operated by either:

(a) competent railway staff, who are permanently stationed at a control point, sufficiently close to have a clear view to enable safe operation of the crossing; or

(b) one of the crew of an approaching train at a control point adjacent to the level crossing after the train has been stopped short of the crossing. *[Where the gates are normally across the road, why would train crew have to operate them?]*

34. The person operating the gates should have a good view of the whole crossing area and, unless road traffic light signals are provided, approaching road traffic.

35. Where road traffic light signals are provided, they should be illuminated before any attempt is made to close the gates to road traffic and should continue to show when the gates are across the railway.

36. Where the crossing is operated by railway staff, the person should have an appropriate indication of the approach of trains and clear instructions as to when the gates should be closed to road traffic.

37. Where the crossing is operated by a member of the train crew of an approaching train, the train is required to stop short of the crossing to allow the person to close the gates to road traffic. The train may then only proceed over the crossing when the train driver receives the authority from the person operating the gates. *[Why no mention of arrangement for opening gates after train has passed?]*

Note: Road traffic light signals may only be omitted where the barriers are normally in the lowered position and are clearly visible from an appropriate distance to approaching road traffic. As a guide, the number of road vehicles during the peak hour should not exceed 20 and the line speed of the railway should not exceed 160 km/h.

43. Telephones for use by the public are not normally provided. Telephones will be required at where barriers can be lowered automatically by an approaching train.

Method of operation

44. This type of crossing may be operated:

(a) by assigned railway staff who are permanently stationed at a control point adjacent to the crossing when the line is open to rail traffic;

(b) by assigned railway staff who are permanently stationed at a control point remote from the crossing, with the use of closed-circuit television (CCTV), whenever the line is open to rail traffic;

(c) automatically, by the approach of a train; and

(d) by a member of the crew of an approaching train at a control point adjacent to the crossing after the train has been stopped short of the crossing.

45. For all methods of operation the person operating the crossing equipment should have a clear and full view of the crossing, including the barriers, from the control point, either directly or via the closed-circuit television.

46. Where the barriers are normally in the raised position *[Are there any cases in which this does not apply?]*, the sequence of events to close the crossing to road traffic, once the lowering cycle has been initiated, either manually or automatically, should be as follows:

(a) the amber lights of the road traffic light signals immediately show and the audible warning begins. The amber lights should show for approximately 3 seconds (5 seconds for higher speed roads);

(b) immediately the amber lights are extinguished, the intermittent red lights should show;

(c) approximately 4 to 6 seconds later the barriers should start to descend. Where pairs of barriers are provided, the right-hand side barriers should not begin to descend until the left-hand side barriers are fully down. The time for each barrier to reach the lowered position should normally be 6 to 10 seconds. At skew crossings, where the crossing distance can be increased greatly, barrier timings may need to be lengthened accordingly. For the safety of road users, the closure sequence should be monitored, particularly if queuing vehicles or heavy usage by pedestrians is noted;
(d) the audible warning for pedestrians should stop when all the barriers are fully lowered;
(e) the intermittent red lights should continue to show; and
(f) the crossing should be viewed carefully to ensure that there are no persons or obstructions present, before 'crossing clear' is confirmed and railway signals cleared for the passage of trains.

47. The sequence of events to open the crossing to road traffic, once the raising cycle has been initiated either manually or automatically, should be as follows:
(a) all the barriers begin to rise simultaneously and should normally rise in 4 to 10 seconds; and
(b) the intermittent red lights should continue to show until the barriers have risen to at an angle of approximately 45º above the horizontal.

48. Where barriers lower automatically, the barriers should not lower unless at least one red light in all the red road traffic light signals facing in each direction is working. If closed-circuit television monitoring is provided, initiation of automatic lowering should switch on the CCTV monitor and give an audible indication at the control point.
Note: Where automatic lowering is used, two barriers on each approach are required.

49. Barriers should rise *[or be raised?]* as soon as practicable after all trains for which the lower sequence has been initiated, have passed clear of the crossing.

Railway signalling and control

64. Railway signals, which provide full protection to the crossing, are required on both railway approaches. These signals must be interlocked with the lifting barriers so that it is not possible to clear the signals unless the road is fully closed by the barriers, nor should it be possible to raise the barriers unless the signals are set at danger and free of approach locking, or the train has passed the signal and traversed the crossings.

65. It should not be possible to clear any protecting signals until 'crossing clear' is confirmed either automatically by obstacle detection equipment, or manually when that equipment is not being used.

66. Discrete function controls at the operating position should be provided for use when obstacle detection equipment is not being used.

67. If a train passes a protecting signal at danger, the road traffic light signals should immediately show an intermittent red light, omitting the steady amber phase, if not already initiated, and the audible warning should start. The barriers should not be lowered *[why not? – if it has passed the protecting signal at danger, a train may be approaching, so this would seem a sensible precaution]*.

68. The status of the crossing equipment should be indicated at the control point to ensure it operates safely when the railway line is open to traffic.

6 Automatic half barrier crossings (AHBC)

General description

69. This type of crossing is protected by road traffic light signals and a lifting barrier on both sides of the railway. Audible warning to pedestrians is also provided. Lifting barriers are normally kept in the raised position and pivoted on the left-hand side of the road. When lowered, the barriers only extend across the entrances to the crossing leaving the exits clear.

70. The crossing equipment is initiated *[activated?]* automatically by an approaching train. The lowering of the barriers is preceded by the display of road traffic light signals. The period between the initial display of the road traffic light signals and the arrival of the fastest train should be sufficiently long to enable road vehicles and pedestrians to clear the crossing.

71. The barriers rise immediately the train has passed unless another approaching train is so close that a minimum of 10 seconds road open time can

[cannot?] be achieved. In this situation the barriers remain lowered and the intermittent red lights continue to flash but the sound emitted by the audible warning device changes in character as soon as the first of the trains arrives at the crossing.

72. Telephones for use by the public, including those who are required to phone for permission to cross, are normally provided near each road traffic light signal on the right-hand side of the road. The telephones are connected to a supervising point, which must always be open when the railway line is open.

73. The supervising point should have appropriate means to stop any train approaching the crossing, and means of communicating with railway staff operating the crossing equipment locally at the crossing in an emergency or abnormal situation.

Method of operation

74. The crossing equipment is activated automatically by a train as it approaches the crossing.

75. Arrangements for initiating the operation of the crossing should be such that the time elapsed between the amber lights of the road traffic light signals starting to show and the train arriving at the crossing should at least 27 seconds. The train should pass as soon after 27 seconds as possible. At least 95% of trains should arrive within 75 seconds and 50% within 50 seconds, once the closing sequence has begun. Where the crossing length is longer than 15 m, the 27 seconds should be increased by 1 second for every additional 3 m of crossing length.

Note: In certain circumstances at 'predictor' crossings, in abnormal circumstances an accelerating train could arrive at the crossing slightly sooner than 27 seconds after initiation of the amber road traffic lights. This may be acceptable at crossings where it can be shown that the likelihood of an 'early arrival' is very low. No trains should arrive at a crossing in less than 22 seconds after initiation of the road traffic lights. If 'early arrival' is in any way a foreseeable event, e.g. for trains accelerating from a station, arrangements should be modified accordingly.

76. The sequence for closing the crossing to road traffic is as follows:

should be sufficiently long to enable road vehicles and pedestrians to clear the crossing.

86. The crossing equipment is normally initiated automatically by an approaching train. The operation of the crossing equipment, and the absence of obstruction on the crossing are monitored by the driver of an approaching train.

87. Train drivers are required to stop their trains short of the crossing unless they have received an indication that the crossing equipment is functioning correctly and have observed that the crossing is clear.

88. The barriers rise immediately a train has passed unless another approaching train is so close that a minimum of 10 seconds road open time can *[cannot?]* be achieved. In this situation the barriers remain lowered and the intermittent red lights continue to flash, but the sound emitted by the audible warning device changes in character as soon as the first of the trains arrives at the crossing.

89. Consideration should be given to providing telephones for use by the public. Where provided these should be connected to a supervising point which is always open when the railway line is open. Where no telephones are provided, signs giving the name of the crossing and the public telephone number of a supervising point, which is always open when the railway line is open, should be provided on each side of the crossing.

90. Staff at a supervising point should have:

(a) direct control of all train movements over the crossing;

(b) a means to communicate with railway staff operating the crossing equipment locally at the crossing:

(i) in an emergency; or

(ii) in an abnormal situation; and

(c) a means of communicating with the train driver approaching the crossing.

Method of operation

91. The crossing equipment is activated automatically by a train as it approaches the crossing.

97. If both intermittent red lights in any of the road traffic light signals fail, the barriers should continue to operate normally. If there is a total power failure, the barriers should remain in the raised position.
98. If the crossing remains closed for longer than could be caused by passing trains, it should automatically reopen to road traffic. The indication to the train driver that all the crossing equipment is functioning correctly should be extinguished at least 30 seconds before the barriers start to rise. The equipment should then automatically reset for another train.
99. The road traffic light signals and the barriers should continue to operate in the event of a failure of the main power supply, but the indication to the train driver that all the crossing equipment is functioning correctly should not be displayed.

Railway signalling and control

100. The indication to the train driver should only be displayed when the barriers have begun to descend and at least one of the intermittent red lights of each road traffic light signal is lit, and the main power supply has not failed.
101. Any railway signals which lie between the strike-in point and the crossing should not give information which conflicts with the indication given to the train driver that the crossing equipment is functioning correctly.
102. On a double-track line, bi-directional control to initiate the crossing equipment is required.
103. Where trains are not required to stop before passing over the crossing, the sequence of events to close the crossing to road traffic should be initiated automatically by approaching trains.
104. A special speed restriction board is required at the point from which the crossing speed begins. This board may display two different crossing speeds for different types of trains.
105. An advance warning board is required at the *service braking distance* from the special speed restriction board to enable trains to reduce their speed to the crossing speed. If the crossing speed is the same as the line speed, the advance warning board should normally be 100 m *[from what?]* on the approach to the special speed restriction board.

106. Where all trains are required to stop at a station between the strike-in point and the crossing, a stop board should be located at least 50 m from the crossing and an advance warning board erected at service braking distance from the stop board. The sequence of events to close the crossing to road traffic may be initiated:
(a) automatically by an approaching train where stopping times of trains at a station can be predicted reasonably accurately and the times taken for trains to arrive at the crossing are within those specified in paragraph 81;
(b) by a means that is only effective when the presence of a train is detected, eg a train crew-operated plunger linked with the train detection system.
Note: To comply with the timings given in paragraph 81, the clearance of the signal may need to be delayed.
107. Where not all trains are required to stop at a station between the strike-in point and the crossing, the sequence of events to close the crossing to road traffic may be initiated:
(a) automatically by an approaching train where a Stop signal is provided between the strike-in point and the crossing, and is interlocked with the signalling system using a '*stopping/non-stopping' control*; or
(b) automatically by an approaching train where stopping times of trains at a station can be predicted reasonably accurately and the times taken for trains to arrive at the crossing are within those specified in paragraph 81.
108. Facilities should be provided for the local initiation of the crossing equipment and effective means are required to prevent its unauthorised operation.

8 Automatic open crossings locally monitored (AOCL)

General description

109. This type of crossing has no barriers but is protected by road traffic light signals and an audible warning for pedestrians. The period between the initial display of the road traffic light signals and the arrival of the fastest train should be sufficient to allow road vehicles and pedestrians to clear the crossing.

124. On a double-track line, bi-directional control to initiate the crossing equipment is required.
125. Where trains are not required to stop before passing over the crossing, the sequence of events to close the crossing to road traffic should be initiated automatically by approaching trains.
126. A special speed restriction board is required at the point from which the crossing speed begins.
127. An advance warning board is required at the service braking distance from the special speed restriction board to enable trains to reduce their speed to the crossing speed. If the crossing speed is the same as the line speed, the advance warning board should normally be 100 m *[from what?]* on the approach to the special speed restriction board.
128. Where all trains are required to stop at a station between the strike-in point and the crossing, a stop board should be located at least 50 m from the crossing and an advance warning board erected at service braking distance from the stop board. The sequence of events to close the crossing to road traffic may be initiated:
(a) automatically by an approaching train where stopping times of trains at a station can be predicted reasonably accurately and the time taken for trains to arrive at the crossing are within those specified in paragraph 105; or
(b) by a means that is only effective when the presence of a train is detected, eg a train crew-operated plunger linked with the train detection system.
129. Where not all trains are required to stop at a station between the strike-in point and the crossing, the sequence of events to close the crossing to road traffic may be initiated:
(a) automatically by an approaching train where a Stop signal is provided between the strike-in point and the crossing, and is interlocked with the signalling system using a ‘stopping/non-stopping’ control; or
(b) automatically by an approaching train, where stopping times of trains at a station can be predicted reasonably accurately and the time taken for

trains to arrive at the crossing are within those specified in paragraph 105.

130. Additionally, where the station is between the strike-in point and the crossing, and a Stop signal is not provided between the station and the crossing, the sequence of events to close the crossing to road traffic may be initiated automatically by an approaching train if the following conditions are met:

(a) the railway is a single line;

(b) the actual daily road vehicle user *[usage?]* is less than about 2000;

(c) not more than 10% of trains stop at the station; and

(d) station stops are of short duration.

131. Facilities should be provided for local initiation of the crossing equipment and effective means are required to prevent its unauthorised operation.

9 Open crossings

General description

132. This type of crossing does not have barriers or road traffic light signals, and only road traffic signs are provided. **Road users must give way to trains at the crossing.** Road users can see approaching trains in sufficient time for them to be able to cross the railway or stop safely. Train drivers are required to stop the trains short of the crossing unless they have observed that the crossing is clear. Train drivers are also required to sound the train's horn as appropriate.

133. Telephones for the use of the public are not required. Signs giving the name of the crossing and the public telephone number of a supervising point, which is always open when the railway line is open, are required on each side of the crossing.

Method of operation

134. Trains normally approach the crossing at a steady speed, known as the crossing speed, so that trains can be halted short of the crossing from the point at which it ~~clearly~~ comes *clearly* into the train driver's view.

Note: The preferred arrangement is for trains not to stop before passing over a crossing unless it is not practicable to arrange otherwise.

135. Trains are required to stop before proceeding over the crossing where:

(a) road users cannot see approaching trains across the viewing zones (defined in Appendix B); or

(b) the train driver cannot see the crossing from the point at which the brake should be applied to stop short of the crossing.

136. Trains are not required to stop again before proceeding over the crossing where:

(a) the train has stopped at a station platform on the approach to the crossing; or

(b) the train has already stopped for other reasons at a point from which the train driver can see the crossing.

Railway signalling and control

137. Where trains are not required to stop before passing over the crossing, a combined speed restriction and whistle board should be provided at a point from which the crossing speed begins. This board displays the crossing speed of 15 km/h for all types of trains.

138. An advance warning board should be provided at the service braking distance from the combined speed restriction and whistle board to enable *drivers* ~~trains~~ to reduce the~~ir~~ speed *of their trains* to the crossing speed. If the crossing speed is the same as the line speed, the advance warning board should normally be placed 100 m before the combined speed restriction and whistle board on the approach side.

139. Where all trains are required to stop before passing over the crossing, a stop board should be located at least 25 m from the crossing and an advance warning board erected at the service braking distance from the stop board.

10 User-worked crossings (UWCs) with gates or lifting barriers ~~on private roads~~

General description

140. This type of crossing is only applicable where the railway crosses a private road.

[Not true. There are examples on lightly used public roads, e.g. the following example at grid reference TG301204]

It is normally protected by gates, or lifting barriers (when authorised by ORR), on both sides of the railway. The gates, normally closed across the road and hung so as to open away from the railway, are operated by the road users. Barriers are normally closed across the road. A sign describing correct crossing procedure, including the use of any telephones, is displayed to road users on each side of the crossing.

141. Road users should have sufficient time from first seeing an approaching train, or otherwise being made aware of the approach of a train with the aid of additional protective equipment, to cross safely.

Method of operation

142. Additional protective equipment may not be required if the warning time (see Appendix D, 'common terms'), a minimum of 20 seconds, is at least 5 seconds greater than the time required by the likely users to traverse the crossing.

143. In assessing the time required to traverse the crossing, consideration should be given to:

(a) the type and characteristics of vehicles, equipment or animals likely to go over the crossing;

(b) the surface of the crossing and its immediate approaches; and

(c) the position at which the vehicle, after going over the crossing, would be clear of the railway or gate on the far side.

144. Additional protective equipment that may be provided includes:

(a) audible warnings from the trains - where train speeds are low and the service infrequent, whistle boards positioned not more than 400 m from the crossing may be acceptable;

(b) telephones, provided on both sides of the crossing and connected to a supervising point, which is always open when the railway line is open, where:
(i) the minimum warning time of trains cannot be obtained;
(ii) there is known regular use by animals on the hoof;
(iii) fog is prevalent;
(iv) there are more than two running lines; or
(v) the line speed exceeds 160 km/h.
(c) miniature stop lights, as described in Section 17 *[which]* should be provided on both sides of the crossing, especially where:
(i) the minimum warning time of trains cannot be obtained and the actual daily road vehicle ~~user~~ *[usage]* exceeds 100; or
(ii) the provision of a telephone is impractical because it is difficult to provide reliable information concerning the whereabouts of trains, or the information supplied would be so restrictive that it would be likely to cause the user to become unduly impatient and to cross without permission.

145. To achieve the required warning time, it may be necessary to reduce the train speed over the crossing.

146. Where telephones are provided, vehicle drivers must telephone the supervising point to seek permission to cross. In some circumstances, it may also be necessary for other types of user, e.g. pedestrians, to telephone before crossing. Signs should make this clear.

147. Where miniature stop lights are provided, users should only cross when the green light shows. If no lights show, they should telephone the crossing operator on the public number provided.

11 Footpath and bridleway crossings

General description

148. This type of crossing is found where the railway crosses a footpath or bridleway. Footpaths and bridleways are those which:

(a) are shown on definitive maps and statements maintained under Part III of the Wildlife and Countryside Act 1981 *[does this act apply also in Scotland?]*; or
(b) have come into being following public path creation agreements or public path creation orders under Part III of the Highways Act 1980 *[ditto?]*; or
(c) otherwise exist as either public or private rights of way.

149. Users are expected to use reasonable vigilance to satisfy themselves that no trains are approaching before they start to cross the line, and to cross quickly. Users should remain alert whilst crossing. Personal audio equipment and head coverings that could reduce the user's ability to hear or see approaching trains should be removed. Users should have sufficient time from first seeing, or being warned of, an approaching train to cross safely.

150. Footpath crossings should be protected by a stile or self-closing wicket gate on both sides of the railway. They should not have a gate on one side and a stile on the other, nor different widths or types of gates. Stiles and kissing gates may not be appropriate at crossings where the use of prams, wheelchairs, *[bicycles,]* etc. is foreseeable.

151. Bridleway crossings should be protected by a self-closing wicket gate on both sides of the railway. Unless required to dismount, it should be possible for a mounted horse rider to open the gates without dismounting.

Note: Riders may be required to dismount, because of the presence of overhead live conductor *[wire]*s. Otherwise, it should be assumed that horse riders will remain mounted while traversing the crossing. Allowance may have to be made for young or inexperienced riders to lead their mounts. Cyclists should always cross dismounted *[is this realistic, even if desirable?]*, though measures may need to be taken to encourage this.

152. At bridleway crossings, any space between a gate and the decision point (see Appendix E 'common terms') should be sufficient to allow a person on horse-back to make a decision from a place of safety.

153. A sign explaining how to cross safely should be displayed at the decision point on each side of the crossing.

154. Where this type of crossing passes over multiple railway tracks and an interval between tracks exists so that a fenced, safe waiting place can be created for users, the crossing on each side of the interval should be treated as

a separate crossing. A chicane may be provided on the crossing to make the position of the safe waiting place clear.

155. The minimum width between fences guiding users to the decision point or safe waiting area should be 1 m for footpath crossings and 3 m for bridleway crossings. This should be increased or a larger waiting area provided if there is foreseeable use by those with prams or in wheelchairs etc.

156. Care should be taken not to provide misleading displays to crossing users. Where, for instance, miniature stop lights are provided on one part of a divided crossing, they should be provided on all parts of the crossing.

157. At a user-worked crossing which is subject to additional footpath or bridleway crossing rights, stiles for pedestrians or separate gates for use by the pedestrians or riders should be provided. (Vehicular gates may be locked and *rout[e]ing* pedestrians separately may reduce the risk of vehicular gates being left open.) The guidance in this chapter should be applied in conjunction with that for the vehicular use of such combined crossings.

Method of operation

158. The warning time should be greater than the time required by users to cross between the decision points at either end of a crossing. In assessing how quickly users will traverse the crossing, allowance should be made for the mobility of the likely users and the type of crossing surface.

159. As a guide, a speed of 1.2 metres per second (m/s) may be used where the surface is at or near to rail level and 1 m/s where the surface is at the standard profile of the ballast. The calculated time in traversing the crossing should be increased to take account of foreseeable circumstances such as impaired mobility of users, numbers of prams and bicycles or where there is a slope or step up from the decision point.

160. Where the warning time is insufficient, additional protective equipment should be provided and may include:

(a) audible warnings from trains - whistle boards positioned not more than 400 m from the crossing;

(b) telephones; or

(c) miniature stop lights as described in Section 17.

161. Where whistle boards are considered, decisions should take account of :
(a) the speed of sound (330 m/s) and the speed of the train;
(b) the possibility that train horns may be inaudible at the crossing because of ambient noise; and
(c) the possible adverse effects of the noise of train horns on the health or welfare of nearby residents.
162. Where whistle boards are provided, they are normally required on all railway approaches. The difference in warning times *[between what?]* should be 3 seconds or
less. The limitations of train horns as a means of protection must be considered.
163. Telephones and their associated signs may be provided where:
(a) the warning time exceeds the time required to traverse the crossing by less than 5 seconds; or
(b) the speed of trains over the crossing exceeds 160 km/h.
164. At footpath crossings and bridleway crossings, miniature stop lights may be provided where:
(a) the crossing is the only access to houses;
(b) the highest attainable train speed exceeds 140 km/h; or
(c) providing whistle boards is inappropriate.
165. An audible warning device may be provided at the crossing if it is regularly used by unaccompanied partially-sighted or blind people.

12 Provision~~s~~ for pedestrians at public vehicular crossings

166. At all public vehicular level crossings, appropriate provision should be made for pedestrians, taking account of the number and frequency of pedestrians and trains.
167. Where the approach roads are provided with a footway on either or both sides of the road, footways of adequate width should continue over the crossing.

181. Where a crossing lies adjacent to a railway station and the entrance or exit to the station is via the platform ramp, pedestrians should be directed from the platform to the road and vice versa so that they are protected by the crossing after leaving or before joining the train.

Pedestrian categories

182. The volume of pedestrian and train flow may be determined by the train pedestrian value (TPV) which in turn defines the pedestrian categories. The TPV is the product of the maximum number of pedestrians and the *[maximum?]* number of trains passing over the crossing within a period of 15 minutes. A detailed method of calculation can be found in Appendix C.

183. Pedestrian categories are given in Table 2.

Table 2 pedestrian categories

Pedestrian category	**Train pedestrian value (TPV)**
A	more than 450
B	151-450
C	150 or less

Pedestrian provisions

184. Unless better information (derived for example from risk assessments) is available, the suggested provision~~s~~ required for pedestrians at a crossing according to its pedestrian category are given in Table 3.

Table 3 pedestrian provisions
Pedestrian category
Width of footway (metres)
Road markings
Audible warnings*
Pedestrian signals**
Tactile threshold*
Guard rails
A 2 or more YES YES YES YES ŧ
B 1.8 or more YES YES ŧ YES ŧ
C 1.5 or more YES YES ŧ ŧ ŧ
* Not required at gated crossings operated by railway staff
** Only at automatic crossings
A reduced width of 1 m or lack of approach funnel is normally restricted to those crossings wit*[h]* a daily pedestrian user *[usage?]* of less than about 25
ŧ Yes if necessary
Note: At any crossing where the number of pedestrians or the size of the vulnerable group is exceptionally large, automatic crossings may not be suitable and a barrier crossing operated by railway staff may have to be provided.

13 ~~A s~~ *[S]*tation barrow crossings

General Description

185. This type of crossing is found between platforms at stations. These crossings may be the only route between platforms or the only practicable route for ~~the disabled~~ *[people who cannot use steps]*.

186. This type of crossing should only be considered for lightly used stations where line speed does not exceed 160km/h and no alternative arrangements are available.

187. The surface should be maintained in a good and even condition at rail level with suitable non-slip properties.

Method of operation

188. Where passengers are always escorted by railway staff, an established form of protection is a white light, extinguished 40 seconds before the arrival of

trains. A sign reading “Caution – Cross only when light shows” is placed adjacent to the white light.

189. A preferred method of protection, required where unescorted passengers may cross, is miniature stop lights, described later in this document. The red light shall show 40 seconds before the arrival of the train(s). An audible warning should be provided. Where the warning is for two or more trains approaching, the character or tone of the warning sound should change distinctively as soon as the first train arrives at the crossing. Appropriate instructions should be provided.

14 Additional measures to protect against trespass

190. Cattle-cum-trespass guards and fencing protection will normally be required to discourage trespass by pedestrians and, in certain locations, animals straying onto the railway.

Cattle-cum-trespass guards

191. Guards should be provided where there is movement of animals over the crossing, or where there is a significant risk of trespass by pedestrians.

192. Guards should be provided at all types of crossings on railways electrified on the conductor rail (“third-rail”) system, except at a gated crossing operated by railway staff, where the gates when across the railway completely fence off the road and any footway from the railway.

193. The guards should be adjacent to the footway at the edge of, and level with, the surface of the carriageway. They should extend the full length of the crossing between the boundary fences.

194. The guards may consist of arris rails running parallel with the running rails or some other ~~effective~~ similarly effective system.

Note: Arris rails which are triangular in section with the vertical sides approximately 115 mm high, at approximately 150 mm pitch, and with a clear space between them not exceeding 35 mm are considered to be effective.

195. The guards should be at least 2.6 m wide measured at right angles to the edge of the carriageway. Where there is insufficient room for a cattle-cumtrespass guard of standard width to be provided immediately adjacent to an existing platform ramp, the toe of the ramp may be cut back, leaving a step not

exceeding 300 mm ~~high~~ *[in height]*, to accommodate the guard. The guards may have to be extended between the platform ramps. Additional fencing at right angles to the edge of the platform and extending from the back edge to within 750 mm of the front edge, may be required. *[This sentence is ambiguous. It seems to be suggesting a fence across most of the platform which would prevent access to/from the ramp, a meaning which in the context seems unlikely.]*

Fencing

196. Fencing may be required:
(a) around barrier mechanisms unless protected in other ways; and
(b) to ensure the effectiveness of any cattle-cum-trespass guards.

197. At footpath crossings and bridleway crossings, additional fencing may be required between the boundary fence and the decision point. Where the gate or stile is at the decision point rather than in the boundary fence, additional fencing to connect the boundary fence to the decision point should be provided.

198. Where the road is unfenced and the adjacent land is used for grazing, and crossing gates are not provided, a standard highway-type cattle-grid in the roadway should be provided.

15 The crossing

Vertical profile

199. The vertical profile over any vehicular crossing should have no sudden changes of ~~vertical~~ curvature. The profile over an automatic half barrier crossing or user-worked crossing is critical to safety. At other types of crossing it is less critical because these crossings are either manually operated by railway staff, or locally monitored by the drivers of trains travelling at restricted speeds such that they can stop short of the crossing.

Note: When existing gated crossings operated by railway staff are being modernised with barriers or are to be converted to open crossings, or locallymonitored automatic crossings, no improvement to the road profile is necessary unless it is known that heavy vehicles have grounded at the crossing.

200. The profile over automatic half barrier crossings should not cause a long, low vehicle, eg a low-loader, to become grounded and obstruct the railway.

Measurement of safe profiles

201. It is the relationship of the wheelbase with the ground clearance of a road vehicle which is used to determine safe profiles. The profile is measured in terms of the maximum permitted hump of 75 mm anywhere on the road surface over a length equal to the wheelbase of a specified nominal road vehicle.

202. At any automatic half barrier crossing, the safe profile is defined by the vehicle category, which is in turn determined by the road and rail traffic density. It is defined in Table 4. Unless better information is available ~~this~~ *[these]* data should be used.

Table 4 measurement of safe profiles

Actual daily road vehicle user
Daily traffic moment
Vehicle category
Theoretical wheelbase length (metres) (feet)

More than 2000 More than
80000
1 15.3 50
2000 or less 80000 or less 2 9.75 32
600 or less 25000 or less 3 8.5 28

Note: The traffic data in Table 4 should be established by a robust and valid census. Any likely increase in road usage following automation of the crossing should be taken into account. Other factors, such as the proximity of heavy plant operators, which may necessitate a flatter profile, should be taken into account. Road weight or width limitations may permit a more curved profile than the figures in Table 4 indicate.

203. Risk of grounding signs as described in Section 18 should be provided for crossings with vehicle categories 2 and 3.

204. Where a crossing is to be converted to an automatic half barrier crossing, the profile should be checked to ensure that it conforms to the appropriate category. The profile should exist across the full width of the carriageway and the approaches. The approaches extend for a minimum of 20 m from the nearest rail for category 2 and 3 crossings, and up to 30 m for category 1 crossings.

205. Road approaches to crossings should be regularly inspected by the crossing operator (as well as the highway authority). The profile should be checked when road defects are noted or when track alterations are undertaken. The highway authority should be informed of any work necessary to the approaches, and make the necessary repairs or alterations.
206. At user-worked crossings, the type of vehicles or equipment likely to go over the crossing should be determined before the design of the vertical profile of the crossing. Once this is determined, the maximum wheelbase length should be used to design the safe profile based on the same maximum permitted hump of 75 mm. The gradient of the approaches to the crossing should be determined in conjunction with the vertical profile commensurate with the type of traffic using it.
Note: Providing telephones at a user-worked crossing does not alter the need to maintain appropriate profile conditions.

Crossing surface

207. The surface of the carriageway over a crossing and on its immediate approaches should be properly maintained and have a skid resistance comparable to that of the road approaches. A higher degree of skid resistance may be needed where road speeds are high, the visibility of a crossing is limited or the road slopes downhill towards the crossing. Appropriate measures should be discussed with the traffic authority. The surface should be free from potholes, upstanding rails, depressed areas or major undulations. Any timbers or panels used in the surface should be firmly fixed.
208. At vehicular crossings with gates which completely fence in the railway when closed to the road or where there is no footway adjacent to the carriageway, the ground at the edges of the carriageway over the crossing should be made up to the same level as the carriageway for at least 1 m.
209. At user-worked crossings, a satisfactory road surface, appropriate for the type of traffic using them, and adequate approaches should be provided and maintained. Where timbers are used for the crossing surface, they should be securely fixed in position and provide a clear flangeway. Where the surface is ~~predominately~~ *[predominantly?]* made up of ballast, it should be contained to ensure that the
surface is at or almost at rail level and the flangeway is maintained.

210. At footpath crossings and bridleway crossings, the surface provided between the decision points should be unobstructed. There should be no movable signalling or track equipment ~~on the surface~~ (such as sets of points) *[on the surface]* or close by, that might create a hazard. The surface should be maintained in a good and even condition. The rails are not considered to constitute an obstruction or uneven surface.

211. The type of surface should be in keeping with, but not necessarily the same as, the surface provided on the road approaches to the crossing immediately outside the railway boundary.

212. Where the track ballast shoulder is high, steps or *[ramps are always preferable, so steps should be provided only where constructing a ramp is impracticable]* ramps for footpath crossings and ramps for bridleway crossings should be maintained to give access to the surface. On steep slopes, hand-rails may be needed in addition to steps or ramps.

213. Where the surface is other than ballast or stone chippings, a non-slip surface should be provided. Where the surface is made up to rail level and stone is used as in-fill, a means to retain the stone should be provided.

214. At bridleway crossings, the surface should be made up to rail level.

215. At footpath crossings, the surface should be made up to rail level, where:

(a) the crossing is in a location where housing, factories, shops etc adjoin or are close to the railway, and the crossing provides an attractive or convenient link between them;

(b) any of the approaches on the path are metalled; or

(c) there is heavy regular use.

Crossing width

216. At all crossings, the width of the carriageway over the crossing and on the approaches should be constant.

217. At all automatic crossings, open and user-worked crossings, it should be possible for traffic to pass safely on the approaches and the crossing itself should not form an isolated passing place.

218. At automatic crossings, the carriageway width over the crossing should be maintained on each approach for the distances shown in Table 5.

Table 5 crossing width

Actual daily road vehicle user	**Daily traffic moment**	**Distances measured from the stop line (metres)**	
AHBC & ABCL	**AOCL**		
More than 2000	More than 80000	21	21
2000 or less	80000 or less	14	14
600 or less	25000 or less	14	7

Note: However, it may be necessary to increase these distances commensurate*[ly]* with the type of vehicles which use the crossing.

219. The carriageway width over an automatic half barrier crossing should normally be at least 6.1 m. A narrower carriageway, to a minimum of 5m, may be acceptable on less busy roads. As a guide in this instance, a less busy road may be considered to be one with a daily road vehicle use of less than 4000.

220. The carriageway width over a locally-monitored automatic barrier crossing should not be less than 5 m.

221. The carriageway width over a locally-monitored automatic open crossing should not be less than 5 m where the actual daily road vehicle ~~user~~ [*usage]* is greater than 600 or the peak hour traffic moment is greater than 120.

222. At user-worked crossings, the road surface should be at least as wide as the distance between the gate posts. The width of the crossing should not exceed 5 m to allow the use of single-leaf gates.

223. At footpath crossings, the width of the surface should not be less than 1 m. At bridleway crossings, the width of the surface should not be less than 3 m.

Provision of lay-bys

224. Lay-bys may be required at automatic crossings equipped with half barriers so that vehicles, whose drivers are required to telephone before using the crossing, can be parked clear of the carriageway.

Crossing alignment

225. At user-worked crossings, the alignment of the crossing over the tracks should enable the time required to traverse the crossing to be kept to a minimum.

226. Footpath crossings and bridleway crossings should, where possible, be at right angles to the railway line. Clarification with Rights of Way Officers may be helpful in determining exact routes and opportunities for diversion, if necessary.

Crossing approaches

227. At user-worked crossings, the alignment of the immediate approaches to the crossing should be in line with the alignment of the crossing itself. The alignment of the approaches to the crossing should be such that any light source from road vehicles or equipment should not cause confusion with lineside signals.

16 Gates, wicket gates and barrier equipment

Gates

228. The gateway should be the full width of the carriageway plus at least 450 mm clearance on each side. The clearance between gate posts should be of equal width at both sides of the railway. Means should be provided to retain the gates in both open and closed positions.

229. When closed, the gates should extend over the full width of the carriageway. Unless legally specified *[otherwise]*, the normal position of the gates is across
the road.

230. At user-worked crossings power operated gates may be installed. These avoid the need for multiple crossings in order to open and close gates.

231. At crossings on public roads, the gates should be painted white and carry red retro-reflective targets to face outwards when the gates are across the road. Where there are red lamps mounted on the gates, which show towards approaching road traffic when the gates are across the road, red retro-reflective targets may also be appropriate.

232. At gated crossings operated by railway staff, the gates should be lockable when closed across the road or railway. They should be conspicuous when closed across the railway to the drivers of approaching trains.

Wicket gates

233. Where wicket gates for pedestrians are provided, they should be on the same side of the carriageway *[as what?]* and open away from the railway. Wicket gates for footpath crossings and gated crossings operated by railway staff should not be less than 1 m wide. Wider gates may be required in accordance with local user needs. Wicket gates for bridleway crossings should not be less than 1.5 m wide.

234. All wicket gates should be easy to open from either side and be selfclosing. Latches which might prevent a wicket gate being opened quickly should not be used. Where wicket gates are provided across the footway at gated crossings operated by railway staff, they should be lockable.

Barriers

235. The tops of the barriers when lowered should be at least 900 mm above the road surface at the centre of the carriageway. The clearance between the bottom edge of the lowered barrier and the road surface should not exceed 1000 mm. When raised, barriers should be inclined towards the carriageway at an angle of between 5º and 10º from the vertical.

236. No part of the barrier equipment, which is less than 5 m above the level of the carriageway, should be horizontally displaced from the nearer edge of the carriageway by less than 450 mm. Where the barriers cover a footway, no part of the barrier equipment, which is less than 2 m above the level of the footway, should be horizontally displaced from the edge of the footway that is furthest from the carriageway, by less than 150 mm.

237. The barriers should be as close as convenient to the railway, but no part of the equipment should be within the standard structure gauge.

238. Barriers should be at least 125 mm deep at their mid-points and at least 75 mm deep at their tips. Each barrier should display on both sides red and white bands about 600 mm long to the full depth of the barrier. A strip of retroreflective material not less than 50 mm deep should be provided along the full length of each band.

239. Two electric lamps (three on barriers longer than 6 m) of adequate luminous intensity should be fitted to each barrier and, when illuminated, show a red light in each direction along the carriageway. The lamps should be evenly spaced along the barriers with one lamp within 150 mm from the barrier tip. The lamps should show except when the barriers are fully raised. It may be appropriate at some user-worked crossings to omit these lamps.

Barriers at skew crossings

240. On skew crossings where the tip of the barrier points towards the railway, the point of intersection of the line extended through the barriers and the outer edge of the road, including any footway, should not be within 1000 mm of the nearest rail.

Barrier crossings operated by railway staff

241. At barrier crossings operated by railway staff, each road approach should be protected by barriers which, when lowered, extend across the full width of the carriageway and footways.

242. At barrier crossings operated by railway staff and user-worked crossings, skirts should be fitted to the barriers where there is a significant risk of pedestrians deliberately passing under the lowered barriers. Where cattle or sheep are regularly taken over the crossing on the hoof, skirts should be fitted. The skirts should be of a light colour *[and]* light construction*[,]* and fence in the space between the lowered barriers and the road surface.

Note: Skirts are not required at automatic crossings with half barriers.

Barriers at user-worked crossings

243. At user-worked crossings, the barriers are normally hand-operated and counter-weighted to fall when released. The barriers should be linked so that they can be raised or lowered together from either side of the crossing.

Single barriers

244. Where single barriers are provided they should preferably be pivoted on the left-hand side of the road. On one-way roads or on two-way roads with central reservations where special provision can be made for pedestrians, barriers may be provided on the approach to the crossing only.

At user-worked crossings and bridleway crossings

258. Telephones, where provided, should be positioned adjacent to the gates or barriers on each side of the crossing. The telephones should be housed in cabinets and connected directly to a supervising point. A two-way calling facility should be provided.

259. The telephone symbol to Diagram 787 is to be displayed on or adjacent to the cabinet. The telephones should be in good view from the crossing and if not, signs to Diagram 788 are required.

260. Inside the cabinet, clear and simple instructions, which are also legible at night, should be provided to direct users to contact the supervising point. The telephone user should not have to dial a telephone number.

261. The name of the crossing and its grid reference should be displayed within the door of each telephone cabinet followed by a telephone number of a continuously staffed railway location to be used when the line is open, in case the telephone at the crossing is out of order. *[Should paragraph 254 apply to telephones at this category of crossing too?]*

18 Miniature stop lights (MSL)

General description

262. Miniature stop lights (often referred to as miniature warning lights) consist of red and green lights. They can be used at user-worked crossings, footpath crossings and bridleway crossings. The green light normally shows, but an approaching train automatically changes the lights to red. Signs instructing users to cross only when the green light shows should be provided.

Note: MSL may not be suitable at crossings where movement of cattle or heavy farm equipment is involved. Alternative arrangements may need to be made.

Positioning of MSL

263. The MSL should be located so that they face towards an approaching user. They should be clearly visible to the crossing users when operating the gates or barriers. MSL may be mounted in the sign to Diagram 107. At crossings not provided with a telephone, the public telephone number of a continuously staffed railway control point should be displayed, so that users may enquire as to safe crossing (and report MSL failure). Use of signs to Diagram 108 should, where possible, be avoided.

264. MSL should be placed on the near side of the railway, facing users approaching the crossing. *[Are repeater lights on the far side permitted?]*

MSL equipment

265. The red and green lights should be of adequate luminous intensity to be clearly seen by users at the decision point. LED lamps are preferred for their brightness and reliability. Lamps should be fitted with hoods (to aid viewing in bright sunlight) where necessary.

Associated signs

266. Traffic signs associated with the use of MSL are shown in Figure 8 of Section 18. These signs are in addition to those required at user-worked crossings, footpath crossings and bridleway crossings.

267. At user-worked crossings the signs to Diagrams 109 or 110 should be mounted with the MSL on the near side of the crossing facing approaching users.

268. At footpath or bridleway crossings the signs to Diagram 114 should be mounted with the MSL on the near side of the crossing facing approaching users. Where a footpath or bridleway is routed over a user worked crossing, care should be taken in the placement of signs (to Diagrams 109/110 and 114) so as to avoid confusing instructions to drivers and instructions to pedestrians/riders.

Railway signalling and control equipment

269. MSL should be operated automatically by approaching trains, in accordance with the warning period required by the particular type of crossing as listed in Table 6 unless there is better data available.

Table 6 minimum warning periods

Type of crossing	**Minimum warning period (seconds)**
User-worked crossings	40
Footpath crossings	20
Bridleway crossings	40

270. The minimum warning periods should be at least 5 seconds longer than the time required to traverse the crossing.
271. The green light should show until the red light appears. As soon as the train is clear of the crossing, the red light should be extinguished and the green light should appear unless the red light is required to show for another train.
272. Bi-directional controls should be provided. *[What exactly is this referring to? Tracks used in both directions?]*
273. Where signals or station platforms lie between the strike-in point and the crossing, special controls may be required.
Note: A standby power supply is not considered necessary.

19 Traffic signals, traffic signs and road markings

274. References to regulations or directions in this section are to the Traffic Signs Regulations and General Directions 2002 or to the Private Crossings (Signs and Barriers) Regulations 1996, and references to sign diagram numbers are to diagrams in those Regulations.

Road traffic light signals

275. The construction and specification of road traffic light signals used at level crossings are required to comply with Diagram 3014. The reverse of the backing board should be coloured grey. LED lamps to the current European standard should be used.
276. A primary road traffic light signal should be located on the left-hand side of the carriageway, on each road approach, as close as possible to the crossing. At crossings where there are barriers, it should be located not more than 1 m before the barrier and adjacent to the barrier machine where this is on the left-hand side.
277. A duplicate primary road traffic light signal should be located on the righthand side of the carriageway on each approach. An additional road traffic light signal may be required where neither the primary nor the duplicate primary signal can be seen from a side approach. Secondary road traffic light signals, located on the far side, should not be used at crossings.
278. No road traffic light signal should be located on the approach side of the vehicular stop line or an extension from it.

279. At acute skew crossings, the duplicate primary signal may be placed in line with the vehicular stop line to shorten the length of the crossing.
280. At obtuse skew automatic crossings, the duplicate primary signal may be placed closer to the railway than normal, provided that a vehicle stopped in line with the signal is not foul of the railway structure gauge. Special arrangements for pedestrians may be necessary (see Section 12 and Figure 9 at the end of this section).
281. Where the normal post mounting of a road traffic light signal is impracticable, it may be mounted over the carriageway provided that no part of the horizontal structure or the signal is less than 5.5 m above the road surface.
282. Where a road traffic light signal is mounted over the carriageway and the line is electrified on the overhead system and the structure and signal, if capsized, could come closer than 150 mm to the overhead conductors, the structure and the signal should either be made of metal or be provided with a continuous conducting strip. The metal structure and signal or the conducting strip should be connected to earth in such a manner as to ensure that inadvertent contact with the overhead conductors causes controlling circuitbreaker(s) to interrupt the electric traction supply.
283. In exceptional cases, eg where the central reservation is narrow or where, at very acute skew crossings, the duplicate primary road traffic light signal would encroach on the overhang clearance above the carriageway, a special design of the restricted width signal in accordance with the relevant Department of Transport~~'s~~ drawing may be used. The use of this restricted width signal requires special authorisation.
284. The road traffic light signals, if mounted at the side of the road, should be positioned so that the centre of the lens nearest the carriageway is not less than 810 mm and not more than 1500 mm from the carriageway edge.
285. Where the signals are above a footway, a minimum headroom from *[below?]* the lower edge of the signal backing board of 2100 mm should be maintained.
286. The distance from which it is desirable that the intermittent red lights and amber lights can be seen varies according to the speed value *[meaning?]* of the road. Recommended minimum visibility distances are shown in Table 7. If these minimum visibility distances cannot be achieved, further measures may be

necessary, eg the provision of additional advance warning signs, countdown markers etc.

Table 7 recommended minimum visibility distances

85%ile speed of road vehicles		**Minimum visibility distance (metres)**
km/h	Mile/h	
50	30	70
65	40	90
80	50	150
95	60	220
115	70	300

287. Where a crossing is close to a road junction equipped with road traffic light signals, the two sets of road traffic light signals may need to be linked. Where they are linked, the connection between them requires special authorisation.

Pedestrian signals

288. The construction and specification of pedestrian ‘fat man’ signals used at level crossings are required to comply with Diagram 4006.

289. The red figure on the pedestrian signal should be illuminated internally by an intermittent light while the intermittent red lights of the road traffic light signals are lit. The rate of flashing should be the same as one *[that?]* of the intermittent red lights in the road traffic light signal.

Traffic signs

General provision

290. Appropriate traffic signs should be provided on each road approach. Examples of the layouts are given in Figures 2 to 7.

291. Details of the signs for use with MSL are shown in Figure 8.

292. At automatic crossings with half barriers, signs to Diagram 784.1 should be as close as possible to the crossing, commensurate with the likely approach speed of the vehicles to which they refer. Signs to Diagram 783 may be required where the approach view and visibility of the sign to Diagram 784.1 is limited.
293. Where lay-bys are provided and a Traffic Regulation Order is in force limiting the parking at lay-bys to 'Large or slow vehicles only', the permitted variant to the sign to Diagram 660 should be provided.
294. At automatic crossings and open crossings, signs to Diagram 775 reading 'Keep crossing clear' should be provided on each primary and duplicate primary road traffic light signal post and face traffic approaching the crossing. At open crossings they should be mounted on both sides of the road on or near the posts carrying the St Andrew's Cross signs.
295. Signs to Diagram 775 may be provided at gated and barrier crossings operated by railway staff where standing traffic is a problem.
296. At automatic crossings on double-track lines, where two trains can arrive at the crossing without providing the minimum road open time, signs to Diagram 777 reading 'Another train coming if lights continue to show' should be provided on or near each duplicate primary road traffic light signal and should face outwards from the crossing.
297. At locally-monitored automatic open crossings on double-track lines, where two trains can arrive at the crossing without providing the minimum road open time, signs to Diagram 776 reading 'Another train coming' should be provided on the left-hand side of the road, normally 2 m on the railway side of each primary road traffic light signal and directed towards drivers of vehicles halted at the stop lines. These signs should flash at the same rate as the road traffic light signals.
298. Where the width of the road is less than 4 m ~~wide~~ and the number of vehicles going over the crossing during the peak hour exceeds 120, a Priority Order should be considered and signs to Diagram 615 and 811 provided accordingly.
299. At automatic crossings and open crossings, where the road crosses the railway at a skew angle or there are bends on one or both approaches, bend and chevron signs and count-down markers may be required. Additional

reflecting road studs along the edges of the carriageway to direct drivers along the road may be required.
300. Wherever the form of protection at a crossing has been altered, a new educational sign to Diagram 790 reading ‘New level crossing control ahead’ is required to be displayed for a period of not more than 3 months (see Direction 37.1).
301. At user-worked crossings, footpath crossings and bridleway crossings, a sign explaining to the user how to proceed safely over the crossing eg ‘Stop, Look, Listen’ or ‘Cross only if green light shows’ or ‘Stop, always telephone before crossing’ should be provided facing the user at the decision point.
302. A sign indicating the name of the crossing should be provided at userworked crossings.
303. At bridleway crossings, a sign requiring cyclists to dismount should be provided.
Note: Signs specified in the Private Crossings (Signs & Barriers) Regulations 1996 may be placed by a crossing operator on or near a private road or path. It is an offence for a user to fail ‘to comply with any requirement, restriction or prohibition conveyed by a crossing sign lawfully placed on or near a private road or path’. (Transport & Works Act 1992) *[or, in Scotland?]* A public footpath or bridleway is
clearly not a ‘private road or path’, but, where they convey an appropriate message, signs from the Private Crossings Regulations are commonly used. At footpath, bridleway and private crossings, other suitable signs may be used to inform users, clearly and simply, how to use the crossing safely.

Related to electrified lines

304. Where the line is electrified on the overhead line system, signs to Diagram 779 should be provided with an appropriate plate (Diagram 780A). At user-worked crossings, suitable signs warning of the danger from bare electrical conductors eg ‘Danger, overhead live wires’ should be provided and face towards the user approaching the decision point.
305. Where the minimum wire height over a public crossing cannot be achieved, advance warning signs to Diagrams 779 and 780A should be provided at the last available diversion before the crossing.

Road markings

312. The following paragraphs describe the use of reflectorised road markings as prescribed in the 2002 Regulations.

313. Road markings are not normally provided at gated crossings operated by railway staff, but where they are, they should conform to guidance in this section.

314. Road markings should be provided at user-worked crossings, except where the road surface is unsuitable.

Transverse and associated road markings

315. Transverse vehicular road markings are required to extend across the left-hand side of each two-way carriageway, across the whole of a one-way approach carriageway, or across the whole of a carriageway if no centre of carriageway markings are provided.

316. Where road traffic light signals are installed, transverse stop lines to Diagram 1001 should be provided at right angles to the carriageway on each approach approximately 1 m in front of the primary road traffic light signal. At locally-monitored automatic open crossings this should be increased to 2 m.

317. At user-worked crossings, if a stop sign to Diagram 601.1 is provided, then a transverse stop line to Diagram 1002.1 together with a road marking to Diagram 1022 should be provided unless the road surface is unsuitable.

318. At open crossings, ‘give way’ lines to Diagram 1003 should be provided at right angles to the carriageway on each approach, but not nearer than 2 m from the running edge *[meaning?]* of the nearest rail. Additionally, a road marking to Diagram 1023 should be provided unless special exemption is given.

319. At automatic crossings and open crossings, a pedestrian stop line to Diagram 1003.2 should be provided across any footway and across the righthand side of any carriageway whose centre line is marked, but it may be omitted from the right-hand side of any such carriageway where there are guard rails between it and a footway or under other special circumstances.

320. The pedestrian stop line should be at right angles to the carriageway. It should be located approximately 1 m on the approach side of any road traffic light signal, except at open crossings where it should be in line with the ‘give

way' markings on the left-hand side of the carriageway. No part of the line should be nearer than 2 m from the running edge of the nearest rail.

321. At an obtuse skew crossing, a pedestrian stop line across the footway should be provided in conjunction with a pedestrian signal. The end of this pedestrian stop line at the edge of the carriageway should be located not less than 2 m from the nearest rail. The pedestrian stop line across the footway on the approach side of the road traffic light signal may then be omitted (see Figure 9).

Longitudinal road markings

322. The type of longitudinal road marking generally depends on the width of the carriageway.

323. Where the road passes over the crossing, continuous longitudinal lines to Diagram 1012.1 should be provided along each edge of each footway. The markings should be continued as necessary on the approaches.

324. Where the width of the carriageway over the crossing is less than 5 m, a centre of carriageway marking is not normally required.

325. Where the width of the carriageway over the crossing is 5 m or over, but less than 5.5 m, the centre of the carriageway, between the stop lines, should be marked with the appropriate longitudinal lines to Diagram 1004, 1004.1, 1008 or 1008.1. The lines should continue for 15 m beyond the stop line or, alternatively, for at least 6 m if beyond this distance the carriageway is less than 5 m in width.

326. Where the width of the carriageway over the crossing and on the immediate approaches is 5.5 m or over, the centre of the carriageway over the crossing should be marked with a double continuous line to Diagram 1013.1A. The lines should continue along the approaches to the crossing where justified by their visibility to oncoming traffic.

327. At automatic half barrier crossings the double continuous lines should be extended at least 12 m beyond each stop line. The double continuous lines should be similarly extended at full-barrier, auto-lower *[meaning?]* crossings where lowering
of the right hand barriers may be delayed by the operation of an obstacle detection device.

Figure 9: typical layout of an obtuse skew crossing indicating the arrangement of the transverse road markings and road traffic light signals (not to scale)

Notes to Figure 9

A pedestrian stop line is to be provided across the footway whenever a pedestrian signal is provided. The pedestrian stop line shall be approximately 1 m in advance of the pedestrian signal. This pedestrian stop line shall be positioned in such a manner that the end of the line at the edge of the carriageway is not less than 2 m from the nearest running rail.

The use of a pedestrian signal may depend on the following factors:

(a) number of lines of track;

(b) visibility problem;

(c) level of pedestrian usage;

(d) economic fact *[meaning?]*; or

(e) degree of skew.

Appendix A - Limitation on road and rail traffic at AOCL

1 Actual daily road vehicle user *[usage?]* is converted to effective daily road vehicle user using Table 11 because the relationship between the accident probability and the actual road traffic volume is not linear. ~~In c~~ Converting the actual road traffic volume to the effective figure~~, this~~ will give the same accident probability if the probability~~-~~ *[:]* traffic flow relationship is a straight line. (For a detailed explanation, see the report Automatic open level crossings - A review of safety by Professor P F Stott, published in 1987 by HMSO, ISBN 0 11 550831 7.)

2 The effective daily road vehicle user is then multiplied by the number of trains within the period to give the effective traffic moment and hence the maximum permitted crossing speed ~~is~~ *[which can be]* derived from Table 12.

Table 11

Actual daily road vehicle user	**Effective daily road vehicle user**
250	230
500	425
750	580
1000	705
1250	810
1500	890
1750	955
2000	1010
2500	1080
3000	1115
3500	1115
4000	1080
4500	1040
5000	900
6000	885
7000	765
8000	650
9000	540
10000	475

Table 12
Effective traffic moment
Maximum permitted crossing speed
(mile/h) km/h
4000 55 88
4600 50 80
5400 45 72
6500 40 64
8200 35 56
10130 30 48
13100 25 40
15000 less than 25 less than 40
Note: The metric equivalent*[s]* show in Table 12 are not exact.

Appendix B - Definition of viewing zone at open crossings

The viewing zone (the shaded region ~~as~~ shown in Figure 10) is defined by lines connecting points ‘X’ and ‘Y’ *[as]* given in Table 13.

Figure 10: Definition of viewing zone at open crossings

Table 13 viewing zones

Distances 'x' (metres)	**Distances 'y' (metres) for crossing lengths of:**		
	7 m	14 m	21 m
2	140	170	200
10	40	45	55
20	25	30	35
40	20	25	30

Distance 'X' is the distance of road vehicle users from the 'give way' line on the approach. Distance 'Y' is the distance of an approaching train from the crossing. A crossing which crosses the railway at right angles over a single line is normally considered ~~as~~ *[to be]* 7 m long, but at longer crossings it should be possible to see trains earlier. Where road gradients are steep, distances 'X' should be varied accordingly. Where the 85%ile road speed is less than 25 km/h (15 mile/h), the maximum value of 'X' may be 20 m.

Appendix C - Train pedestrian value (TPV) calculation

1 TPVs are calculated by multiplying the number of pedestrians who pass over the railway by any route at the crossing within any period of 15 minutes by the number of trains passing over the crossing in the same period.

2 Normally a census *[should be taken]* over a nine day period, between the hours 06.00 and 24.00, ~~should be taken~~, particularly where high volumes or vulnerable groups of pedestrians are involved. Where the number of pedestrians is low, the actual number may be determined by an estimate.

3 Where the data ~~is~~ *[are]* obtained from a census, only the maximum number of pedestrians for *[in]* any period of 15 minutes in the day needs to be established. Where an estimate is accepted, the number of pedestrians used in calculating TPV should be deemed to be 75% of the largest hourly value to obtain an equivalent maximum figure for a period of 15 minutes to cater for the nonuniform distribution of pedestrian flow.

4 The number of trains should be deemed to be 25% of those passing over the crossing in a period of one hour. This hour should be either:

(a) the same hour used to give the estimated hourly value of numbers of pedestrians; or

(b) the hour which includes the 15 minutes when the pedestrian number is established by census.

5 The number of trains should be rounded up to the next integer and should not normally be less than one.

Appendix D - Common terms

Where possible the document has been written in plain English and the use of technical expressions or jargon has been avoided. However, to keep the document reasonably concise and to avoid the repetition of phrases which only serve to provide an extended definition, some words or expressions are used in a way which has a slightly wider meaning than their natural meaning, or a meaning that is different ~~to~~ *[from]* that accepted by disparate parts of the ~~R~~ *[r]*ailway ~~I~~ *[i]*ndustry.

The following are terms used within the document:

Railway terms

'***Railway'*** means a system of transport employing parallel rails which:

(a) provide support and guidance for vehicles carried on flanged wheels; a nd

(b) form a track which has a gauge of at least 350 mm or crosses a carriageway (whether or not on the same level)

'***Tramway'*** means a system of transport used wholly or mainly for the carriage of passengers:

(a) employing parallel rails which:

(i) provide support and guidance for vehicles carried on flanged wheels;

(ii) are laid wholly or partly along a road or in any other place to which the public has access (including a place to which the public has access only on making a payment); and

(b) on any part of which the permitted maximum speed is such as to enable the driver to stop a vehicle in the distance *[s/]*he can see to be clear ahead.

Note: In the context of tramways, 'highway' is used to mean any, or any combination of the following: carriageway, bridleway, cycle track, footpath, land on the verge of the carriageway or between two carriageways and any other place to which the public has access (including access only on making a payment).

'***Heritage railway***' means a railway or tramway which is operated to:
(a) preserve, re-create or simulate railways of the past; or
(b) demonstrate or operate historical or special types of of motive power or rolling stock;
and is exclusively or primarily used for tourist, educational or recreational purposes.
'Other guided transport system' means a system, other than a railway or tramway, where the vehicles operating on it are guided by means external to the vehicles (whether or not the vehicles are also capable of being operated in some other way). The term therefore includes monorails and airport transit systems. *[and guided busways?]*
Note: Trolleybuses are excluded because they are not in any circumstances guided externally *[unless on guided busways?]*, and funiculars are not included because they fall under the
definitions of railway or tramway.

People terms

'People' means workers on the railway, passengers, emergency services personnel, people on business, level crossing users and trespassers (those who are on railway property when they have no right to be there) on the railway.
There are four types of 'people':
(a) 'Workers' means staff and contractors directly employed on the railway (including the train crew, station staff, signalling staff etc) and contractors employed in the supply industries, maintenance facilities and disposal organisations. The workers may be employed at a fixed location or move about the railway.
(b) 'Passenger' means any person who is on railway property and is travelling, or intends to travel, or has recently completed travelling on the railway. Consideration should be given to a wide range of passenger characteristics and classifications, for example:
• passengers who are disabled (e.g. sight, hearing or mobility);
• children and unusually short or tall adults;

• passengers with heavy luggage, pushchairs, *[cycles]* young children etc.
Passengers may be on the station premises (waiting to purchase a ticket, waiting on the platform etc) or on a train.
(c) 'People on business' means people who:
• visit railway premises as non-travelling 'passengers' (people meeting or seeing off passengers, train spotters, customers of station retail units etc); *[and/or]*
• are official visitors to the railway.
(d) 'Level crossing users' means people crossing the railway on or at a level crossing. This includes pedestrians, horse-riders and occupants of road and agricultural vehicles.

Infrastructure terms

'Infrastructure' means fixed assets used for the operation of a transport system *[including]* ~~which shall include, without prejudice to the generality of the foregoing~~
(a) its permanent way *[needs defining?]* or other means of guiding or supporting vehicles;
(b) any station; and
(c) plant used for signalling or exclusively for supplying electricity for operational purposes to the transport system.

Station terms

'Station' means a passenger stop, station or terminal on a transport system, but does not include any permanent way or other means of guiding or supporting vehicles or plant used for signalling or exclusively for supplying electricity for operational purposes to a transport system.

Train terms

'Train' includes any rolling stock and means any vehicle or combination of vehicles which run on the railway. Therefore, a train may consist of a single vehicle or a number of vehicles coupled together including any locomotives or power units. A train may be composed of one or more vehicles and vehicle inter-connections. These can be passenger and freight, also maintenance and construction, vehicles. It also includes on-track machines, engineers' trolleys,

cranes and other plant while operating on a railway (commonly referred to as on-track plant or machines). For tramways 'train' means a tramcar or two or more tramcars coupled together and includes non-passenger vehicles *[and on-track plant and machines?]*.

Electric traction system terms

'Electric traction system' means the electrical equipment and conductors necessary to power trains on the railway. It includes the switchgear and transformers which control the electric current at line voltage, the distribution network and overhead line or conductor rail equipment. It does not include the *[current-]*collection equipment of the train or other on-board equipment.

Safety terms

'***Foreseeable'*** means that which is likely or possible.

'Hazard' means a situation with the potential to cause harm including human injury, damage to property, plant or equipment, damage to the environment, or economic loss.

'Risk' means the chance of something adverse happening and its severity. It is the combination of the probability, or frequency, of the occurrence of a defined hazard and the magnitude of the consequences of the occurrence.

'Safety' means the freedom from unacceptable risks of personal harm, ie the avoidance of accidents and incidents *[do these need defining?]*.

Operational conditions or states

'Normal conditions' means the conditions which a part of the railway is designed to accommodate. This would include the peaks, eg rush hours, and troughs in demand experienced during the day.

'Degraded conditions' means the state of the part of the railway system when it continues to operate in a restricted manner ~~due to~~ *[despite?]* the failure of one or more components.

'Abnormal conditions' means extreme loading on a part of the railway system. For example, this may be the result of extended delays on one part of the service impinging on another.

'Emergency situation' means a ~~current~~ unforeseen or unplanned event which has life threatening or extreme loss implications and requires immediate attention, eg a fire.

Level crossing terms

Some terms that relate specifically to level crossings have a special meaning.

[There are other terms found in the document which may merit inclusion here, such as obstacle detector and approach locking, both used in Table 1, service braking distance in paragraph 105, stopping/non-stopping control in paragraph 107, structure gauge in paragraph 237]

'Actual daily road vehicle user' means the number of road vehicles passing between 06.00 and 24.00 averaged over a 9-day period.

'Acute (skew) crossing' is a crossing at which the angle measured in an anticlockwise direction from the road to the running rail is less than a right angle.

'Automatic crossing' is a crossing where the protective equipment is automatically activated by the approaching train.

'Control point' is a location from which the equipment at a crossing is controlled.

'Crossing length' applies to any vehicular crossing. At a crossing equipped with gates or full barriers it is the distance between the gates or barriers measured across the railway. At an open crossing or one equipped with half barriers it is the distance measured from the give way or stop line to a point at which a road vehicle would be clear of the railway or crossing equipment on the far side.

'Crossing speed' applies to locally-monitored crossings or open crossings. It is the maximum speed at which trains are allowed to travel from a point defined by a special speed restriction board on the approach to a crossing until the front of the train arrives at the crossing. It should not be less than 15 km/h and should be selected so that in normal visibility train drivers will have a clear view of the crossing (not more than 600 m *[what exactly does this distance define?]*) before reaching braking distance from it.

'Decision point' applies to user-worked crossings, footpath crossings and bridleway crossings. It is a point where guidance on crossing safely is visible and at which a decision to cross or wait can be made in safety. For footpath crossings this should be not less than 2 m from the nearest running rails or 3 m where the line speeds are higher than 160 km/h. For bridleway crossings and

Further information

This document contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do. *[This is more in the nature of an explanatory note than "further information" – a term which raises expectations of an indication of where this can be sought.]*

Chapter 3: A guide to ~~the~~ *[submitting]* level crossing order*[s]* ~~submissions~~

1. Overview and introduction

1.1 Overview

When the construction of railways was authorised, mainly in the 19th century, the individual enabling Act of Parliament specified how the railway was to cross other ways (e.g. roads and footpaths), either by bridge or on the level. Where the crossing was on the level, the arrangements for protecting the users, both railway and highway, were specified.

Since initial construction, use of the roads and railway has changed considerably, as has the cost of and delay caused by level crossings, and from the 1950s level crossings have been modernised to permit remote or automatic operation with lifting barriers and/or road traffic signals.

In order to permit the railway operator to change the protective arrangement specified in the original Act, a legal process was introduced which empowered the Secretary of State for Transport to make statutory Orders specifying the new or updated arrangements at individual crossings to which the public has access. This process is currently authorised through provisions in the Level Crossings Act 1983.

This Order making process is managed by the Office of Rail Regulation (ORR) on behalf of the Secretary of State for Transport. The process is normally initiated by the operator of a level crossing, and requires consultation with the local traffic authority. An Order provides for the protection of those using a level crossing and may place duties on both the crossing operator and local traffic authority. An Order may make such provision as the Secretary of State considers necessary for the safety or convenience of crossing users, both road and rail.

This guide is intended to be an *aide-memoire* to assist railway level crossing operators in making level crossing Order submissions to ORR for consideration. It also provides information for statutory consultees on the process, together with other background information. It ~~has been amended and expanded to~~ take*[s]* account of the changes introduced in the Level Crossings Act 1983 by the Road Safety Act 2006.

2.3 New level crossings

Except in exceptional circumstances, ORR does not support the creation of any new level crossings, of any type. A new public highway level crossing in England and Wales may require a Transport and Works Act Order1 or other appropriate statutory authorisation to create 'the right to cross the railway on the level'. Similarly in Scotland, an Order under the Light Railways Act 1912, a Scottish private Act or, when brought into force, an Order under the Transport and Works (Scotland) Act 2007 may be required. ORR is consulted on such proposals and may object during any relevant consultation exercise. Normally, any new road required to cross a railway should do so by a bridge or underpass.

Where a new level crossing is authorised under the Transport and Works Act 1992 or similar legislation, a level crossing Order (obtained by the processes outlined in this document) may be needed to specify the necessary protective arrangements.

3. Level Crossing Order scope, content and format

A level crossing Order details the protective arrangements at a level crossing. A new or amended Order may bring about changes to those protective arrangements. Orders can revoke earlier Orders, disapply requirements under other legislation (for example the authorising Act, a Light Railway Order or an Order made under the Transport and Works Act 1992) and enable road traffic signs (including signals and road markings) to be placed (and have legal effect) upon a highway or other road to which the public has access. It may place duties on both the level crossing operator and the local traffic authority, in relation to the safety or convenience of users of the crossing.

1 See Section 1 & Schedule 1 of the Transport and Works Act 1992. Transport and Works Act Orders are dealt with by the Transport and Works Act Unit, Dept for Transport, Great Minster House, 76 Marsham Street, London, SW1P 4DR *[or, in Scotland, …?]*

Any level crossing on a “highway2 or other road to which the public has access” may be subject to a level crossing Order made under the Level Crossings Act 1983. “Access” includes pedestrian, vehicular or on horseback, and is not restricted to a public right of way. It is a matter of fact, rather than right. Thus an Order may be made for a “private” crossing if the public has access to it, even though there are no public rights of way over it or over the road up to the crossing.

Level crossing Orders may normally only be requested by the operator of the crossing (defined in relation to a level crossing as the person carrying on an undertaking which includes maintaining the permanent way at the crossing3). However, the Secretary of State may make an Order without the request of an operator, and the ORR may, by serving notice on an operator, require the operator to request an Order.

The level crossing Order specifies how the crossing shall be operated and the protective equipment (which includes barriers, traffic signs, signals and road markings) to be provided at the crossing by both the operator and local traffic authority.4 The type of level crossing should normally conform with one of the types described *[elsewhere]* in ~~other~~ *[this]* guidance *[document]* ~~(Railway Safety Publication 7 – Managing level Crossings: A Guide for Users, Designers and Operators)~~. The level crossing Order consideration process takes account of the safety and convenience of users, road and rail, and the status of the crossing. Where necessary and appropriate to particular circumstances at individual crossings, protective arrangements may be varied from the standard guidance.

Orders normally contain several parts:

The Order itself, ~~which~~ contains the citation, principal duties, revocation of earlier Orders and other details. It records who applied for the Order in its title,

2 See definition in the Level *Crossin[g]s* Act 1983, inserted by the Level Crossing Regulations 1997 and the ~~h~~*[H]ighways* Act 1980

3 See section 1(11) Level Crossings Act 1983

4 See the amendments made to section 1(20(a) of the Level Crossings Act 1983 by section 50(2) of the Road Safety Act 2006

though this does not affect the validity of the Order if the operator subsequently changes. It may also explicitly or implicitly disapply parts of earlier legislation applying to the crossing.

Three supporting Schedules, which contain details of:

- The location of the crossing (in both road and railway terms), together with a record of the local traffic authority and, if appropriate, the status of the crossing for which the protection is provided (Schedule 1);
- What equipment the operator must provide (Schedule 2 part 1);
- How the operator must operate the crossing (Schedule 2 part 2);
- What the local traffic authority must provide (Schedule 3 part 1); and
- How the local traffic authority shall conduct its undertaking in relation to the level crossing (Schedule 3 Part 2).

Orders for each type of crossing are made to a standard format, for which templates are available from ORR on application. However, where particular features, requirements or equipment need to be included, any proposed additional wording should be discussed with ORR at an early stage. Templates normally contain a number of options or alternative paragraphs (dealing with yellow box markings or centre of carriageway markings, for instance).

Any change that affects, or alters, the content of a level crossing Order (including variation and amendment Orders) requires statutory consultation (see timescales below). There is no mechanism for exemption from statutory consultation, nor can the minimum ~~consultation and~~ two-month period for representations be reduced.

Level crossing Orders can amend or vary earlier Orders, and can revoke an earlier Order completely. Orders can also disapply any other legislative requirements relating to protection of the crossing.

Amendment or variation Orders can be used to amend or vary individual words or paragraphs. Variation and amendment Orders that affect an earlier Order must explicitly provide for the earlier Order to remain in force.

ORR will not normally progress a variation or amendment Order, and will require the submission of a new, complete draft Order:

• where there are significant changes to any existing Order;
• where a change of level crossing type is proposed;
• where there are already three or more existing amendments or variations to an original Order;
• where the traffic sign numbering within an existing Order relates to other than the current edition of the Traffic Signs Regulations and General Directions 2002; or
• where significant time (more than two years) has elapsed since consultation, commissioning has been delayed, or circumstances have changed significantly since the original consultation.

New Orders other than variation and amendment Orders should explicitly revoke all earlier Orders together with any amendment or variation Orders that have not previously been revoked.

Where an earlier Order is revoked, the correct, full citation as quoted (This Order may be cited as…) in the earlier Order itself must be used.

4. Level Crossing Order request and consideration process

A "flow chart" outlining the order making process can be found at Figure 1 *[Needs renumbering? There is already a figure 1 in the document]* . It is intended to be illustrative rather than prescriptive. In general, the earlier matters are discussed and resolved, the less scope there is for unforeseen timescale and resource problems to affect implementation of the proposed works.

4.1 Initial proposals

Level crossing modernisation project teams should make ORR aware of their proposals 12-24 months or more in advance of the proposed commissioning date so as to allow time to discuss the engineering aspects and the draft level crossing Order with ORR. At this stage it is important to resolve issues of principle, such as to what extent the crossing should meet current standards, or whether renewal as a different type of crossing will be required, for instance in the case of AOCL crossings. Consideration should to be given at this stage ~~as~~ to whether a public consultation meeting will be needed (see public meetings below). Either at this stage or as part of the initial consultation with ORR and the local traffic authority, a site visit ~~of~~ *[by]* interested parties should normally be arranged.

The proposed use of any novel equipment may require special consideration and should be discussed with ORR at this stage.

4.2 Consultation with Local Traffic Authority and ORR

New consultation provisions have been introduced by the Road Safety Act 20065. Before submitting a request for an Order to the Secretary of State, an operator must consult both ORR and the local traffic authority about the draft Order he intends to submit to the Secretary of State, and must allow a reasonable period for them to make representations. This new requirement for consultation in advance of the formal request for the Order represents a formalisation of existing good practice. The purpose is to permit any matters of concern to be raised and resolved in advance of the Secretary of State's formal consideration of the Order. These amendments to the Level Crossings Act also permit level crossing Orders to place requirements on local traffic authorities6. Clearly, the proposed content of an Order, in particular the schedules placing duties on the local traffic authority, needs to be discussed at ~~an~~ *[as]* early a stage as possible, and particular attention should be given to the first consultation under the new arrangements with each local traffic authority. Attention should also be given at this stage to establishing an agreed status of the crossing, particularly where private vehicular rights are involved. Ideally, all matters should be resolved at this time, and the statutory consultation process should not raise any further issues or matters of comment.

As a minimum, the crossing operator must consult with the local traffic authority in the area the crossing is situated, and the ORR. There is no longer a statutory duty to consult with the planning authority, but ORR considers that it is good practice to continue to do so. The crossing operator should consider consulting on a*[s]* wide~~r~~ *[a[* basis as is felt necessary, for instance with planning authorities, parish and community councils. In the case of crossings with private rights, consideration should be given to consulting the authorised users and the owner of the private road. Consideration may also need to be given to consulting the

5 See the new sections 1(8) and 1(8A) to the Level Crossings Act 1983 introduced by section 50(7) of the Road Safety Act 2006

6 See the new section 1(2)(a) to the Level Crossings Act 1983 introduced by section 50(2) of the Road Safety Act 2006

authorised users, if the crossing is an accommodation or occupation crossing with public footpath or bridleway rights. Where operation of the crossing involves a train operator, such as for train crew operated crossings or automatic crossings initiated by station staff, the relevant train and station operators must be consulted. Responses to this consultation should be directed to and be considered by the crossing operator.

There is no statutory guidance on the process required or how far in advance of the draft Order circulation date this consultation should be carried out. However, it will need to include a written summary of the proposal, a preliminary draft of the proposed Order and an outline layout, and may, where appropriate and practicable, include a site visit. A record should be kept of issues raised and the considerations and decisions arising from ~~it~~ *them]*.

Evidence that consultation has been carried out, how it was done, what responses were received and what action has been taken should accompany the later draft Order submission.

Public Meetings

Although not a statutory requirement, “public” consultation meetings should also be considered and held with relevant local authorities and other relevant bodies as part of this consultation process where there are significant changes to the method of operation planned (e.g. conversion of manual gates to automatically controlled barriers). Such meetings within the local community, to describe the railway operator’s proposals, will give advance warning of local concerns and allow time to consider any objections raised by the communities concerned. The organisation and cost of such meetings are the railway operator’s responsibility; ORR has, in the past, chaired such meetings in an independent capacity, and is prepared to continue doing so when requested, provided sufficient advance warning is given. Minutes should be kept and distributed to the communities concerned and ORR. Such meetings should be held as early as possible (12-24 months in advance). Local representatives such as the highway and planning authorities, town, parish and community councils, police (local as well as British Transport Police), other ~~E~~*[e]mergency* ~~S~~*[s]ervices*, National Farmers Union and any other significant local users should be invited as appropriate.

The railway operator should be prepared to give a brief presentation explaining the operation of the proposed level crossing and should be able to answer technical and any other questions. ORR will be pleased to explain the legislation and Order making process to those present. A record should be kept of items raised at these meetings.

Any undertakings made to local communities should be carefully considered before being given, as failure to honour undertakings can lead to such issues being raised again during the formal consideration of the Order, thus possibly delaying the making of the Order.

4.3 Draft Order submission and supporting information required

A list of supporting documents and information required to accompany Order requests is provided in Appendix C. Which documents need to be provided will depend on the particular circumstances of each level crossing, and the list is for guidance and is neither exhaustive nor prescriptive. Where there are deviations from established guidance or practice, these should be justified. Evidence of the legal status of the crossing should be provided, if necessary.

If you have any doubts on what information is required, please contact ORR before making your submission. The information provided should come from one single point of contact in the relevant part of the organisation, for instance the level crossing risk manager.

New section 1(8) of the Level Crossings Act 1983 requires the crossing operator, after having consulted ORR and the local traffic authority about the draft Order, *[then]* to ~~then~~ give them written notice of the operator's intention to make a request for an Order to the Secretary of State. That notice must specify a period (of at least 2 months) within which ORR and the local traffic authority can make representations to the Secretary of State, and this notice must be accompanied by a copy of the draft Order that is being requested.

The consultation letter to the local traffic authority and the ORR should include an end date for consultation (minimum two months), and a proposed or likely commissioning date for the new arrangements. (See other comments on ORR's assessment timescales *[where?]*). Responses or objections from consultees at this stage

should be directed to the Secretary of State c/o Mr DG Wilson, HM Principal Inspector of Railways, ORR, One Kemble Street, London, WC2B 4AN.

an Order, and the consultation cycle will need to be restarted from the initial consultation phase. ORR is anxious to avoid wasted effort by operators, local authorities and its assessment team and encourages early liaison to ensure all necessary information will be available when required.

Consultation

Before submitting a request for an Order, the crossing operator must formally advise and consult the ORR and the local traffic authority of its intention to do so. (section 1(8A) of the Level Crossings Act 1983). ORR advises that the local planning authority should also continue to be consulted, even though there is no longer a statutory requirement to do so. The timescales are not set down, but this should be undertaken at the earliest opportunity. Sufficient time should be allowed for a public meeting if necessary and, once the consultation is started, sufficient reasonable time should be allowed for responses to this consultation to be made and considered. Two months may be considered as an absolute minimum for this to be done effectively. If adequate time is not allowed, or the consultation is otherwise ineffective, it may result in comments being made and needing to be considered after the statutory consultation. In the worst case, if consultation is not effectively carried out, the subsequent draft Order submission might be legally challenged.

Circulation of draft Order

After submitting a draft Order, a minimum period of two calendar months is required for the receipt of representations before the statutory consideration of the Order (section 1(8A)). The last date for comments should be included in the letter accompanying the draft Order. Note that new level crossing Orders, and variations or amendments to existing Orders, however minor the changes, all have to go through a statutory consultation process in full. There is no power in the Level Crossings Act to shorten or waive the minimum consideration period.

Consideration of draft Order together with any consultation responses

Consideration of draft Orders and *[the]* making of a recommendation for signature cannot take place until the consultation period has ended. Consideration of the draft Order and any comments will lead on to a recommendation being made for the making of the Order. The recommendation can be that the Order is made as submitted, that an Order is not made, or that an amended Order is made. In practice the majority of Orders made fall into the ~~latter~~ *[last]* category.

Crossing operators are therefore advised to allow an absolute minimum of four months between circulation of the draft Order and the proposed commissioning date. The level crossing is required to comply with the level crossing Order at all times and, therefore, the crossing operator must ensure that the new Order is dated to 'come into force' on the commissioning date.

The earlier crossing operators make the application for an Order, the less likely it is that there will be timescale problems. Whilst ORR will make every attempt to meet reasonable project timescales, it cannot deal with last-minute applications unless there are exceptional circumstances. Poor planning will not be considered as an exceptional circumstance.

The required "coming into force" date should normally be confirmed to ORR. Cancellation or postponement of a planned commissioning should be advised to ORR at the earliest opportunity. Once made, an Order cannot easily be unmade.

5. Information for local traffic and planning authorities

A process for making Orders in relation to level crossing protection has been in place since the late 1950s, and local authorities have, since that time, been part of that process. Even before level crossing modernisation began, local highway authorities had responsibility for traffic signs on the road approaches to level crossings, and this responsibility has not changed.

The modifications to the Level Crossings Act 1983 introduced by the Road Safety Act 2006 formalise current good practice in securing consultation on changes to level crossings in advance of formal circulation of a draft Order. The changes also permit the Order to record and clarify the local traffic authority's existing responsibility for the traffic signs on the approaches to the crossing.

Where new traffic control measures are required (such as *[a]* centre of carriageway "median strip" to prevent "zig-zag*[ging]*" around half barriers) the responsibility for provision and maintenance should be agreed through consultation and incorporated in the draft Order. The final division of responsibilities will be made clear in the signed level crossing Order. As a general principle, it may be considered appropriate for the party introducing any increased risk to bear the responsibility for controlling it. Where there is any failure to provide or maintain any traffic signs required by the Order, ORR will consider whether formal enforcement is appropriate.

6. Temporary vehicular level crossings and temporary increased use

The bringing into use of temporary level crossings, (excepting those for ~~the~~ sole use by employees of the relevant transport undertaking) for instance to enable construction works to take place, must comply with the Railways and Other Guided Transport Systems (Safety) Regulations 2006. This also applies in the case of temporary increased use of private level crossings.

If the crossing is one to which the public has access, and protective arrangements differing from those required by the 1845 Railway Clauses Consolidation Act are needed, it may be appropriate to record arrangements in a level crossing Order.

User-Worked Crossings

Any project involving a change to line speeds over a length of route will require reassessment of all user-worked crossing risk assessments. Closure, where possible, should be pursued. Self-verification is required under the Railways and Other Guided Transport Systems (Safety) Regulations 2006. Where a private user worked crossing is one to which the public has access, any significant changes may make it appropriate for all protective arrangements to be recorded in a level crossing Order.

7. Requiring a request for a level crossing Order

The Level Crossings Act 1983 section 1(6A) gives ORR, where it is of the opinion that an Order is required, the power to issue a written notice to the operator of a crossing to require the operator to request a level crossing Order. The notice will contain details of the reasons for the opinion, and places a statutory duty on the operator to request an Order.

The subsequent request for an Order will be considered by ORR as normal, but the subsequent making of the Order is not delegated to ORR in these circumstances. In such cases the Order is made by the Secretary of State, taking into account any recommendation from ORR.

If the operator declines to make a request for an Order, the Secretary of State can be advised to make an Order without a request. Alternatively, ORR may serve an improvement notice, under the Health and Safety at Work etc Act

purposes of section 54(4) of that Act as having been placed as provided by that Act.
(4A) Nothing in subsection (3)(b) above affects any provision made by or under Part 1 of the Health and Safety at Work etc. Act 1974.
(5) An order under this section –
(a) may be varied or revoked by a subsequent order under this section; and
(b) may impose requirements as to protective equipment provided before the making of the order.
(6) The Secretary of State may make an order under this section in respect of a level crossing on being requested to do so by the operator of the crossing or without a request by the operator.
(6ZA) The Secretary of State may not make an order without a request by the operator unless
(a) he has consulted the Office of Rail Regulation and the local traffic authority about the order he proposes to make; and
(b) having done so, he has sent to the operator, the Office of Rail Regulation, and the local traffic authority a copy of a draft order he proposes to make and a notice specifying the period (not being less than two months) within which they *[may]* make representations to him in respect of his proposal to make the order.
(6A) Where the Office of Rail Regulation gives written notice to an operator of a crossing that in its opinion a request should be made to the Secretary of State to make an order under this section in respect of that crossing and the notice states the reasons for that opinion, the operator shall be under a duty to make such a request.
(7) Where the operator of a crossing requests the Secretary of State to make an order under this section, the request shall be accompanied by a draft of the order which the operator is requesting the Secretary of State to make.
(8) Before making a request the operator–
(a) must consult the Office of Rail Regulation and the local traffic authority about the draft order he intends to submit to the Secretary of State; and

"protective equipment" includes barriers, lights, traffic signs, manual, mechanical, automatic, electrical, telephonic or television equipment or other devices;
"road" means any highway or other road to which the public has access; and
"traffic sign" has the same meaning as in the Road Traffic Regulation Act 1984.
2.- (1)This Act may be cited as the Level Crossings Act 1983.
(2) This Act shall come into force at the end of the period of three months beginning with the day on which it was passed.
(3) This Act does not extend to Northern Ireland.

Appendix C Supporting documentation required for assessment and level crossing Order process checklist

Items on this list will normally be required, but the particular circumstances at each individual level crossing will need to be considered to determine whether all the items listed are required, or whether additional documentation may be needed to support the assessment.

Major works at existing level crossings, including change in protection method, complete renewal or major modernisation

1) A statement of compliance with standards and regulations, signed by a competent person within the crossing operator's organisation.
2) An outline project description and risk assessment, together with justification that the type of protection proposed is suitable for current or foreseeable road and rail traffic levels.
3) Ground plans showing the level crossing at a scale of 1:50 or 1:100.
4) A plan, at a suitable scale, showing the highway approaches and positions of all proposed signs and road markings. A sketch should show~~ing~~ the position of road traffic signals and barriers.
5) For all automatic crossings, a scale drawing detailing the category of road profile proposed, and showing the vertical road profile across the full width of carriageway over the crossing and on all approaches for a distance of 30 metres from the nearest rail. The drawing should demonstrate that the claimed profile is achieved. (Items 3, 4 & 5 can be presented on one drawing.)
6) As appropriate to the submission, signalling scheme plans (or relevant parts) showing:

a) for Automatic Half Barrier Crossings [AHBC]

'Strike in points', control tables *[definition needed?]* for protecting signals if there are station controls
or similar within the scheme, distance of protecting signals from the crossing and line speeds and calculations relating to the acceleration of trains, where required.

b) for Automatic Half Barriers Locally Monitored [ABCL] and Automatic Open Crossings Locally Monitored [AOCL]

The position of stop boards, special speed restriction boards (SSRB), advance warning boards (AWB), 'strike in points', details of the calculations and standards used to position the boards and strike in points, gradients and line speeds (please contact ORR in advance of making any AOCL or ABCL submission if other signalling alterations are proposed in the vicinity of the level crossing).

c) for Automatic Open Crossings Locally Monitored [AOCL]

A robust, comprehensive, risk assessed justification for the continued provision of AOCL type crossing equipment (or Manually Operated Crossings Locally Monitored) rather than any form of barrier crossing will be required in all cases. Orders for new AOCL crossings will not normally be considered.

d) for Open Crossings [OC]

The position of stop boards, special speed restriction boards (SSRB), advance warning boards (AWB), calculations and standards used to position the boards, gradients, line speeds and details of the viewing zone proposed.

e) for Manually Controlled Barriers with CCTV (MCB CCTV) and for Manually Controlled Barriers (MCB)

The position of protecting signals and control tables, the position of 'strike in points', if authority for auto-lowering is sought, gradients and line speeds.

f) for Miniature Stop Light crossings (MSL)

'Strike in points', control tables for protecting signals if there are station controls *[requires definition?]*

or similar within the scheme, distance of protecting signals from the crossing, line speeds and details of authorised usage of the crossing.

7) A detailed road traffic *[and pedestrian?]* census covering a minimum of a representative 9-day

period between 0600-2400 hours to accompany all automatic crossing submissions, particularly AOCL, and at MCB CCTV crossings, if authority for auto-lowering is sought,. Seasonal variation in traffic levels should be addressed in any supporting census analysis. Permitted and normal road traffic approach speeds should be included. Rail traffic census details should also be supplied. Recent (less than 18 months old) traffic and pedestrian census

Appendix D - Legislation and publications

Legislation:

Level Crossings Act 1983 (as amended by the Level Crossings Regulations 1997 and the Road Safety Act 2006)
The Railways and Other Guided Transport Systems (Safety) Regulations 2006
Transport and Works Act 1992 *[and Scottish equivalent?]*
The Railway Clauses Consolidation Act 1845 (and Scottish version)
Private Crossings (Signs and Barriers) Regulations 1996
Traffic Signs Regulations and General Directions 2002 (as amended by the Traffic Signs (Amendment) Regulations and General Directions 2008
Traffic Signs Regulations (Welsh & English Language Provisions) and General Directions 1985
New Roads and Streetworks Act 1991
Railway Safety (Miscellaneous Provisions) Regulations 1997
Railway Safety Regulations 1999

Publications: *[publishers to be identified?]*

Guide to the Level Crossing Regulations 1997. (ISBN 0 7176 1261 9)
Chapters 4/5, The Traffic Signs Manual (ISBN 978 0 11 552411 0 & 0 11 5524797)
Installation of Traffic Signals and Associated Equipment (ISBN 0 11 552008 2)
Safety at Street Works and Road Works, Code of Practice (ISBN 0 11 551958 0)
Railway Group Standards & Network Rail Line Standards and Codes of Practice
Guidance on the use of Tactile Paving Surfaces (rev June 2007)
Prevention of Trespass & Vandalism on Railways - a good practice guide (ISBN 0 7176 1661 4)