



Warwickshire County Council Highway Safety Inspection Manual

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1. Introduction

The Highway Safety Inspection regime has been developed in accordance with the recommendations contained in the Code of Practice for Well Managed Highway Infrastructure (2016).

Our regime is set out within a framework of risk assessment and inspection frequency, which takes account of all road users, including those who are most vulnerable. Our main objectives are:

- To locate and identify defects on the highway, and where appropriate, adjacent to the highway.
- To assess the potential risks of damage and/or injury to highway users that may result from these defects.
- To ensure that appropriate measures are put in place to manage the risk.
- To ensure that the measures are effective in eliminating, or at least minimising the risk.

The manual sets out how defects that may create a danger or serious inconvenience to highway users are to be dealt with through a system of inspection and referral for repair where necessary. Defects that meet the stated investigatory criteria are to be assessed against the risk assessment matrix. This will determine the degree of risk they may pose to a highway user and the appropriate response.

2. Legislation

Section 41 of the Highways Act 1980 places a statutory duty on all Highway Authorities to maintain the highway network under their control.

The establishment of an effective regime of inspection, assessment, recording and prioritisation of defect repairs is a crucial component of highway maintenance. This provides a robust framework to address key objectives to maintain the highway, as required by Section 41.

Section 58 of the Highways Act 1980 gives the authority an opportunity to offer a defence to the proven failure of Section 41 by demonstrating that reasonable care has been taken to 'secure that the part of the highway to which the action relates' to a level commensurate with the volume of ordinary traffic such that it 'was not dangerous to traffic'.

Member councils of the Midland Service Improvement Group (MSIG) in complying with the duty to maintain have collaborated to develop a set of high-level principles for the risk-based approach to highway safety inspections. Warwickshire County Council (WCC) have adopted those principles and carry out highway safety inspections in accordance with the MSIG approach, adapted for local circumstances, in order to provide a special defence by virtue of Section 58.

3. The Maintenance Hierarchy

A road network hierarchy based on asset function is the foundation of a risk-based maintenance strategy as set out in recommendation 12 of the Well Managed Highway Infrastructure code of practice.

Recommendation 12 – Network Hierarchy

A network hierarchy, or a series of related hierarchies, should be defined which include all elements of the highway network, including carriageways, footways, cycle routes, structures, lighting and rights of way. The hierarchy should take into account current and expected use, resilience, and local economic and social factors such as industry, schools, hospitals and similar, as well as the desirability of continuity and of a consistent approach for walking and cycling.

The carriageway and footway network have been assessed against a range of operational factors which together reflect the level of use and relative importance of localised parts of the highway network.

Carriageway hierarchy

The carriageway hierarchy has been developed in accordance with the table provided in paragraph A.3.3.11 of the code of practice. The table provided in the code of practice is intended to be a reference point.

WCC have identified the sectional carriageway hierarchy as shown in table 3.1.

Table 3.1 - Carriageway hierarchy

Category	Type of Road/General Description	Description
Motorway	Limited access - motorway regulations apply	Routes for fast-moving long-distance traffic. Fully grade separated and restrictions on use.
Strategic Route	Trunk and some Principal 'A' class roads between Primary Destinations	Routes for fast-moving long-distance traffic with little frontage access or pedestrian traffic. Speed limits are usually in excess of 40 mph and there are few junctions. Pedestrian crossings are either segregated or controlled and parked vehicles are generally prohibited.
Main Distributor	Major Urban Network and Inter-Primary Links. Short - medium distance traffic	Routes between Strategic Routes and linking urban centres to the strategic network with limited frontage access. In urban areas speed limits are usually 40 mph or less, parking is restricted at peak times and there are positive measures for pedestrian safety.
Secondary Distributor	B and C class roads and some unclassified urban routes carrying bus, HGV and local traffic with frontage access and frequent junctions	In residential and other built up areas these roads have 20 or 30 mph speed limits and very high levels of pedestrian activity with some crossing facilities including zebra crossings. On-street parking is generally unrestricted except for safety reasons. In rural areas these roads link the larger villages, bus routes and HGV generators to the Strategic and Main Distributor Network.
Link Road	Roads linking between the Main and Secondary Distributor Network with frontage access and frequent junctions	In urban areas these are residential or industrial interconnecting roads with 20 or 30 mph speed limits, random pedestrian movements and uncontrolled parking. In rural areas these roads link the smaller villages to the distributor roads. They are of varying width and not always capable of carrying two-way traffic.
Local Access Road	Roads serving limited numbers of properties carrying only access traffic	In rural areas these roads serve small settlements and provide access to individual properties and land. They are often only single lane width and unsuitable for HGVs. In urban areas they are often residential loop roads or cul-de-sacs.
Minor Roads	Little used roads serving limited number of properties	Locally defined roads.

Footway hierarchy

Footway maintenance standards are unlikely to be reflected by road classification. It is the number and nature of pedestrian usage that counts, rather than the classification or hierarchy of the road. Local factors such as the proximity of schools and shops are important in this context.

WCC have identified the sectional footway hierarchy based on the risk-based approach shown in table 3.2.

Table 3.2 - Footway Hierarchy

Category	Description
Prestige Walking Zones	<ul style="list-style-type: none">• The main pedestrianised shopping streets within the main urban centre
Primary Walking Routes	<ul style="list-style-type: none">• Urban centre shopping areas with greater than 30 shops• Main shopping street in local town centres with greater than 20 shops
Secondary Walking Routes	<ul style="list-style-type: none">• More than 5 shops• Entrance to schools• Entrance to Hospitals• Entrance to large supermarkets• Outside transport Interchanges
Link Footways	<ul style="list-style-type: none">• Local shops/retail premises• Religious meeting places• Industrial estates• Residential homes or care homes
Local Access Footways	<ul style="list-style-type: none">• Predominately residential streets• Low usage rural footways

4. Frequency of Inspection

The maintenance hierarchy has been used to formulate the frequency that safety inspections will be undertaken. The frequency of inspection is determined in accordance with tables 4.1 and 4.2.

Table 4.1 – Carriageway Inspection Frequency

Category	Inspection Frequency
Strategic Route	Monthly
Main Distributor	4 times a year
Secondary Distributor	3 times a year
Link Road	Twice a year
Local Access Road	Once a year
Minor Roads	Once a year

For footways and pedestrian areas, the frequency of inspection will be determined from whether the feature is inspected as part of a driven inspection or as part of a dedicated walked inspection. The frequency as part of a driven inspection will be as above for carriageways and will include where lengths are inspected on foot as part of a driven inspection. The frequency of inspection for dedicated walked inspection is:

Table 4.2 - Footway Inspection Frequency

Category	Inspection Frequency
Prestige Walking Zones	Monthly
Primary Walking Routes	Monthly

Inspection Frequency Tolerance

One of the purposes of defining inspection frequencies is to be able to demonstrate to a court of law that the County Council has taken due care to maintain its highways. The inspection team should always endeavour to undertake inspections to the target inspection frequency. However, it is accepted that this is not always possible and inspection tolerances have therefore been adopted as follows.

Table 4.3 – Driven Inspection Frequency Tolerance

Target Inspection Frequency	1 Month	3 Monthly	4 Monthly	6 Monthly	Annual
Tolerance	nil	Plus or minus 5 working days	Plus or minus 5 working days	Plus or minus 5 working days	Plus or minus 10 working days
Max period between inspections	31 days	14 weeks	18 weeks	28 weeks	56 weeks

For operational reasons it has been agreed that driven inspections on the strategic network should always be undertaken during the first week of the month. If for reasons beyond the control of the inspection team (e.g. substantial snow fall) an inspection cannot be carried out during this week then an entry will be made to document the circumstance and the inspection will be programmed as soon as conditions allow.

Table 4.4 - Walked Inspection Frequency Tolerance

Target Inspection Frequency	1 Month
Tolerance	Plus or minus 5 working days
Max period between inspections	38 days

5. Defect Definitions & Risk Assessments

The safety inspection regime uses a risk assessment process as recommended in the Code of Practice to determine the degree of risk a defect, which meets an investigation criterion impacts upon highway users.

Table 5.1 – Risk Matrix

		Probability/Likelihood of Interaction with Road User				
		Negligible	Low	Noticeable	High	Almost Certain
IMPACT	Negligible	1	2	3	4	5
	Low	2	4	6	8	10
	Moderate	3	6	9	12	15
	High	4	8	12	16	20
	Very High	5	10	15	20	25

Factors which the safety inspector may take into consideration when undertaking a risk assessment:

- Frequency of inspection, for example: heavier foot traffic areas such as shopping areas or pedestrianised zones will incur a higher risk when it comes to loose slabs, while primary routes and higher speed limits can pose a higher risk for vehicle damage from potholes or depressions.
- Location of Defect, for example: defects on a carriageway directly in the wheel track could be of a higher risk than a carriageway defect which is in-line with the kerb, where vehicles are less likely to travel.
- Size or Severity, for example: On the same stretch of road, in the same type of position, a defect which measures at 60mm deep, and 115mm in diameter could pose a significant risk and therefore need investigation, while a much smaller defect at 40mm deep, and 80mm in diameter will pose far less of a risk.

Key to selecting the appropriate action for a defect is the risk assessment process. Tables 5.2 and 5.3 will be used by the inspector to evaluate the impact and probability of injury or damage to a highway user.

Table 5.2 - Impact Rating

Impact Rating	Score	Description	Possible Indicators
Very High	5	The Hazard presented by the defect, or due to the short-term structural deterioration in the defect, could result in serious injury or a fatality.	Highway users will instinctively react to avoid the defect, and this will place them in peril. The defect could destabilise a vehicle and this will place highway users in peril.
High	4	The Hazard presented by the defect, or due to the short-term structural deterioration in the defect, could result in injury or serious claim against the Authority.	Impact will result in damage to persons or property, from which they are likely to recover. Highway users will instinctively react to avoid the defect. The defect could destabilise a vehicle.
Moderate	3	The Hazard presented by the defect, or due to the short-term structural deterioration in the defect, could result in injury or claim against the Authority.	Impact may result in minor damage to persons or property. Highway users would seek to safely avoid the defect. The defect would be felt when impacted but is unlikely to destabilise a motor vehicle.
Low	2	The Hazard presented by the defect, or due to the short-term structural deterioration in the defect, could result in minor injury or small claim against the Authority. If untreated the defect will contribute to the deterioration in the overall condition of the Highway Asset. The defect is likely to deteriorate further before the next safety inspection.	Most impacts will not result in any injury. Highway users are unlikely to react to avoid the defect and the impact will not interrupt their passage. The defect will be felt and recognised as a defect by most Highway users, and its presence will be a negative influence on their perception of the Highway Asset. If untreated the defect will accelerate the local deterioration of the Highway Asset.
Negligible	1	The Hazard presented by the defect, or due to the short-term structural deterioration in the defect, is unlikely to result in injury or claim, but the defect will contribute to the deterioration in the overall condition of the Highway asset. The defect is unlikely to deteriorate further before the next scheduled safety inspection.	The defect will be recognised by Highway Inspectors as requiring attention but is unlikely to be felt and recognised as a defect by most Highway users. The defect is very unlikely to cause injury.

Table 5.3 - Probability Rating

Probability Rating	Score	Description	Possible Indicators
Almost Certain	5	More than a 75% chance of occurrence.	<p>Vehicular, cycle or pedestrian speeds will be high. Vulnerable users and/or different transport modes regularly pass through the site.</p> <p>The location of the defect and the topography of the site will mean that it is difficult to a highway user to recognise and hence avoid the defect.</p> <p>Forward visibility may be compromised.</p>
High	4	50 – 75% chance of occurrence.	<p>Vehicular, cycle or pedestrian speeds may be high, but vulnerable users and/or differing modes are less likely to share the highway at this location.</p> <p>Responsible highway users may be able to recognise and take action to mitigate the impact of the defect.</p> <p>Forward visibility is good.</p>
Noticeable	3	25 – 50% chance of occurrence.	<p>Vehicular, cycle or pedestrian speeds are moderate or low.</p> <p>Vulnerable users and/or different transport modes are unlikely to share the highway at this location.</p> <p>The majority of responsible highway users will be able to recognise and take action to mitigate the impact of the defect.</p>
Low	2	10 – 25% chance of occurrence.	<p>Vehicular, cycle or pedestrian speeds are very low.</p> <p>The speed differential between users is very likely to be low.</p> <p>The majority of responsible highway users will be able to avoid the defect.</p>
Negligible	1	Less than 10% chance of occurrence.	<p>Vehicle speeds and traffic flows are low with limited opportunity for conflict.</p> <p>The defect will be situated in an area of the highway where the natural desire line of vehicles and pedestrians means they are unlikely to encounter the defect.</p> <p>Highway users will have ample opportunity to avoid the defect should they encounter.</p>

Defect Response Times

The result of the risk assessment defines an appropriate response from emergency to no further action and is detailed in table 5.4. Four response times will be considered for each defect requiring action.

Table 5.4 – Defect Response Categories

Response Category	Colour/Score	Response
Category E	Within 2 hours (25)	Attend within 2 hours and subsequently make safe or permanently repair.
Category 1	Next working day (16-20)	Attend before the end of the next working day and make safe or permanently repair.
Category 2H	5 working days (10-15)	Attend within 5 working days and make safe or permanently repair.
Category 2L	30 days (6-10)	Attend within 30 working days and make safe or permanently repair.
No Action	No Action (1-5)	No Action

Inspectors may also record potential defects with an increased priority, in expectation of the potential defect presenting a further level of risk before the next inspection is undertaken. Whilst the inspector will use their experience to assess whether defects will deteriorate before the next inspection, some defect deterioration is impossible to predict, and some defects are latent.

Only defects considered to be actionable will be recorded during the course of the safety inspection.

6. Inspection Methodology

Highway safety inspections will not be carried out during the hours of darkness/dusk or under conditions of poor weather e.g. snow, fog, heavy rain. Periods of peak traffic flows should be avoided where possible.

Driven inspections will be undertaken by two people with the passenger being a qualified inspector who will record identified defects. Driven inspections will be undertaken at a 20mph or less, appropriate to the location and the requirement to ensure accurate observation and recording of defects. Each inspection will be carried out in one direction on each road section. Defects will only be recorded where they meet the investigatory criteria or where they result from a report made by a third party.

Where adjacent areas are not visible from the inspection vehicle, the inspector shall carry out a walked inspection of those areas.

7. Training and Competency

All Highway Safety Inspectors will be competent and have an appropriate level of training in highway safety inspections. All inspectors will complete a recognised highway safety inspection course such as the Lantra - Highway Safety Inspectors Modular Training and Assessment. All safety inspections should be included on the National Register of Highway Inspectors currently held by the Institute of Highway Engineers (IHE).

All Highway Safety Inspectors will also be competent in traffic management design and will be qualified to a suitable level, such as National Highway Sector Scheme 12D, or equivalent.

Training specifically related to Warwickshire's interpretation of risk will be given via in-house courses which will be provided every two years or upon revision of the safety inspection manual.

8. Quality Control

To maintain the quality of the service, regular internal inspection audits will be undertaken based on the guidance given in the highway safety inspection manual.

A test inspection route will be selected each year and each of the inspection teams will independently inspect the route identifying defects in the same manner that they would do during the course of a normal safety inspection.

The inspection will take place during one morning with each inspection team commencing the route at staggered start times.

Immediately following completion of the inspection the results will be collated, assessed and discussed to ensure the consistent application of risk across inspection teams.

Appendix A – Defect Investigatory Criteria

Items for Inspection and Investigatory Levels

The purpose of a safety inspection is to identify defects within the highway that are likely to create a hazard to highway users. To provide clear guidance minimum investigatory criteria has been developed using a risk and evidence-based approach, benchmarking with other Highway Authorities and the Well Managed Highway Infrastructure Code of Practice.

Examples of safety defects follow, with definitions, notes for guidance and photographic examples given. It is not always possible to give a measured threshold for each defect, for example standing water on the road, and this is one of the issues discussed during inspector training with the aim of achieving a consistent understanding.

Minimum Investigatory Levels are provided as a guide only. Should the inspector, following risk assessment, deem it necessary to record any specific defect at a higher priority, then they should do so.

The response to any defect type not detailed in this manual will be at the inspector's discretion using the general risk matrix.

1.1 – Carriageway Running Surface

Investigatory Criteria

An area of material loss resulting in a vertical edge depression where part or all of the surface layers have been removed including carriageway collapses, surrounds to ironwork and missing cats eyes.

Investigatory Levels

A defect greater than 50mm deep will be assessed for the likely risk.

At controlled pedestrian crossing or other defined crossing points, e.g. at junctions or dropped crossings, intervention levels will be as for the adjacent footway.

Sample Photograph



Response

1. Undertake risk assessment to determine level of response
2. Make safe with temporary repair
3. Record as a category 2 defect for inclusion in future permanent repair programme.

If it is not possible to carry out a temporary repair to make the defect safe, assess and record the defect as per risk matrix.

1.2 – Carriageway Edge or Verge

Investigatory Criteria

On un-kerbed roads, a negative vertical face at the edge of carriageway.

Investigatory Levels

A negative vertical face at the edge of carriageway greater than 200mm in depth.

Sample Photograph



Response

1. Undertake risk assessment to determine level of response
2. Make safe with temporary repair
3. Record as a category 2 defect for inclusion in future permanent repair programme.

If it is not possible to carry out a temporary repair to make the defect safe, assess and record the defect as per risk matrix.

2.1 – Footway Trip/Pothole or Abrupt Level of Difference

Investigatory Criteria

An area of material loss or where a rigid surface has become displaced resulting in a difference in level.

Investigatory Levels

A vertical edge depth greater than:

20mm on Prestige or Primary footways.

40mm on Secondary, Link or Local Access footways.

Sample Photograph



Response

1. Undertake risk assessment to determine level of response
2. Make safe with temporary repair
3. Record as a category 2 defect for inclusion in future permanent repair programme.

If it is not possible to carry out a temporary repair to make the defect safe, assess and record the defect as per risk matrix.

3.1 – Kerbing

Investigatory Criteria

Where kerbs have been misaligned horizontally or are loose/rocking/misaligned vertically.

Investigatory Levels

Where kerbs have been displaced and are obstructing the carriageway or footway, or where they are so loose that they may fall on to the carriageway or footway.

Where kerbs are adjacent to footways, differences in horizontal levels between kerbing and footway shall be recorded as footway defects.

Sample Photograph



Response

1. Undertake risk assessment to determine level of response
2. Make safe with temporary repair
3. Record as a category 2 defect for inclusion in future permanent repair programme.

If it is not possible to carry out a temporary repair to make the defect safe, assess and record the defect as per risk matrix.

4.1 – Ironwork

Investigatory Criteria

A missing or broken cover to any chamber/box is a defect. A collapsed or collapsing chamber is a defect. A high or low cover or frame is a defect when the cover within the frame or the frame itself, is above or below the immediate surrounding metalled surface.

Investigatory Levels

A vertical edge depth greater than:

20mm on Prestige or Primary footways.

40mm on Secondary, Link and Local Access footways

50mm in the carriageway.

Sample Photograph



Response

1. Undertake risk assessment to determine level of response
2. Make safe with temporary repair
3. Record as a category 2 defect for inclusion in future permanent repair programme.

If it is not possible to carry out a temporary repair to make the defect safe, assess and record the defect as per risk matrix.

5.1 – Drainage

Investigatory Criteria

Where flooding or standing water is observed on the highway likely to cause danger to the road user.

Investigatory Levels

Consideration will be given to the depth and extent of water and the type, speed and level of traffic.

Sample Photograph



Response

1. Undertake risk assessment to determine level of response
2. Make safe by removing any obstruction to alleviate standing water on the highway or install warning signs.
3. Report to client for further investigation.

6.1 – Road Markings

Investigatory Criteria

Road markings that are missing or worn away will be assessed against the general risk matrix.

Investigatory Levels

Where any Stop line and associated STOP wording is missing, worn or obscured this will necessitate a category 1 defect response.

Investigatory levels and response time for worn road markings will be identified using the general risk matrix.

Sample Photograph



Response

1. Undertake risk assessment to determine level of response.
2. Use road marking warning signs to make safe.
3. Report to Client.

7.1 – Road Signs

Investigatory Criteria

Signs that are missing, obscured or in a state of collapse or obstruction to the extent that it is a physical danger to the road user.

Investigatory Levels

STOP signs missing obscured or illegible always record as a category 1 defect.

All other signs to be determined by the general risk matrix.

Sample Photograph



Response

1. Undertake risk assessment to determine level of response unless it's a STOP sign.
2. If required sign and guard area to make safe.
3. Replace post or clean sign if appropriate.
4. Record defect or report to client.

8.1 – Street Lighting Units, Illuminated Bollards and Illuminated Signs

Investigatory Criteria

Lighting units and illuminated bollards or signs that are missing, obscured or in a state of collapse or obstruction to the extent that it is a physical danger to the road user.

Electrical equipment with exposed/damaged wiring.

Investigatory Levels

Where illuminated assets are damaged to the extent that it is a physical danger to the road user by obstruction, exposed wiring or broken lamps.

Sample Photograph



Response

1. If possible make safe by signing and guarding or removing any obstruction.
2. Report as an emergency to the WCC street lighting team.

Safety Inspectors must not attempt to rectify any defect which involves electrical wiring.

9.1 – Other Defects

Investigatory Criteria

Where during the course of an inspection, any other incident, activity or defect is observed likely to cause danger to the highway user. Such defects will include but not be limited to damaged street furniture, crash barriers, cattle grids, trees, obstructions, fuel spillages.

Investigatory Levels

Defect to be assessed against the general risk matrix and actioned accordingly.

Sample Photograph



Response

1. Undertake risk assessment to determine level of response.
2. Make safe with temporary repair.
3. Report to client.