

# **Well - maintained Highways**

**Code of Practice for Highway  
Maintenance Management**

## **Complementary Guidance**

Since Well-maintained Highways was published in 2005, Government Policy with respect to highway maintenance has developed and evolved in a number of areas. There have also been a number of changes, including the introduction of new statutory duties on highway authorities.

To assist users of this Code, the Roads Liaison Group has prepared complementary guidance to advise and direct users to where they may find more up to date information to assist them in implementing best practice and the recommendations of the Code.

Users of the Code should treat this complementary guidance as up-to-date and having the same status as the Code. Where paragraphs have been amended, they supersede the ones in the Code.

It must be noted that these updates should not be read in isolation but should be considered within the context of the Code

***Last Updated: 15 December 2009***

# Section 2

## Introduction

### **New Paragraph** **Added 14 May 2009**

- 2.1.7 Following the publication of these three Codes, the DfT published *Maintaining a Vital Asset*, a booklet aimed at highlighting the importance of maintaining the highway asset to Local Authority senior managers. The booklet, which was, at the time, endorsed by the DfT, the Welsh Assembly Government, the Mayor of London, the Scottish Executive and the Northern Ireland Office, commends the Codes to highway authorities. *Maintaining a Vital Asset* can be downloaded from the following website.  
[www.ukroadsliaisongroup.org/pdfs/051107\\_maintaining\\_a\\_vital\\_asset.pdf](http://www.ukroadsliaisongroup.org/pdfs/051107_maintaining_a_vital_asset.pdf)

### **New Paragraph** **Added 7 August 2009**

- 2.3.21 The Comprehensive Area Assessment (CAA) is a new approach that examines how effectively local public services are performing and improving the lives of the people they serve. Assessments, which started in April 2009, are designed to provide a snapshot of each area and act as a catalyst for improvement by identifying where more effort is needed or where exceptional improvement may help others. Under the use of resources section of the new CAA framework, specific reference is made to highway maintenance and the requirement for an effective asset management planning process. The CAA framework can be downloaded from the following website.  
<http://www.audit-commission.gov.uk/localgov/audit/CAA/Pages/caaframeworkdocuments.aspx>

# Section 5

## Policy Framework

### **New Paragraph** **Added 14 May 2009**

- 5.5.6 A review of progress with TAMPs was commissioned by the DfT and was completed in January 2008. The report concluded that, although some progress has been made with the development of TAMPs, there is still scope for improvement. The report can be downloaded from the following website.  
[http://www.ukroadsliaisongroup.org/pdfs/Review\\_of\\_Transport\\_Asset\\_Management\\_Plans\\_January\\_2008.pdf](http://www.ukroadsliaisongroup.org/pdfs/Review_of_Transport_Asset_Management_Plans_January_2008.pdf)

### **New Paragraph** **Added 14 May 2009**

- 5.5.7 A report was commissioned by the Government to review the accounting, management and financing mechanisms for local authority transport infrastructure assets. The report, published in June 2008, concluded that comprehensive transport asset management has the potential to deliver significant value for money benefits and improvements in the services delivered to users. The timetable for implementing transport infrastructure asset valuation was also included in the report. The report can be downloaded from:  
[www.cipfa.org.uk/pt/infrastructure/download/final\\_report\\_jun08.pdf](http://www.cipfa.org.uk/pt/infrastructure/download/final_report_jun08.pdf)

### **New Paragraph** **Added 15 December 2009**

- 5.5.8 The UK Roads Board has produced four Quick Start Guidance Notes on asset management, namely *Getting Started*, *Levels of Service*, *Risk Management* and *Life Cycle Planning*. The notes form part of a suite of documents and give an overview of asset management, aiming to help local authorities to progress the implementation of an asset management approach. The guidance notes can be downloaded from:  
[http://www.ukroadsliaisongroup.org/liaison/asset\\_management.htm](http://www.ukroadsliaisongroup.org/liaison/asset_management.htm)

### **New Paragraph** **Added 14 May 2009**

- 5.8.4 The DfT and the Department for Communities and Local Government (DCLG), with support from the Commission for Architecture and the Built Environment (CABE), developed a Manual for Streets to give guidance to a range of practitioners on effective street design. The Manual for Streets, launched in March 2007, provides guidance for practitioners involved in the planning, design, provision and approval of new residential streets, and modifications to existing

ones. It aims to increase the quality of life through good design which creates more people-orientated streets. The manual can be downloaded from: [www.dft.gov.uk/pgr/sustainable/manforstreets/](http://www.dft.gov.uk/pgr/sustainable/manforstreets/)

# Section 6

## Context of Best Value and Continuous Improvement

**Paragraph Amended**  
**14 May 2009**

- 6.7.6 Vulnerable users, including children and older people, should also be considered together with users of cycles and motorcycles, who can be particularly affected by differing maintenance standards. Guidance on providing for motorcyclists has recently been published by the Institute of Highway Incorporated Engineers ([www.ihie.org.uk](http://www.ihie.org.uk)). In Australia, recognising the need to assist road design and maintenance practitioners understand the needs of motorcyclists and hence provide safe road conditions for all road users, the Victorian Motorcycle Advisory Council has produced a leaflet titled *A road builder's guide to motorcycle safety*. The document may be downloaded from the following website.  
[www.vicroads.vic.gov.au/NR/rdonlyres/E9A40513-5DB7-4BCA-BC60-7EBE5A1988B0/0/tr2000067.pdf](http://www.vicroads.vic.gov.au/NR/rdonlyres/E9A40513-5DB7-4BCA-BC60-7EBE5A1988B0/0/tr2000067.pdf)

# Section 7

## Legal Framework

***New Paragraph***  
***Added 14 May 2009***

- 7.7.7 Following its initial introduction in 1994, the Construction Design and Management Regulations (commonly known as the CDM Regulations) were re-introduced in April 2007. The revised Regulations are intended to make it easier for those involved in construction projects to comply with their health and safety duties. More information may be downloaded from the following website.  
[www.hse.gov.uk/construction/cdm.htm](http://www.hse.gov.uk/construction/cdm.htm)

***New Paragraph***  
***Added 14 May 2009***

- 7.7.8 The Traffic Management Act was introduced in 2004 to tackle congestion and disruption on the road network. The Act places a duty on local traffic authorities to ensure the expeditious movement of traffic on their road network and those networks of surrounding authorities. The Act gives authorities additional tools to better manage parking policies, moving traffic enforcement and the coordination of street works. The Act states that local traffic authorities shall make appropriate arrangements for performing the network management duty. These arrangements must include provision for the appointment of a traffic manager. The Act may be downloaded from:  
[www.opsi.gov.uk/acts/acts2004/ukpga\\_20040018\\_en\\_1](http://www.opsi.gov.uk/acts/acts2004/ukpga_20040018_en_1)

# Section 9

## Inspection Assessment and Recording

### ***New Paragraph Added 14 May 2009***

- 9.5.12 A model based on risk assessment principles has been developed to allow the calculation of the cost of claims for footways. The model is described in a report that was published in 2007. The report describes the application of risk management techniques to the management and maintenance of footways and cycle tracks, essentially to address the physical risk of accidents to pedestrians and cyclists resulting from the construction and maintenance of footway and cycle track surfaces. Detailed advice on risk management is given in relation to policy and categorisation, and on strategic, tactical and operational issues. A risk assessment model for footways is currently under development to calculate the number of accidents on a local highway networks. The model is based on deriving the probability that a person walking over a given defect will fall and be injured, and on the assumption that the number of defects on the network will be a dynamic balance between the rate at which they appear and the rate at which they are repaired. A software tool containing this model is under development. More information may be found from the following website.  
[http://www.footways.org/data/uploads/PPR171\\_Development%20of%20a%20Risk%20Analysis%20Model%20for%20Footways%20and%20Cycle%20Tracks.PDF](http://www.footways.org/data/uploads/PPR171_Development%20of%20a%20Risk%20Analysis%20Model%20for%20Footways%20and%20Cycle%20Tracks.PDF)

### ***Paragraph Amended Added 14 May 2009***

- 9.8.3 Concerns have been raised with regard to early life skid resistance and horses slipping on negatively textured new surfaces. The CSS and the British Horse Society worked in partnership to produce a report that considers the use of Stone Mastic Asphalt in highway maintenance schemes and its impact on horse riders. The report recommends that a surface treatment to increase friction may be appropriate. The report may be ordered from the CSS web site: (Report ENG/3-05 (January 2006)).  
[www.cssnet.org.uk/documents/PublicationsReportsJune08updateforweb.pdf](http://www.cssnet.org.uk/documents/PublicationsReportsJune08updateforweb.pdf)

### ***New Paragraph Added 14 May 2009***

- 9.10.3 The Footways & Cycletrack Management Group (FCMG) (Figure 1) has established a website to promote awareness of the work of the FCMG in general and through the publication of project reports and consultation papers where appropriate. More information may be found from the following website.  
[www.footways.org/](http://www.footways.org/)

***New Paragraph  
Added 14 May 2009***

9.22.8 The SCANNER User Guide was published in 2007 incorporating guidance on the use of the equipment, to support local authorities through all stages of collecting SCANNER information, from procurement of surveys to data use. The Guide includes 5 volumes.

Volume 1 – Introduction to SCANNER

Volume 2 – Advice to Local Authorities – Procuring Surveys

Volume 3 – Advice to Local Authorities – Using SCANNER Survey Results

Volume 4 – Technical Requirements – SCANNER survey data and Quality Assurance

Volume 5 – Technical Requirements – SCANNER Survey Parameters and Accreditation

The Guide may be downloaded from the following website.

<http://ukpms.com>

# Section 10

## Condition Standards and Investigatory Levels

**Comment Added**  
**Added 14 May 2009**

In Section 10 various references are made to Best Value Performance Indicators (BVPIs). These have now been replaced by National Indicators (NI). Hence, when reading Section 10, BVPIs must be read as NIs.

**Paragraph Amended**  
**14 May 2009**

10.3.4 In England local road carriageway condition is identified by statutory indicators, which record the percentage of the road network where maintenance should be considered. There are separate indicators for Principal Roads (NI 168) and Non-Principal Roads (NI169). Details of these National Indicators may be found in the following website.

<http://www.communities.gov.uk/publications/localgovernment/nationalindicator>

Further details of survey and data processing requirements, together with investigatory levels for surface and skidding resistance, commonly used by authorities to meet safety objectives, are included in Section 9. The definition of investigatory levels to meet requirements for serviceability will be a matter for local determination, preferably in consultation with users.

**Paragraph Amended**  
**14 May 2009**

10.4.2 In England, since 2008, there are no statutory indicators for the condition of footways. However, recognising the importance of recording and monitoring the condition of footways, many authorities are continuing to collect information to calculate the indicator that was previously defined as BVPI 187, which records the percentage of Categories 1, 1A and 2 footways where maintenance should be considered.

**New Paragraph**  
**Added 15 December 2009**

10.4.10 The UK Roads Board has developed and tested a new footway survey known as the Footway Network Survey (FNS). This is now available for use. Work is ongoing towards its implementation within UKPMS for April 2010. The FNS is intended to provide a cost effective, efficient and consistent approach to footway

surveys, based on a linear basis. The survey is carried out by a single surveyor walking along the footway, referenced to chainage within a UKPMS section. Further details on the survey may be found on [www.footways.org](http://www.footways.org).

# Section 13

## Winter Service

*Section Amended  
15 December 2009*

Section 13 has been superseded with the revised Section below.

### 13.1 INTRODUCTION

#### Background

- 13.1.1 Although sometimes termed “Winter Maintenance”, the particular network management requirements during winter are not “maintenance”, in the traditional sense, but specialist operational services. The term “Winter Service” has been adopted by this Code.
- 13.1.2 Winter Service deals with regular, frequent and reasonably predictable occurrences like low temperatures, ice and snow, as well as with exceptional events. Whilst the effects of climate change are likely to result in an increased frequency and intensity of severe winter events, these can be taken into account in Winter Service planning. Therefore Winter Service can and should be subject to the same regime of plan, deliver, review and improve as other aspects of the highway maintenance regime.



- 13.1.3 Policies and plans developed for Winter Service are likely to have relevance in emergency planning for dealing with extreme weather conditions including flooding, high winds and high temperature, as discussed in Section 14 of this Code. The incidences of such events may be affected by climate change. They are also likely to have some relevance to the wide range of non-weather related emergencies that could affect the highway network.
- 13.1.4 Although a very specialised area, Winter Service is a significant aspect of network management both financially and in terms of its perceived importance to

users. It can also have significant environmental effects. The organisation of the service is likely to have considerable implications for the overall procurement and management of other highway maintenance services. This Section of the Code should therefore be read in conjunction with other sections dealing with these issues and Appendix H.

## **Objectives**

13.1.5 Winter Service can contribute significantly to each of the core objectives set out in this Code as described below:

### **Customer**

- There are, in all parts of the UK, very considerable user needs and expectations and these can be a major influence on customer satisfaction through demonstrating an efficient, effective and proportionate response to winter conditions.

### **Safety**

- Safety is a prime consideration for Winter Service, even though statutory obligations and users needs vary in different parts of the UK.

### **Serviceability**

- Maintaining availability and reliability of the highway network is a key objective for Winter Service and one where user judgements of performance will be immediate rather than longer term.

### **Sustainability**

- Low temperatures and the formation of ice can cause serious damage to the fabric of running surfaces and accelerated damage of the network. Effective Winter Service can contribute to a reduction in whole life costs and minimise damage to the environment.

## **Statutory Basis**

13.1.6 The statutory basis for Winter Service varies in different parts of the UK. In England and Wales Section 41 (1A) of the Highways Act 1980 was modified on 31st October 2003, by Section 111 of the Railways and Transport Act 2003. The first part of Section 41 now reads:

*“a) The authority who are for the time being the highway authority for a highway maintainable at the public expense are under a duty, subject to subsections (2) and (3) below, to maintain the highway.*

*b) (1) In particular, a highway authority are under a duty to ensure, so far as is reasonably practicable, that safe passage along a highway is not endangered by snow or ice.”*

- 13.1.7 This is not an absolute duty, given the qualification of “reasonable practicability” but it does effectively overturn previous legal precedence, albeit not with retrospective effect. Section 150 of the Highways Act 1980 still imposes a duty upon authorities to remove any obstruction of the highway resulting from *“accumulation of snow or from the falling down of banks on the side of the highway, or from any other cause”*.
- 13.1.8 In addition, the Traffic Management Act 2004 placed a network management duty on all local traffic authorities in England. It requires authorities to do all that is reasonably practicable to manage the network effectively to keep traffic moving. In meeting the duty, authorities should establish contingency plans for dealing promptly and effectively with unplanned events, such as unforeseen weather conditions, as far as is reasonably practicable.
- 13.1.9 Given the scale of financial and other resources involved in delivering the Winter Service it is not reasonable either to:
- provide the service on all parts of the Network;
  - ensure running surfaces are kept free of ice or snow at all times, even on the treated parts of the network.
- 13.1.10 In Scotland statutory responsibilities are defined by Section 34 of the Roads (Scotland) Act 1984 which requires that *“a road authority shall take such steps as it considers reasonable to prevent snow and ice endangering the safe passage of pedestrians and vehicles over public roads”*.
- 13.1.11 In Northern Ireland, the Roads (NI) Order 1993 SI 1993/3160 (NI 15) provides, in Article 10, a duty for the Department of Regional Development to *“remove snow, soil etc which has fallen on a road”*. Section 9 of the Order also enables the authority to *“take such action as it considers reasonable to prevent snow or ice interfering with the safe passage of persons and vehicles using the road”*. However paragraph 7 of Article 110 provides protection from liability and states that *“Nothing in this Article operates to confer on any person a right of action in tort against the Department for failing to carry out any duty imposed on it under the Article”*.

## 13.2 WINTER SERVICE POLICY

- 13.2.1 Authorities should formally approve and adopt policies and priorities for Winter Service, which are coherent with wider objectives for transport, integration, accessibility and network management, including strategies for public transport, walking and cycling. They should also take into account the wider strategic objectives of the authority. **(Recommendation 1)**
- 13.2.2 Issues for consideration in developing policy should include:
- treatment of facilities for public transport users;
  - treatment of facilities for road users;
  - treatment of facilities for walking and cycling;
  - treatment of transport interchanges;

- treatment of promoted facilities;
- extent of priority for emergency services;
- extent of priority for key public services and critical infrastructure;
- extent of priority for vulnerable users;
- other local circumstances.

13.2.3 Authorities should develop service standards for Winter Service which define the Overall Winter Period, the Core Winter Period, the desired level of resilience and treatment routes.

13.2.4 These policies and service standards should be developed as far as reasonably possible with users and key stakeholders and should also be based on a risk assessment to define the scope of the service.

### 13.3 RESILIENCE

13.3.1 Authorities should consider, consult on and formally adopt local service standards for resilience of their winter service in terms of number of days continuous severe conditions salting on a defined Minimum Winter Network for the Overall Winter Period and for the Core Winter Period. **(Recommendation 2)**



13.3.2 Establishing a winter service resilience standard requires consideration of the number of days resilience to be adopted, definitions of the Overall Winter Period<sup>1</sup> and Core Winter Period<sup>2</sup>, whether it should refer to the normally salted network or to a smaller locally determined Minimum Winter Network<sup>3</sup>.

<sup>1</sup> Overall Winter Period – Locally defined since the winter period may vary according to climatic conditions, but usually at least the beginning of October to end of April.

<sup>2</sup> Core Winter Period – Locally defined since the winter period may vary according to climatic conditions, but usually at least December to February inclusive.

<sup>3</sup> Minimum Winter Network – That part of the carriageway network normally treated in winter which provides a minimum essential service to the public, including strategic routes, access to key facilities and other transport needs.

- 13.3.3 It is suggested that at least 6 days resilience for salt and other resources, including equipment, drivers and fuel, would represent sensible good practice for determining the number of days' resilience during the Core Winter Period. This is based on a number of days' severe conditions plus replenishment time and taking into account weekends, and combinations of public holidays and weekends such as Christmas and the New Year.
- 13.3.4 This approach based on a reasonable number of days' resilience in the ability to deliver a defined winter service should ensure that highway authorities hold or have easy guaranteed access to sufficient salt, gritters and drivers and other essential resources to deal with severe winter weather conditions.
- 13.3.5 Some highway authorities may already have a good level of resilience, but if individual authorities decide they need to increase resources, they will need to consider the practical implications and a reasonable implementation period. Implications may include any new arrangements or facilities required and cost.
- 13.3.6 In developing their local service standards based on days' resilience, authorities should assess the risks that are faced in the delivery of the Winter Service. The assessment should cover all items of policy and management including:
- network for treatment;
  - adjoining highway networks;
  - salt management policies;
  - operational resources (including equipment, salt stocks and fuel);
  - access to Winter Service depots and salt storage areas;
  - staff training;
  - availability of operational staff.
- 13.3.7 An example of how authorities may express and apply their Winter Service resilience standard is included in Appendix H.

## 13.4 CLIMATE CHANGE

- 13.4.1 It is now acknowledged that the world is experiencing a rapidly changing climate. It is generally accepted that although weather is likely to be milder and wetter in winter, there may be more occurrences of severe weather events.
- 13.4.2 The effects of climate change make it difficult for highway authorities to anticipate winter conditions from year to year. Wide variation and extreme events as a consequence of climate change needs to be taken into account in winter service planning. The events of the 2008/09 winter provide evidence of what can happen and are reviewed in detail in the UKRLG report *Lessons from the Severe Weather February 2009*.
- 13.4.3 Authorities should review their approach to climate change and in particular their resilience to prolonged cold weather. **(Recommendation 3)**
- 13.4.4 Climate change is dealt with in more detail in Section 14.1.

## 13.5 CO-ORDINATION AND COLLABORATION

- 13.5.1 Authorities should consider whether collaborative arrangements such as shared services, lead authority arrangements, collaborative service procurement, and sharing depots and salt stock, would provide an effective and value for money approach to increasing winter service resilience. **(Recommendation 4)**
- 13.5.2 Co-ordination and co-operation between authorities in winter service planning including defining treatment routes, response, and treatment times is of crucial importance. This should be a formal process between the adjoining local authorities and with the authority responsible for the strategic network. The intention should be to negotiate effective service integration across administrative boundaries and to enable operation of the plant and vehicles required to achieve adequate resilience.



- 13.5.3 In these circumstances close liaison both with public transport operators and local authority transport co-ordinators is essential, at the annual review, on an ongoing basis throughout the season and on a continual basis in severe weather conditions. This is particularly important as, although changes to public transport routes and frequencies will be made throughout the season, it will not usually be practical or desirable for consequent changes to the treated network during the season. This may influence the nature and timing of changes to public transport routes.
- 13.5.4 The efficient operation of many essential public services may be dependant upon ice or snow removal from key areas of private land, which is fundamentally the responsibility of land owners.
- 13.5.5 Authorities should determine critical areas and infrastructure in conjunction with key public services and other stakeholders and seek to ensure that appropriate winter treatment has been considered by the appropriate party. **(Recommendation 5)**

- 13.5.6 Authorities should explore the potential for sharing depots as this may provide opportunities for efficiencies. Other areas where collaboration should be considered include decision support services for weather particularly where authorities have similar climatic conditions.

## **13.6 WINTER SERVICE PLANNING**

### **Communications - Information for the Public**

- 13.6.1 Authorities should ensure effective communication of information for the public before and during both normal and severe winter conditions. **(Recommendation 6)**
- 13.6.2 Authorities should make widely available for users and the community a non-technical summary of the Winter Service Plan, including plans of the treated network, together with guidance on safe use of the network. They should also establish arrangements for local radio and web based information.
- 13.6.3 Section 6 of this Code deals with arrangements for community involvement in highway maintenance and the importance of information and publicity. This provides opportunities and challenges, which should be positively addressed by authorities and provide an important opportunity to demonstrate understanding of users' needs, and a strong service commitment.
- 13.6.4 It is of crucial importance that policies and standards of Winter Service provided by authorities are widely available and understood by users and the community. As far as possible highway users should be made familiar with treatment routes, particularly in severe weather conditions. This will help in ensuring that expectations are realistic and consistent with the resources available as well as maintaining public safety.
- 13.6.5 Many authorities provide leaflets summarising policies and service standards, including maps showing routes treated, contact information and advice on safe network use. The leaflets should be reviewed annually and made available through the internet, libraries, information centres, schools and a wide range of outlets. Further details on the content and use of leaflets are included in Appendix H.
- 13.6.6 Authorities should establish effective working arrangements with local press and broadcast media to enable the presentation of timely and accurate information and advice on network condition and use, including travel information, network availability and risk of severe conditions such as snow and black ice. This is especially important during prolonged cold weather and is likely to involve television, radio and the internet. Local radio in particular considers this to be a most important aspect of their service to the community and it therefore provides the opportunity to build good working relationships over wider issues. Many authorities have specialist press and public relations personnel and it will be important to clarify and agree respective service and specialist responsibilities.
- 13.6.7 It is important to define and agree key contacts with press and broadcast media and also establish a clear understanding of the most effective timings for information to be provided, in order to reach necessary audiences and broadcast

schedules. It may be helpful to arrange joint workshops or training sessions to build understandings and relationships.

- 13.6.8 There may also be a need in more widespread and extreme conditions to provide information to the public using national press and broadcast. This may be undertaken either directly or by arrangement with local media, and arrangements should be discussed with them. It may also be possible to utilise variable message signs.

### **Communications - Information for other services**

- 13.6.9 Authorities should ensure that there is appropriate consultation and communication with other highway authorities, key public services and other stakeholders to ensure improved service for the public. **(Recommendation 7)**



- 13.6.10 It is important to provide information directly to key stakeholders, including adjacent highway authorities, all emergency services, public transport operators, motoring organisations, the education authority, schools, their bus operators, and key local organisations. This information could include:

- Sharing Winter Service Plans;
- A non-technical summary of the Winter Service Plan;
- Maps of treatment routes;
- Operational decisions on a timely basis.

## Winter Service Plan

- 13.6.11 Authorities should formally approve, adopt, and publish, in consultation with users and key stakeholders, a Winter Service Plan based on the principles of this Code. **(Recommendation 8)**
- 13.6.12 The Winter Service Plan should be reviewed annually in consultation with a wide range of stakeholders.
- 13.6.13 Suggested contents of the Winter Service Plan are detailed in Appendix H. The Plan should recognise the fundamental differences between the main components of Winter Service for carriageways, cycle routes, footways and any critical areas and infrastructure as follows:
- pre-treatment - “precautionary” salting;
  - post-treatment - continuing salting following the formation of ice;
  - clearance of ice and snow;
  - dealing with continuous severe conditions.

## Treatment Routes

- 13.6.14 Authorities should define treatment route plans for carriageways, cycle routes and footways for pre-treatment and snow conditions, based upon the general maintenance hierarchy, but adapted to take into account the factors identified by this Code. **(Recommendation 9)**
- 13.6.15 The treatment routes for Winter Service should take as a starting point the hierarchy developed for other maintenance purposes but this is likely to require extensive modification to consider:
- wider transport and other policy priorities referred to above;
  - special requirements of carriageways, footways and cycle routes;
  - safe and reliable access to emergency facilities including Fire and Rescue, Police, Ambulance Services and hospitals;
  - other public services access needs and critical infrastructure where the maintenance of access may be critical;
  - public transport routes and access to stations, bus garages and depots;
  - safe and reliable access to main industrial and business centres of key importance to the local and regional economy;
  - any significant variation between summer and winter traffic;
  - accessibility dependencies of remote communities for example Scotland’s island and peninsular communities;
  - the special needs of disabled people or older people particularly where these can be effectively targeted;

- known problems, including significant gradients, exposed areas and other topological factors;
  - climatic and thermal capacity differences within the area;
  - co-ordination and co-operation with other authorities.
- 13.6.16 Consideration of these issues is likely to suggest differences in networks adopted for each element of Winter Service. Such decisions will usually not be clear cut. For example treatment of footways will differ from carriageways and for low traffic roads it may be difficult to justify high priority for service provision.
- 13.6.17 Risk assessments should be undertaken to establish which routes should be included in a programme of treatment during winter. In particular, the treatment of carriageways, footways and cycle routes must be considered taking account of risk to all highway users and consideration of the available resources.
- 13.6.18 Where the authority is actively promoting facilities, or there are clear trends of increasing use, a more proactive approach to Winter Service may send an important message.
- 13.6.19 Transport interchanges perform a key role in the delivery of integrated transport, which should be reflected in Winter Service policies and priorities. These include airports, rail and bus stations and the means of access to them whether by main routes for walking, cycling, public transport or car. Parts of the interchange may be subject to differing management regimes and it will be important to agree common standards and ensure effective co-ordination of resources.



- 13.6.20 It should be recognised that many authorities will have difficulty treating all bus routes as part of their precautionary salting routes. The treatment of bus routes should be based on risk assessment of local circumstances such as service frequency and their importance to integrated transport services. It is important that treatment routes include the access roads to bus garages.
- 13.6.21 Similar considerations apply to school bus routes where, although authorities should endeavour to provide Winter Service support, there may be practical difficulties in wide spread treatment of such a diverse network.

- 13.6.22 In general salting should not be undertaken between the stop lines of level crossings, even when covered with snow. Before ploughing over a level crossing the driver must stop and telephone the signalman for permission to proceed and then inform the signalman when past the crossing. Snow blowers must not be used on level crossings.
- 13.6.23 One means by which authorities can assist the local community in areas not on priority routes or at known trouble spots, including gradients and sharp bends is by the provision of public access salt bins. Where these are provided authorities should make arrangements for their replenishment as necessary and to ensure that they do not become unsightly or used for the unauthorised disposal of waste.
- 13.6.24 Consideration should be given in certain circumstances for the temporary erection of snow fencing to reduce the effect of drifting snow. The legal powers to provide snow fences in England and Wales are contained in Section 102 of the Highways Act 1980. Where no agreement can be reached with the landowner, Sections 239, 240 and 250 of the Act provide for compulsory powers. The power to provide snow fences in Scotland is in Section 30 of the Roads (Scotland) Act 1984. There is no equivalent of these specific powers in Northern Ireland but Article 100 of the Roads Order, which deals with the acquisition of land, could be used in these circumstances.
- 13.6.25 In periods of especially severe weather in certain parts of the UK, temporary road closures may be necessary. Where roads are known to be particularly vulnerable consideration should be given to the installation of permanent flap down or variable message signs. These signs should be located well in advance of any anticipated obstruction and should be operated in conjunction with the Police. In determining the optimum location consideration should be given to the availability of alternative routes and, if necessary, holding areas. With manually operated signs, and in more remote areas, it is essential that the signs are easily accessible and can be quickly operated by authority or police to give timely information. Consideration should be given to the merits of remotely controlled matrix signing.

### **Contingency Planning**

- 13.6.26 Authorities should prepare contingency Winter Service Plans for severe weather conditions which include possibilities such as salting a Minimum Winter Network. Authorities should seek agreement on plans in advance with other highway authorities and key public services such as hospitals and public transport providers. There should be a co-ordinated approach to implementing Minimum Winter Networks across adjacent highway authorities. **(Recommendation 10)**
- 13.6.27 As part of their contingency planning, authorities should define a Minimum Winter Network, see paragraph 13.3.2. This may be a subset of their normal treatment network and should provide a minimum essential service to the public, including links to the strategic network, access to key facilities and other transport needs. It is important that Minimum Winter Networks ensure continuity across boundaries. It is recognised that authorities will have difficulty in treating all bus routes as part of their minimum network. Minimum Winter Networks should however enable bus operators to run minimum services, as appropriate.
- 13.6.28 Mutual aid between authorities is often used in the response to “wide” area emergencies, as the impact on the local authorities, emergency services and other resources can be overwhelmed. Sharing, e.g. depots and salt stocks,

through mutual aid may be helpful. Where planning to do so authorities should make contingency arrangements in advance.

13.6.29 Mutual aid can be an informal or formal process having written agreements. Arrangements are usually between organisations that work closely together on a regular basis or as part of local resilience forums. Both approaches work well if they are flexible enough to change in response to the dynamics of a situation. Guidance on mutual aid may be found at:  
[www.cabinetoffice.gov.uk/media/132859/mutual\\_aid.pdf](http://www.cabinetoffice.gov.uk/media/132859/mutual_aid.pdf).

13.6.30 Authorities should explore the potential for mutual aid in salt supply and other aspects of winter service and should make contingency arrangements in advance. **(Recommendation 11)**

## 13.7 WINTER SERVICE DELIVERY

### Decisions and Management Information

13.7.1 Authorities should take full advantage of decision support systems and services to enable timely, efficient and accurate decision making. **(Recommendation 12)**

13.7.2 Decision support systems and management information are the basis of effective Winter Service delivery. More details are given in the *ICE Design and Practice Guide, Highway Winter Maintenance* published in 2000.

13.7.3 Systems will use current information and trends in conjunction with relevant software to extrapolate and display predicted conditions over a range of periods.

13.7.4 The decision support information will be used by the authority's designated Winter Service controller, or similar, together with local experience, and against the background of a range of pre-determined scenarios, in deciding the action to be taken. The decision should usually be delegated to a single person, although in larger authorities with varying climatic conditions the role may be delegated to two or more persons. Controllers will of course need to maintain close consultation with others both within and adjoining the authority and also those dealing with the strategic network.

13.7.5 A suggested decision making framework, which will need to be adapted for local circumstances, is included in Appendix H.

13.7.6 The quality of decisions made by the controller will be the key factor in determining both the effectiveness of the Winter Service and also how it is perceived by users and the community.

### Information Recording and Monitoring

13.7.7 Authorities should continually monitor performance during service delivery and respond effectively to changing conditions or network incidents.  
**(Recommendation 13)**

13.7.8 Comprehensive and accurate records should be kept of the all Winter Service activity, including timing and nature of all decisions, the information on which they were based, and the nature and timing of all treatment. Note that time taken running dead mileage at end of salting run is not included in treatment time. It is

preferable to record both the time at the end of actual salting and the time of return to depot.

- 13.7.9 Authorities should make use wherever possible of electronic vehicle location systems together with automatic recording of salt spreading. This will simplify and improve the accuracy of records as well as provide corroboration of service delivery in cases where failure to salt is alleged.

## **Resources**

- 13.7.10 Authorities provide Winter Service through combinations of their own resources and those of service providers contracted to them. There is a wide variety of approaches. Many highway authorities provide some of their own facilities with others provided by the private sector. In all cases, service providers' activities are governed by their contract with the highway authority.
- 13.7.11 In some authorities refuse collection, street cleansing and grounds maintenance services often provide support to the Winter Service, especially in times of prolonged ice and snow. Arrangements should be made well before the commencement of the season.
- 13.7.12 Detailed route planning and for each aspect of Winter Service will need to be optimised to ensure economic, efficient and effective resource allocation. This will depend on:
- spreading vehicle characteristics and capacity;
  - depot and salt location;
  - Response times (the period between decisions being taken to begin treatment and vehicles leaving the depot. It is suggested that authorities should adopt a target response time of no more than one hour. This should apply both within and outside normal working hours);
  - Treatment times (the period between vehicles leaving the depot and the completion of treatment on all priority routes. Authorities should adopt target treatment times based on risk assessment of local circumstances that provide for the completion of pre-treatment before ice forming. They should however recognise however that treatment times might vary in different weather conditions).
- 13.7.13 A key factor in ensuring that response and treatment times are met once a decision has been taken to treat is the availability of appropriately trained personnel. Identifying the extent of resources needed under various scenarios and the potential source of these will be an important aspect of pre-season planning. This planning should cover the whole range of requirements and conditions likely to be encountered, including:
- Pre-season preparation;
  - Precautionary treatment;
  - Footway and cycle route treatment;
  - Post treatment;

- Snow clearance;
  - Continuous severe conditions;
  - Post snow emergencies (flooding etc).
- 13.7.14 Planning of resources should cover the entire workforce involved in the Winter Service. It is particularly important not to overlook:
- the need for staff to be available throughout defined risk periods;
  - the need for the treatment operations to be co-ordinated and supervised;
  - resources and equipment for treating carriageways, footways and cycle routes;
  - resources for dealing with vehicle breakdowns, problems with fuel supply and communications failure;
  - resources for the storage, delivery and loading of salt.
- 13.7.15 In planning resources the following issues regarding personnel also need to be addressed:
- implications of Drivers' Hours Regulations;
  - extent and nature of double manning and driver support;
  - shift system arrangements;
  - provision for holidays and sickness.
- 13.7.16 Authorities in planning their resources should ensure that they are compatible with the resilience standards adopted by the authority.
- 13.7.17 Authorities often place reliance in times of prolonged ice and snow on temporary contracts with contractors, farmers and others to supplement resources for snow clearing. Arrangements should be made to ensure that necessary insurance cover is in place.
- 13.7.18 In rural areas, authorities should examine the potential for using local council snow wardens, who may have an effective role in gathering information and providing Winter Service Managers with details of specific local problems. If snow warden schemes are adopted clear terms of reference should be established.

### **Training and Development**

- 13.7.19 To ensure appropriate level of competence, training and development needs of all personnel should be established and reviewed annually, including health and safety and appropriate vocational qualifications. Training should then be provided where appropriate before the Winter Service season.
- (Recommendation 14)**

13.7.20 Issues where training is required are described below. This is not an exhaustive list and will largely be based on local circumstances:

- the content and operation of the Winter Service Plan;
- driving in difficult and hazardous road conditions including duty of care to other road users;
- circumstances where special safety considerations apply;
- snow ploughing, in particular around rail level crossings, tramways, partially segregated areas,
- dealing with emergencies;
- dealing with post ice and snow emergencies especially flooding.

13.7.21 In addition to such specific training it will be necessary to ensure that all personnel are provided with information during operational periods on current network characteristics and constraints, including:

- nature and location of highway works, including statutory undertakers;
- temporary and permanent barriers;
- nature and location of any traffic diversions;
- nature and timing of any events likely to affect network use.

13.7.22 Authorities should prepare specific health and safety policies, guidance, and risk assessments with their service provider. These should be issued and discussed with all personnel, including temporary contractors, and should form the basis of further training as necessary.

13.7.23 Training provided to service delivery personnel should also include specific reference to the health and safety needs of users, including:

- avoidance of spraying pedestrians, cyclists and vehicles where practicable with salt or slush when salting or ploughing;
- avoidance of risks to pedestrians and cyclists when using vehicles in segregated or partially segregated areas and in treating footways;
- ploughing and manoeuvring in restricted circumstances;
- other road vehicles that may not be under proper control.

13.7.24 Authorities should consider both qualifications (e.g. City and Guilds) and practical experience training. Some authorities have found it useful for those personnel involved in Winter Service management and decisions to undertake training in familiarisation and interpretation of weather forecast information.

## Exercising

- 13.7.25 Authorities and relevant organisations should provide training and conduct periodic exercising to test plans for responding to severe weather events. **(Recommendation 15)**
- 13.7.26 It would be beneficial for authorities to build severe weather conditions into regional or local training exercises or to develop specific Winter Service exercises involving adjacent authorities and relevant partners. Such testing of plans and personnel associated with the Winter Service would ensure authorities are fully prepared. It would also assist with ensuring that resilience of Winter Service is addressed and communication networks developed and improved.
- 13.7.27 *Case study.* The Highways Agency has been running Snow Desk adverse weather exercises for several years. The exercises are based on resilience guidelines using real networks, realistic scenarios and weather forecasts to ensure that effective and realistic assessments are achieved.

## Plant and Vehicles

- 13.7.28 This Code does not deal in detail with the equipment used for Winter Service, but refers to certain more strategic issues relating to procurement and sustainability.
- 13.7.29 In assessing the required plant and vehicles authorities should ensure that sufficient resources are available for the delivery of the Winter Service during severe and prolonged ice and snow. This should be compatible with the resilience standards adopted by the authority.
- 13.7.30 It is unlikely that, with the level of investment involved, authorities will be able to make frequent changes to the fleet, other than replacement or renewal. It is important however, that opportunities are taken when overall service procurement changes are being contemplated to thoroughly review Winter Service and equipment procurement.
- 13.7.31 There have been significant advances in the equipment available on the market in recent years. Vehicles are now capable of delivering a range of treatment types and can have sophisticated technology. The procurement of such technology potentially allows a more targeted and effective approach to treatment of the road network and an improved audit trail of where treatments have been undertaken.
- 13.7.32 It is often extremely difficult and inefficient to remove significant depths of snow using only salt and therefore consideration should be given to the use of snow ploughs mounted on spreaders or other suitable vehicles. Snow ploughs are durable, require little maintenance and should therefore prove very cost effective. However, in urban areas there may be considerable difficulties in utilising snow ploughs and in this situation any consideration should be on a risk based approach.
- 13.7.33 It is also important to consider equipment requirements for dealing with footways and cycle routes. Specialist equipment, such as footway ploughs and footway salt spreaders may be necessary for this purpose.
- 13.7.34 The location of depots should be kept under review and specifically addressed when consideration is being given to procurement arrangements. It would be

unlikely if all present depots from which authorities undertake Winter Services are ideally located, and significant financial and operational savings can often be achieved from re-location.

- 13.7.35 The environmental effects of highway maintenance depots and operations are dealt with in Section 15 of this Code, and these can be particularly significant in the case of the Winter Service, where operations will inevitably involve unusual hours of working. Every effort should be made to minimise the environmental intrusion of depots and so far as is practicable the effect of Winter Service operations.
- 13.7.36 A significant contribution to minimising environmental effects can be made by providing covered storage for all vehicles, equipment and materials, which can also reduce waste and maintenance problems.
- 13.7.37 Purchase and ownership of vehicles and equipment will also be a key issue for consideration in relation to the procurement of services. Private sector partners may be able to assist with financing arrangements and authorities will need to balance the financial advantages of this against the contractual and operational risks involved.

## **Salt and De-icing Materials**

### ***Salt for de-icing***

- 13.7.38 Rock salt is the prime material for dealing with ice and snow on roads but can have environmental consequences. It can adversely affect vegetation, pollute watercourses and leave a residue on footways. It can also damage the road structure, bridges and structures, utility apparatus and vehicles. However, used responsibly it can have minimal environmental impact. In the interests of sustainability therefore authorities should ensure that only the minimum of salt is used to deal with the prevailing conditions. Suggested rates of spread are given in Appendix H.
- 13.7.39 Appendix H lists a number of alternative materials that authorities could consider using in place of rock salt in particular circumstances. The costs of some of these are extremely high and particular materials also have some environmental consequences. They may prove, however, to be cost effective in specific locations, such as the treatment of footways, where the need for additional sweeping can be avoided, and bridges, where the damage caused by the use of salt can be avoided.
- 13.7.40 As rock salt requires the passage of traffic to improve effectiveness, it may be necessary to use brine in some cases for example some cycle routes.

### ***Salt management***

- 13.7.41 Many authorities award salt supply contracts to a single supplier on a call-off basis. Contracts are often awarded on a balance of quality and price, with price usually being the driving consideration. This approach has resulted in a price driven market where salt supply is often treated as a commodity purchase. Authorities carry the risk of being able to obtain the salt they require when they require it. Suppliers carry the risks involved in producing and stock piling salt before sale. Commodity purchase arrangements do not necessarily embrace the service relationships between authorities and their salt suppliers which should

lead to improved reliability, and knowledge and anticipation through good communications, and which are facilitated by contemporary procurement arrangements.

- 13.7.42 Authorities and salt suppliers should treat the supply of salt as a service rather than a simple commodity purchase. **(Recommendation 16)**
- 13.7.43 It has become common to restock at intervals during the winter season using salt management systems based upon predicted use of salt and delivery times. The salt shortage in winter 2008/09 demonstrated that it is difficult for salt supply arrangements to accommodate significantly increased short term demand. Authorities should therefore ensure sufficient resilience in their salt stocks.



- 13.7.44 Authorities should develop close working relationships with salt suppliers and ensure that initial salt quantities and reorder triggers are set to achieve their local resilience standard.
- 13.7.45 It may not be easy for some authorities to achieve an appropriate level of resilience through storing salt at their own depots. Salt suppliers may be able to hold dedicated stock at locations around the UK and authorities should consider whether such an approach is possible.
- 13.7.46 Communications and relationships with salt suppliers may be improved by the development of supplier user groups and authorities should consider participation in such groups.

### ***Salt storage***

- 13.7.47 The correct storage of salt is essential to minimise environment damage and storage in salt barns helps to prevent leaching, eases handling, helps in maintaining low salt moisture content, and is strongly recommended where additives are used. Detailed advice is available on alternative types and construction methods available. Where open stockpiles are used these should be covered with sheeting, or spraying with bituminous emulsion which provide an effective alternative.
- 13.7.48 Both permanent and temporary salt storage areas should be sited and managed in accordance with requirements of the Local Planning Authority and the Environment Agency. In particular they should not be sited where they could

cause damage to landscape or nature conservation or have the potential to pollute watercourses or groundwater. Authorities should be aware of the deterioration in the quality of salt stored for long periods and the need for effective stock rotation.

- 13.7.49 Where grit is used for treatment, for example in the more extreme conditions applying in Scotland, storage requirements may be less stringent and local advice should be sought.
- 13.7.50 As a means of enhancing local salt storage capacity, authorities and salt suppliers should jointly consider supplier owned salt stocks held on a short or long term basis in a number of widely distributed locations around the country. A joint approach may include agreements such as purchase of some or all stock by the end of a season or provision of land. **(Recommendation 17)**

### ***Salt Procurement***

- 13.7.51 Authorities should seek a broad approach to salt supply, for example establishing framework contracts with more than one supplier. **(Recommendation 18)**
- 13.7.52 *Case Study.* Devon County Council has adopted a framework contract which specifies the supply of different types of salt, including rock and marine salt from different UK and overseas suppliers. The Council can specify the quantity of salt and has options for different salt for different purposes e.g. pre-wetting or normal salting.
- 13.7.53 Authorities should consider whether efficiency benefits can be obtained from collaborative salt procurement and should also consider ways to improve the balance of risk between salt suppliers and themselves, e.g. longer contracts, performance contracts with minimum guaranteed purchase and supply, and contracts that include supply of salt and investment in facilities. **(Recommendation 19)**
- 13.7.54 *Case study.* The Illinois Department of Transport performance contract adopts purchase arrangements based on a contracted range of supply between minimum and maximum levels. Illinois guarantees to purchase 80% of its estimated salt need and the supplier guarantees to supply up to 120% if required. This provides the State with security and the supplier with guaranteed business.

### **Post Snow Inspection and Maintenance**

- 13.7.55 Immediately following the completion of snow clearance operations priority should be given to the clearance of gullies and offlets to ensure that melt water from snow on verges and island or central reservations can quickly drain away. However, it may be especially difficult to prevent melt water which is running across the carriageway from freezing and several applications of salt may be necessary.
- 13.7.56 It will also be necessary to inspect the network to ensure that any damage is dealt with either as a Category 1 defect or as programmed maintenance as appropriate. The inspection should be treated as a special safety inspection and deal with the items usually included. Special attention should be given to the routes treated and the following items:

- removal of accumulations of grit from running surfaces and drainage channels;
- inspection and clearance of all bridges, culverts and drainage systems liable to flooding;
- inspection for frost effects and any damage caused by Winter Service equipment;
- check and replenish salt stocks in depots and grit bins;
- inspect, clean, lubricate, check and repair all vehicles and plant.

13.7.57 In addition it will be important to debrief all personnel involved to ensure that their experience and observations are recorded. These should be used to inform the Annual Service Review and contribute to the process of continuous improvement. It will also be useful in a less formal way to invite observations from parish and town council snow wardens and others that may have also contributed to the operations.

## **13.8 ANNUAL REVIEW**

13.8.1 All aspects of the Winter Service Plan, including service delivery arrangements, should be reviewed annually in consultation with key stakeholders to take account of changing circumstances. **(Recommendation 20)**

13.8.2 All vehicles, plant, fuel provision, equipment and maintenance arrangements should be checked annually and in accordance with manufacturers' requirements to ensure that any necessary action can be taken to ensure full operational service status prior to the Winter Service season. This should include checking the calibration of all de-icing equipment and spreaders.

13.8.3 Authorities should review the administrative and management arrangements for Winter Service annually. This should include the role of the private sector in delivering highway services, and the use of support services such as refuse collection, street cleansing and grounds maintenance services.

13.8.4 As part of the Annual Review authorities should consult with bus operators regarding changes to routes. In doing so and where practicable bus operators should be encouraged not to change routes through out the winter season where there would be an effect on treatment routes.

13.8.5 The Annual Review should include an analysis on whether service delivery meets the Winter Service policy and plan. It should also include a review of the current thinking with regards to the impact of climate change. Service efficiency improvements such as route optimisation should also be considered.

## **RECOMMENDATIONS FOR SECTION 13**

R13.1 Authorities should formally approve and adopt policies and priorities for Winter Service, which are coherent with wider objectives for transport, integration, accessibility and network management, including strategies for public transport, walking and cycling. They should also take into account the wider strategic objectives of the authority.

- R13.2 Authorities should consider, consult on and formally adopt local service standards for resilience of their winter service in terms of number of days continuous severe conditions salting on a defined Minimum Winter Network for the Overall Winter Period and for the Core Winter Period.
- R13.3 Authorities should review their approach to climate change and in particular their resilience to prolonged cold weather.
- R13.4 Authorities should consider whether collaborative arrangements such as shared services, lead authority arrangements, collaborative service procurement, and sharing depots and salt stock, would provide an effective and value for money approach to increasing winter service resilience.
- R13.5 Authorities should determine critical areas and infrastructure in conjunction with key public services and other stakeholders and seek to ensure that appropriate winter treatment has been considered by the appropriate party.
- R13.6 Authorities should ensure effective communication of information for the public before and during both normal and severe winter conditions.
- R13.7 Authorities should ensure that there is appropriate consultation and communication with other highway authorities, key public services and other stakeholders to ensure improved service for the public.
- R13.8 Authorities should formally approve, adopt, and publish, in consultation with users and key stakeholders, a Winter Service Plan based on the principles of this Code.
- R13.9 Authorities should define treatment route plans for carriageways, cycle routes and footways for pre-treatment and snow conditions, based upon the general maintenance hierarchy, but adapted to take into account the factors identified by this Code.
- R13.10 Authorities should prepare contingency Winter Service Plans for severe weather conditions which include possibilities such as salting a Minimum Winter Network. Authorities should seek agreement on plans in advance with other highway authorities and key public services such as hospitals and public transport providers. There should be a co-ordinated approach to implementing Minimum Winter Networks across adjacent highway authorities.
- R13.11 Authorities should explore the potential for mutual aid in salt supply and other aspects of winter service and should make contingency arrangements in advance.
- R13.12 Authorities should take full advantage of decision support systems and services to enable timely, efficient and accurate decision making.
- R13.13 Authorities should continually monitor performance during service delivery and respond effectively to changing conditions or network incidents.
- R13.14 To ensure appropriate level of competence, training and development needs of all personnel should be established and reviewed annually, including health and safety and appropriate vocational qualifications. Training should then be provided where appropriate before the Winter Service season.

- R13.15 Authorities and relevant organisations should provide training and conduct periodic exercising to test plans for responding to severe weather events.
- R13.16 Authorities and salt suppliers should treat the supply of salt as a service rather than a simple commodity purchase.
- R13.17 As a means of enhancing local salt storage capacity, authorities and salt suppliers should jointly consider supplier owned salt stocks held on a short or long term basis in a number of widely distributed locations around the country. A joint approach may include agreements such as purchase of some or all stock by the end of a season or provision of land.
- R13.18 Authorities should seek a broad approach to salt supply, for example establishing framework contracts with more than one supplier.
- R13.19 Authorities should consider whether efficiency benefits can be obtained from collaborative salt procurement and should also consider ways to improve the balance of risk between salt suppliers and themselves, e.g. longer contracts, performance contracts with minimum guaranteed purchase and supply, and contracts that include supply of salt and investment in facilities.
- R13.20 All aspects of the Winter Service Plan, including service delivery arrangements, should be reviewed annually in consultation with key stakeholders to take account of changing circumstances.

# Section 14

## Weather and Other Emergencies

***New Paragraph***  
***Added 14 May 2009***

- 14.4.5 Following flooding in June and July 2007, Sir Michael Pitt was asked by the Government to conduct an independent review of the flooding emergency that took place. The Pitt Review: Lessons Learnt from the 2007 Floods was published in June 2008 and it contains 92 recommendations, some of which are relevant to highway maintenance issues, with particular reference to a need to collate and manage the main flood risk management and drainage assets (over and underground), including a record of their ownership and condition. The report may be downloaded from the following website.  
<http://archive.cabinetoffice.gov.uk/pittreview/thepittreview.html>

# Section 15

## Sustainable Highway Maintenance

**New Paragraph**  
**Added 14 May 2009**

- 15.3.8 In June 2006 best practice guidelines were published for Negative Texture Surfaces (NTS), providing a methodology for site evaluation and material selection, to ensure that the right material is installed in the right site, together with a structural approach to the factors which may have a bearing on distress mechanisms. The report, titled *Best Practice Guidelines for Surfacing*, may be downloaded from the following website.  
<http://roadscodes.org>

**New Paragraph**  
**Added 14 May 2009**

### 15.15 CLIMATE CHANGE

- 15.15.1 The Department for Transport, recognising that climate change is having a considerable impact on the UK's highway network, commissioned a research project to investigate the implications of the changing climate for highway maintenance on different types of pavement. The report produced gives recommendations on how to reduce the risks associated with climate change by ensuring good construction and maintenance practice and using adaptive maintenance techniques. The report, which was published in June 2008 and contains case studies demonstrating the impact that the weather can have on highways, can be purchased from the following website.  
<http://www.tsoshop.co.uk>

**New Paragraph**  
**Added 14 May 2009**

- 15.15.2 Following three major landslides in August 2004, the Scottish Government commissioned a study into potential trends in climate change in Scotland and how these might affect the road network. The Scottish Road Network Climate Change Study was subsequently published in June 2005 and presented a series of 28 recommendations for the design and operation of the road network. A further report, *Progress On Recommendations*, was published in October 2008 detailing how the recommendations made in the Climate Change Study have progressed in the intervening period. The progress report may be downloaded from:  
<http://www.transportscotland.gov.uk/road/climate-change-and-the-roads>

**New Paragraph**  
**Added 14 May 2009**

- 15.15.3 An associated study into the risk factors associated with landslides and their potential effects on the trunk road network was also instigated at that time. The Scottish Road Network Landslides Study: Implementation report was published

in March 2009. This is also available as a summary report. The main and summary reports can be downloaded from <http://www.transportscotland.gov.uk/road/climate-change-and-the-roads>

***New Paragraph  
Added 14 May 2009***

## **15.16 SUSTAINABILITY**

- 15.16.1 It is recognised that highway maintenance and new construction has an important part to play in the sustainability debate. In response to this, the Department for Transport commissioned a research project to produce guidance for local authority highway and material engineers on the choice of sustainable materials and techniques for use in highway and footway maintenance, as well as new construction. "Sustainable Highways: A Short Guide" may be purchased from the following website.  
<http://www.tsoshop.co.uk>

# Section 16

## Procurement and Service Delivery

*New Paragraph*  
*Added 14 May 2009*

- 16.4.5 The Highway Efficiency Liaison Group (HELG) aims to support the whole highways industry in identifying and delivering improved and increasingly efficient highway services. In 2008 HELG published the latest version of the Measurement Toolkit. The Toolkit describes an approach for measuring efficiencies in the delivery of the highway service and contains case studies and examples on a number of issues, including procurement. More information on HELG and the Toolkit may be downloaded from the following website.  
[www.helg.org](http://www.helg.org)

# Appendix C

## Highway Risk and Liability Claims

***Addition to Appendix  
15 December 2009***

An update to the Highway Risk and Liability Claims was published in June 2009 and can be downloaded from:

<http://www.ukroadsliaisongroup.org/liaison/practice.htm>

# Appendix H

## Winter Service Issues

**Appendix Amended**  
**15 December 2009**

Appendix H has been superseded with the revised Appendix below.

### **H1 GENERAL**

H1.1 The document *ICE Design and Practice Guides "Highway Winter Maintenance"*, Thomas Telford 2000, provides additional information on Winter Service.

### **H2 WINTER SERVICE PLAN**

H2.1 This section provides guidance in what is considered to be the desirable content for an authority's Winter Service Plan. The Winter Service Plan should be a "Controlled Document" within the Quality Management Regime.

#### **Statement of Policies and Responsibilities**

- Policies and objectives;
- Client and Service Provider risks and responsibilities;
- Partnership or shared risks and responsibilities;
- Decision making process and responsibilities;
- Liaison and communication arrangements with other authorities and other public services;
- Winter risk period;
- Resilience standard;
- Legislative background.

#### **Route Planning for Carriageways, Footways and Cycle Routes**

- Carriageway routes by risk level;
- Response and treatment times for all carriageway treatments;
- Routes for footbridges, subways and other high risk pedestrian areas;
- Response and treatment times for footway and cycle route treatments;
- Routes for other footway and cycle route treatment by risk level;
- Allocation of plant, vehicles, equipment and materials to routes;

- Location and maintenance of salt bins and grit heaps;
- Special sites or features (e.g. near railways or traffic calming).

### **Weather Prediction and Information**

- The decision making process;
- Road weather information bureau service;
- Road weather stations;
- Timing and circulation of information;
- Road weather forecast;
- Reporting procedure;
- Thermal mapping;
- Maintenance of ice detection equipment;
- Information to be provided.

### **Organisational Arrangements and Personnel**

- Command, control and operational organisation;
- Arrangements with other authorities;
- Arrangements with other public services;
- Decision making;
- Operational record keeping and reporting;
- Plant and vehicle manning arrangements, including management of drivers' hours regulations;
- Materials management;
- Training and development arrangements;
- Schedules of Contract and Voluntary Personnel (CVP);
- Employee roles and responsibilities;
- Contact and commissioning arrangements for CVP;
- Employee duty schedules, rotas and standby arrangements;
- Winter Service exercising arrangements;
- Standard operating procedures;

- Escalation and emergency operating procedures;
- Operational monitoring;
- Health and safety procedures;
- Contingency arrangements.

### **Facilities, Plant, Vehicles and Equipment**

- Winter Service compounds and facilities;
- Calibration procedures;
- Fleet inventory including licence requirements and capacity;
- Fuel stocks and locations;
- Location of plant, vehicles, snow-blowers and other equipment;
- Contingency arrangements;
- Garaging, servicing and maintenance arrangements;
- Contact and hire arrangements for contract plant.

### **Salt and Other De-Icing Materials**

- Location and capacity of stocks for salt and other materials;
- Contacts and purchasing arrangements for supplies;
- Minimum pre-season and in-season stock levels;
- In season re-stocking arrangements;
- Testing arrangements;
- Stock level monitoring and forecasting procedures;
- Loading arrangements;
- Treatment requirements including spread rates.

### **Operational Communications**

- Technical systems information;
- Reporting arrangements and protocols;
- Inventory and allocation, including back up.

### **Contingency Plan**

- Contingency arrangements for Winter Service delivery such as salt supply, drivers, fuel vehicles etc;

- Arrangements for implementing minimum winter networks;
- Mutual Aid e.g. resources available from adjacent authorities;
- Liaison with Category 1 and Category 2 responders (reference Civil Contingencies Act 2004).

### **Information and Publicity**

- Local press and broadcast contact information;
- Public information leaflets;
- Other key local and national contact information;
- Thermal mapping;
- Responsibilities and guidance for providing information;
- The decision making process;
- Road weather stations;
- Information to be provided;
- Road weather information bureau service;
- Timing and circulation of information;
- Road weather forecast;
- Notification arrangements for failure to maintain the published network;
- Reporting procedure;
- Maintenance of ice detection equipment.

### **Quality Management**

- Quality management regime;
- Document control procedures;
- Distribution of documents;
- Information recording and analysis;
- Arrangements for performance monitoring, audit and updating;
- Procedure for deviation from the Winter Service Plan.

## **H3 PUBLIC INFORMATION LEAFLETS**

H3.1 Public information leaflets provide a useful means of providing publicity to drivers on travelling in winter conditions and roles and responsibilities of an authority in delivering Winter Service. Authorities should consider

emphasising key messages in their leaflets. Typical contents of such a leaflet could include the following:

H3.2 Winter travelling advice to address issues, such as:

- The need to travel;
- Using public transport;
- Drivers should never assume a road has been salted;
- Adding extra time to journeys;
- Reducing speed;
- Hazards of black ice;
- Using lights in poor visibility;
- Extra care for cyclists pedestrians and horse riders;
- Giving snow ploughs and gritters plenty of room;
- Parking where it may block a salting route;
- Skidding and stopping distances;
- Condition of vehicle and appropriate personal provisions and equipment.

H3.3 Information on network treatments, such as:

- Map of normal treatment network;
- Map of Minimum Winter Network;
- When salting takes place;
- Showers or rain may wash salt off roads;
- Salting will not stop ice forming in very cold weather;
- Times to treat the network;
- Snow clearance;
- Salt bins.

H3.4 Further advice and contacts

- Telephone and email and website details.

H3.5 Authorities should consider as wide a distribution of the leaflets as possible through public and private outlets such as council offices, shops, petrol stations and service areas. Leaflets should also be available from authorities' websites.

## H4 SERVICE RESILIENCE

H4.1 An example is provided below on how authorities could express and apply their Winter Service resilience standard.

Overall Winter Period 1st October to 30th April

Core Winter Period 1st December to 1st March

Days Resilience (Overall Winter Period) 3 days

Days Resilience (Core Winter Period) 6 days

### Determination of minimum salt stocks by Depot

H4.2 For the purpose of this example it has been assumed that in heavy snow conditions this authority would carry out 6 successive treatments at 20g/m<sup>2</sup> each day.

Table H1 – Minimum Salt Stocks by Depot				
Route	Minimum Winter Network (tonnes/run)	Minimum Winter Network (tonnes/day)	Minimum Stock	
			Overall Winter Period 3 days resilience	Core Winter Period 6 days resilience
1	8.4	50.4	151.2	302.4
2	5.2	31.2	93.6	187.2
3	6.8	40.8	122.4	244.8
4	8.0	48.0	144.0	288.0
Footways, cycle routes & salt bins	4.0	4.0 (treated once per day)	12.0	24.0
<b>Total</b>	32.4	174.4	523.2	1,046.4

The minimum stockpile is (rounded up to nearest 5 tonnes):

- 1st October to 1st December = 525 tonnes
- 1st December to 1st March = 1,050 tonnes
- 1st March to 30th April = 525 tonnes

## **H5 CONSIDERATIONS FOR VARIOUS SURFACE COURSES**

- H5.1 Some surfacing materials, including “negative texture” thin surfacings, multiple surface dressings and micro surfacings, exhibit different texture, drainage and thermal characteristics from conventional positively textured surfacings such as Hot Rolled Asphalt. Operational experience of treating these surfaces has provided evidence that has indicated they do not benefit from an increase in dosage, above that required for these conventional surfacings. However, evidence has been found that the effect of residual salt on the carriageway is reduced, particularly in areas of low traffic and should therefore not be relied upon. As a consequence routes with such surfacing may require more frequent treatments.

## **H6 DE-ICING MATERIALS**

- H6.1 Rock salt is the most commonly used material for de-icing. A number of other materials are available which could be considered for particular circumstances. Cost and environmental characteristics differ widely and should be compared before adoption. The main materials available for de-icing treatment are:

### **Salt**

- H6.2 Rock salt is the most commonly used salt; however marine salt is also available. All rock salt should comply with BS3247:1991.
- H6.3 Commonly used in its dry condition, where it has a natural moisture content of about 4%. It melts ice and snow at temperatures as low as -21°C, but below -5°C the effectiveness of the salt is reduced and below -10°C the amount needed increases to become environmentally and economically undesirable.
- H6.4 The moisture content of the salt can be a critical factor in de-icing, as melting only occurs after the dry rock salt forms a solution by absorbing moisture from the road surface and atmosphere. Pre-wetting of salt with brine is used by some authorities and can improve the effectiveness of treatment in dry running surface conditions by reducing particle distribution, increasing adherence to the surface and increasing the speed of anti-icing or de-icing action. Additional equipment and saturators are required to deliver the service.
- H6.5 Salt coated with proprietary agricultural by-products is used by some authorities. This can improve the effectiveness of treatment by reducing particle distribution and increasing adherence to the surface.

### **Brine**

- H6.6 Brine solution is effective in some conditions for example, certain cycle routes, where the volume and weight of traffic may be insufficient to activate dry salt.

### **Grit (Salt Sand mix)**

- H6.7 Where hard-packed snow and ice have formed and cannot be removed by ploughing, a salt/sand mixture can be used in successive treatments at a spread rate of 20 to 40 g/m<sup>2</sup>. This aids vehicular traction and acts to break up the snow and ice.
- H6.8 Sand for use in mixtures shall be single sized abrasive of particle size 1-6mm or 5mm sand having a low fines content. The particles should be

angular in shape and suitable to create an abrasive surface. The sand can be added to salt at a ratio of 1:1 by weight.

- H6.9 If authorities do use a grit mix then after snow melt they should ensure that drains are checked and cleaned as necessary.

#### **Calcium Chloride**

- H6.10 Acts at a lower temperature than salt but is more corrosive and more expensive. It absorbs moisture freely and special requirements are needed for storage. The only use in UK is likely to be in blending with salt or as a pre-wetting agent in water.

#### **Urea**

- H6.11 No more effect on steel than water alone but is less effective than salt for equivalent weight and ceases to be effective at about -6°C. Used in certain specialist locations because of its less corrosive effect. Supplied in pellets and needs special attention to storage. Conventional spreading equipment requires modification to obtain satisfactory results. Considerably more expensive than salt.

#### **Glycol**

- H6.12 Liquid supplied in bulk or in drums. Used on airfields and other specific locations. May have a slight adverse effect on skidding resistance. Considerably more expensive than salt.

#### **Calcium Magnesium Acetate**

- H6.13 Supplied in the form of spherical pellets, does not corrode bare steel but may be comparable to salt in the corrosion of reinforcement bars in concrete. Considerably more expensive than salt.

#### **Potassium or Sodium Acetate (Liquid Acetate)**

- H6.14 Liquid supplied in bulk or in drums. Fast acting and used on some airfields. There is some laboratory evidence that acetates may adversely affect the durability of concrete that has not been air entrained but the significance of this has not yet been proven. Considerably more expensive than salt.

### **H7 DECISION MAKING PROCEDURE**

- H7.1 A suggested procedure for decision making, taking into account various operational scenarios is given in Table H2. This should be modified as necessary to suit local circumstances.
- H7.2 Training of decision making and management staff is important in making a rational decision. Although there is no formal qualification for Winter Service decision making and management available, staff should have a number of years' experience and have received a minimum level of training in operational and weather forecasting methods. Authorities should also conduct periodic exercising to test plans for responding to severe weather events.

**Table H2 – Sample Decision Matrix Guide**

Road Surface Temperature	Precipitation	Predicted Road Conditions		
		Wet	Wet Patches	Dry
May fall below 1°C	<u>No</u> rain <u>No</u> hoar frost <u>No</u> fog	Salt before frost	Salt before frost (see note a)	No action likely, monitor weather (see note a)
Expected to fall below 1°C	<u>No</u> rain <u>No</u> hoar frost <u>No</u> fog			
	<u>Expected</u> hoar frost <u>Expected</u> fog	Salt before frost (see note b)		
	<u>Expected</u> rain <b>BEFORE</b> freezing	Salt after rain stops (see note c)		
	<u>Expected</u> rain <b>DURING</b> freezing	Salt before frost, as required during rain and after rain stops (see note d)		
	<u>Possible</u> rain <u>Possible</u> hoar frost <u>Possible</u> fog	Salt before frost		Monitor weather conditions
<u>Expected</u> snow	Salt before snow fall			
<p>The decision to undertake precautionary treatments should be, if appropriate, adjusted to take account of residual salt or surface moisture.</p> <p>All decisions should be evidence based, recorded and require continuous monitoring and review.</p>				

**Notes:**

- (a) Particular attention should be given to the possibility of water running across carriageways and other running surfaces e.g. off adjacent fields after heavy rains, washing off salt previously deposited. Such locations should be closely monitored and may require treating in the evening and morning and possible other occasions.
- (b) When a weather warning contains reference to expected hoarfrost, considerable deposits of frost are likely to occur. Hoarfrost usually occurs in the early morning and is difficult to cater for because of the probability that any salt deposited on a dry road too soon before its onset, may be dispersed before it can become effective. Close monitoring is required under this forecast condition which should ideally be treated just as the hoarfrost is forming. Such action is usually not practicable and salt may have to be deposited on a dry road prior to and as close as possible to the expected

time of the condition. Hoarfrost may be forecast at other times in which case the timing of salting operations should be adjusted accordingly.

- (c) If, under these conditions, rain has not ceased by early morning, crews should be called out and action initiated as rain ceases.
- (d) Under these circumstances rain will freeze on contact with running surfaces and full pre-treatment should be provided even on dry roads. This is a most serious condition and should be monitored closely and continuously throughout the danger period.
- (e) Weather warnings are often qualified by altitudes in which case differing action may be required from each depot.
- (f) Where there is any hint of moisture being present, a pessimistic view of the forecast should be taken when considering treatment to negatively textured surfaces.

## **H8 TARGET SPREAD RATES OF SALT**

H8.1 The following minimum spread rates of un-modified salt are suggested for different operational scenarios and are illustrated in Table H3.

H8.2 Different rates of spread may be appropriate for pre-wetted or modified salt and these should be established based on documented evidence.

### **Pre-Treatment Salting**

- Salt stored under cover -10g/m<sup>2</sup>;
- Salt stored in the open -15g to 20g/m<sup>2</sup>.

### **Post-Treatment Salting (For all methods of storage)**

- Prior to snowfall, or rain followed by rapid freezing, dependent on conditions - 20g to 40g/m<sup>2</sup>;
- Snow in place, depth over 30mm - ploughing and salting up to 40g/m<sup>2</sup>.

### **Hard Packed Snow and Ice**

- Air temperature above minus 8°C - successive salting at 20g to 40g/m<sup>2</sup>;
- Air temperature below minus 8°C - gritting with salt/single size abrasive aggregate not exceeding 6mm or 5mm sharp sand.

<b>Table H3 – Sample Treatment Matrix Guide For Dry Unmodified Salt</b>			
<b>Weather Conditions</b>	<b>Treatment</b>		
<b>Road Surface Conditions</b>	<b>Air Temperature</b>	<b>Salting (g/m<sup>2</sup>)</b>	<b>Ploughing</b>
<b>Road Surface Temperature (RST)</b>			
Frost or forecast frost RST at or above – 2°C		10	No
Frost or forecast frost RST below – 2°C and above – 5°C		20	No
Frost or forecast frost RST at or below – 5°C and above – 10°C and dry or damp road conditions		20	No
Frost or forecast frost RST at or below – 5°C and above – 10°C and wet road conditions (existing or anticipated)		2 x 20	No
Light snow forecast (<10mm)		20	No
Medium/heavy snow or freezing rain forecast		2 x 20	No
Ice formed	Above – 5°C	20	No
Ice formed	at or below – 5°C	2 x 20	No
Snow covering exceeding 30mm		20 – 40 (successive)	Yes
Hard packed snow/ice	Above – 8°C	20 -40 (successive)	No
Hard packed snow/ice	at or below – 8°C	salt/abrasive (successive)	No

**Notes:**

- (a) Rate of spread for precautionary treatments may be adjusted to take account of variations occurring along the route such as residual salt, temperature variations, surface moisture (in the air or on the road surface) road alignment and traffic density.
- (b) All decisions should be evidence based, recorded and require continuous monitoring and review.
- (c) Ice refers to all ice on the road surface, including black ice.

## **H9 PLANT AND EQUIPMENT**

- H9.1 In order to deliver a robust Winter Service, authorities should ensure that they have sufficient vehicles to undertake precautionary treatment and a suitable reserve capacity.
- H9.2 The need to remove snow should also be considered when procuring vehicles. Specialist equipment such as snowblowers may be appropriate in some locations; however the most cost effective means of clearing snow from the carriageway is ploughs mounted on spreaders and other maintenance vehicles.
- H9.3 The need to ensure vehicles are correctly calibrated, well maintained and repaired quickly is essential to the delivery of the service. Whatever arrangements are used the response time, speed of repair, availability of spare parts, quality of repair and audit trail should be carefully established and documented.
- H9.4 Operatives should receive training in the vehicle they are using, and specifically in the operation of a spreading vehicle. Formal qualifications exist that will assist authorities in specifying a minimum standard expected of operatives.
- H9.5 Authorities should take account of regulations associated with working time, maximum driver hours and driver licensing.
- H9.6 Over recent years there have been a number of advances in technology available from spreader manufacturers. When procuring replacement vehicles consideration should be given to the flexibility of the spreader to use alternative treatments, control technology, on board weighing and the inclusion of data logging, tracking facilities and the central recording of such information.