4. Highway Maintenance

Objective 1 - Improve the condition of local roads, footways and cycleways, including resilience to climate change

The core objective of highway maintenance is to deliver a safe, serviceable and sustainable network, taking into account the need to contribute to the wider requirements of asset management, integrated transport, corporate policy and continuous improvement.

Highway Maintenance Policies

Policy HM1 **Oxfordshire County Council will use a whole life approach for determining and delivering its highway maintenance programme.**

Policy HM2 **Oxfordshire County Council will seek to develop a programme of community-led, low-cost highway maintenance schemes.**

Policy HM3 **Oxfordshire County Council will use best practice in developing sustainable drainage systems for roads and other transport assets.**

Scope of highway maintenance

4.1 Highway maintenance is a wide ranging function, including:

* routine maintenance providing works or services to a regular consistent schedule, generally for cleaning and landscape maintenance;
* programmed maintenance providing larger schemes primarily of resurfacing, reconditioning or reconstruction to a planned schedule;
* reactive maintenance responding to inspections, complaints or emergencies;
* regulatory maintenance inspecting and regulating activities of others;
* winter service providing salting and clearance of snow and ice;
* providing a planned emergency response for adverse weather conditions and other emergencies.

4.2 There are a number of related functions which could affect, or be affected by, highway maintenance activity. This includes:

* Asset management (a strategic approach for the management, operation, preservation and enhancement of the highway infrastructure)
* Network management (the development and maintenance of the highway network and the traffic on it)
* Highway development control (the assessment of the impacts of land use changes on the transport system and the identification of measures to mitigate these impacts)
* Street cleansing, including integrated street management
* Town centre management, including use of public space
* Maintenance of sustainable drainage systems
* Operation of public transport services

4.3 When maintenance activity is being planned and programmed the potential for joint working and co-ordination with others will be explored.

Powers and Duties for Highway Maintenance

4.4 In addition to a general duty of care there are a number of specific pieces of legislation which provide the basis for highway maintenance.

4.5 The Highways Act 1980, set out the main duties of highway authorities in England and Wales. In particular Section 41 imposes a duty to maintain highways maintainable at public expense, and almost all claims against authorities relating to highway functions arise from the alleged breach of this Section. Section 58 provides for a defence against action relating to alleged failure to maintain on grounds that the authority has taken such care as in all the circumstances was reasonably required to secure that the part of the highway in question was not dangerous for traffic.

4.6 The Traffic Management Act 2004 introduced in England a number of provisions including a duty for local traffic authorities 'to manage their road network' with a view to achieving, so far as may be reasonably practicable having regard to their other obligations, the expeditious movement of traffic on the authority's road network.

4.7 The duty requires the authority to consider all highway users, including pedestrians. An important issue for maintenance planning and programming is that authorities are expected to operate the Act even-handedly, leading by example and applying conditions and enforcement activity equally to their own and utilities works.

4.8 The Act changes significantly the provision of the New Roads and Street Works Act 1991 (NRSWA) but much of the guidance is still valid, including:

* Undertakers have a statutory right to install apparatus in the highway;
* Highway authorities are required to co-ordinate works in the highway and utilities are required to co-operate;
* The highway authority has a right to carry out inspections on all works entailed.

The Highway Network

4.9 A vital part of planning for future maintenance requirements is knowledge of what the current size and condition of the network is. The overall highways inventory for Oxfordshire contains in excess of 1 million items. The major items in this inventory are detailed in the following sections.

Carriageways

4.10 The basic elements of the county's highway inventory can be summarised as:

	Carriageway length (km/miles)			%age of total
Description	**Built-up**	**Non built-up**	**Total**	
Principal (A) Roads	126/78	467/292	593/371	13
B roads	163/102	317/198	480/300	10
C roads	343/214	799/499	1142/714	25
Unclassified Roads	1,556/973	839/524	2,394/872	52
Back lanes	8/5	0	8	-
Total	**2,195/ 1,372**	**2,421/ 1,513**	**4,617/ 2,885**	**100.00**

4.11 Oxfordshire County Council is also responsible for 287km/179 miles of green lanes, 963km/602 miles of bridleways and 50km/31 miles of purpose built cycleways. In addition, there are 60km/38 miles of motorway (M40) and 49km/31 miles of Trunk Road (A34 and A43) which are the responsibility of the Highways Agency. Of the county roads, 232km/145 miles are defined as part of the county's Premium Bus Routes network, the condition of which is measured separately.

Footways

4.12 Oxfordshire County Council has developed a classification for all the footways for which it is responsible based on location and amount of pedestrian use. The majority of footways are associated with unclassified roads in residential areas which do not receive a significant amount of pedestrian use. This is summarised as :

Description	Total (km/miles)	% of total
Class 1a (Prestige areas)	11/6	< 1
Class 1 (Primary walking routes e.g. busy shopping areas)	92/58	4
Class 2 (Secondary walking routes e.g. local shopping centres)	295/184	12
Classes 3 and 4 (Link footways and local access footways)	2,116/1,323	84
Total	**2,513/1,571**	**100.0**

Drainage

4.13 Like many other local authorities, the inventory of drainage assets in Oxfordshire is not yet complete. This is due to the way the drainage network has developed over the years and the difficulty in obtaining information on the majority of the underground network. However it is estimated that highway drainage in Oxfordshire includes nearly 100,000 gullies, over 20,000 catchpits and 10,000 offlets (not including those that are the responsibility of Thames Water).

Electrical Equipment

4.14 Oxfordshire County Council maintains nearly 150,000 street lights, over 6,700 illuminated bollards and other miscellaneous assets

such as pay & display ticket machines, CCTV cameras, drainage pumps and even a level crossing.

Bridges and other structures

4.15 As Highway Authority, Oxfordshire County Council has around 1000 bridges with a span greater than 1.5m and over 300 smaller culverts. Retaining walls are not well recorded and we know of around 200 with a height of greater than 1.3m.

4.16 Our bridges are predominantly masonry arches although we do have a significant number of modern reinforced concrete bridges on modern bypasses and major routes such as the A40 and A420. We have a small number of steel bridges including two larger bridges crossing the Thames at Wallingford and Isis Bridge carrying the southern bypass in Oxford. Retaining walls are typically masonry and generally in poor condition. We also have the only fibre reinforced plastic bridge in Western Europe at West Mill near Watchfield.

4.17 Oxfordshire has more River Thames crossings than any other county starting at Henley on Thames in the South going upstream there are 21 bridges with the last being Bloomers Hole footbridge at Lechlade designed and built by us in 2000. The two oldest bridges in the county dating from the 12th century cross the Thames at Radcot and Newbridge.

4.18 Within Oxfordshire there are other bridge owners, the major ones are the Highway Agency (trunk roads and motorway), Network Rail (railways) and British Rail Property Board (disused railways).

Programming Maintenance Works

Strategy

4.15 Our Strategy for highway maintenance will include:

* Maintaining roads to minimise long-term costs (the "whole life" approach)
* Setting service standards related to the importance of routes in the county's road hierarchy
* The development of networks that are resilient to the impact of climate change

Asset management

4.16 In 2008, the county council set out a strategy for the effective

management of the condition of the county's highways in its Transport Asset Management Plan (TAMP). The principles in the TAMP remain those which will be used to guide the selection and programming of highway maintenance schemes.

4.17 The main aim of the TAMP is to inform highway maintenance and management decisions and to promote good practice in the physical management of the highway network. The approach outlined in the TAMP for highway maintenance asset management is now being extended to all transport assets.

4.18 New asset management service standards have been produced in line with the TAMP principles. Service standards, maintenance regimes and prioritisation will then be applied accordingly.

4.19 Recent highway condition surveys indicate that we are currently on track to meet our targets for principal and classified roads and for footways. The results of surveys on unclassified roads indicate that the condition has deteriorated slightly in the last year after a steady improvement in previous years.

Scheme programming

4.20 The majority of our funds for highway maintenance will be allocated using a system of prioritisation based on:

* carriageway and footway condition surveys;
* skid resistance surveys;
* wet skid injury accident records;
* place in network hierarchy;
* accident claims;
* on-site inspections and number and severity of defects recorded;
* effectiveness of treatment; and
* importance of the route in bus network.

Community-led schemes

4.21 We will annually assign part of the maintenance budget for carrying out community-led schemes recommended by community stewards after consultation with local representatives (parish, county and district councillors and other community groups or organisations). The could be either small maintenance schemes or minor improvements.

Maintenance activities

4.22 The range of maintenance activities that will be covered by these policies will include (percentage of 2009/10 maintenance programme, revenue and capital, in brackets):

* Principal roads carriageway major schemes (7%)
* Non-principal roads carriageway major schemes (7%)
* Footway schemes (6%)
* Surface Dressing Treatments (10%)
* General structural maintenance and smaller schemes (18%)
* Bridge maintenance (10%)
* Routine operations (gully emptying, verge clearance etc) (7%)
* Village maintenance (6%)
* Signs & lines (5%)
* Winter maintenance (5%)
* Electrical maintenance (16%)
* Drainage Improvements (2%)

Drainage

Best Practice

4.23 The County Council is now considered to be a regional champion on drainage matters. A working group has been established (Oxfordshire Drainage Asset Management Group) with UK Climate Impacts Programme (UKCIP), Environment Agency, utilities and other council services to develop and disseminate best practice in drainage asset management through the better use of data.

4.24 The objectives of the Working Group are:

* To identify organisations that can contribute to the input of data and other relevant information
* To qualify the information that each organisation can provide and to gauge its usefulness
* To identify changes to existing practices, procedures and systems to enable relevant data to be captured and analysed more readily in future
* To introduce new processes where appropriate
* To freely exchange information between partner

organisations

* To consider the effects of climate change at the planning stage
* To assess the implications of flood risk on vulnerable users, properties and traffic
* To proactively manage flood risk by identifying and prioritising measures at flood-prone sites
* To produce revised methodologies for prioritising actions and work programmes that consider the wider flooding and drainage issues whilst addressing local concerns
* To implement cost-effective sustainable solutions
* To provide timely, meaningful information to the local population and the traveling public.

4.25 For works associated with new developments it is now our practice to investigate a Sustainable Drainage Solution (SUDS) system before any other solutions are considered. On estate roads we strongly promote the use of porous block paving for driveways, parking areas and pavements. Roof water drainage may be connected to the porous pavements on payment of a commuted sum to cover a part share of future maintenance. Developers can make savings as manholes, pipes, gullies and (sometimes) kerbs are not required. The potential for SUDS to contribute to other, non-transport objectives, such as biodiversity, will be investigated.

4.26 These solutions can contribute significantly to controlling flood risk and reducing our future liability, by reducing run-off, and through the provision of storage. Other sustainable solutions have provided amenity space through the construction of storage ponds and the use of planting to remove excess water. We promote the use of recycled materials in drainage construction.

4.27 The current drainage system has been built up over many years and represents a high value asset. Upgrading the whole system would require a significant investment and would not necessarily offer good value for money. An evaluation of high risk areas and the economic impact of flooding to property and land must be undertaken since some land could be used as short term sacrificial storage areas.

Flooding and water management

4.28 With a greater emphasis being placed on flood and water management activities there is a growing requirement for additional resources to be made available to cope with

operational measures and for partnership working activities as a result of the legislative responsibilities for lead authorities.

4.29 Undoubtedly, there will be pressure on the County Council to meet these new duties and responsibilities in a situation where there is unlikely to be additional funding available.

4.30 Oxfordshire County Council will therefore:

* Use sustainable drainage on all highway schemes where feasible;
* promote the use of Sustainable Drainage Solutions (SUDS) in all new development schemes;
* identify, locate and record all SUDS and maintain maintenance schedules;
* undertake flood risk assessments in high risk areas;
* undertake Surface Water Management Plans in High Risk Areas;
* map all highway drainage assets in the county;
* identify and locate all road drainage outfalls to watercourses throughout the county;
* investigate the potential for habitat creation along wider verges to modify water flows off the highway;
* investigate the potential for the road network to contribute towards renewable energy production - for instance through planting of short rotation coppice or similar;
* identify and implement works which will remove pollutants (hydro carbons, silt, heavy metals and chemicals) from these outfalls;
* co-ordinate and adopt Catchment Flood Management Plans from all District Councils and submit these plans to the Environment Agency; and
* prepare and periodically review flood risk areas, management plans and maps for the whole of Oxfordshire.

Resilience to Climate Change

4.31 The 2008/09 winter was the most severe in recent years. The bad weather caused significant damage to carriageways and footways, resulting in a large increase in potholes and other structural defects. This has placed significant pressures on the maintenance budget.

4.32 Climate change presents a considerable challenge, now and in

the longer term. Work has already commenced to identify and prioritise risk-prone areas, and to establish trends as an aid to predicting locations that may be susceptible to future events. Initial findings around climate change suggest that:

* Average temperatures have increased by 0.7°C in the UK since 1959;
* Summers have become hotter and drier, and
* Winters have become milder and wetter.

4.33 Hotter, drier summers are likely to lead to heat damage of road surfaces (melting roads) and cracking due to shrinking subsoil. Dry hard packed soil is likely to prevent water soaking in when higher intensity rainfall occurs. Milder wetter winters will further add to the flooding risk. Unfortunately, milder winters are unlikely to result in lower winter maintenance costs (salt gritting) since milder winters will only lead to marginally fewer freezing nights. Additionally, a change as small as a 2°C global temperature rise is likely to increase the frequency and severity of extreme weather events, including drought, heavy rainfall and heavy snowfall.

4.34 Since 2004, Oxfordshire's road network has suffered significant damage through drought (clay shrinkage - causing over £3.5 million of damage in one summer), high temperatures (melting road surfaces - causing over £4 million of damage in one month) and widespread flooding (over £1 million of damage caused by one extreme weather event). The costs of dealing with exceptional weather events can be extremely high and at current levels of resource allocation challenging to resolve.

4.35 Measures to arrest or mitigate the effects of severe weather events can include the specification of more resilient assets and materials, or higher capacity drainage solutions or roadside equipment which can tolerate higher winds, where they are likely to be more susceptible to the effects of extreme weather events or climate change.

4.36 Highway land is an important part of the county's green infrastructure resource, with the potential for SUDS and tree planting to reduce problems caused by climate change and extreme weather events.