
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 the activities of others;
- * winter service providing salting and clearance of snow and ice; and

- * 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. These include:

- * asset management (a strategic approach to the management, operation, preservation and enhancement of the highway infrastructure);
- * network management (the maintenance of the highway network and traffic operation);
- * 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; and
- * the 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. When such joint works are planned then it is expected that full consultation will be undertaken with affected parties before a final decision on the scheme is made.

4.4 A "whole life" approach aims to minimise the long term costs of maintaining a section of road. It may be, for instance, that the overall lowest cost option could be by carrying out a more extensive maintenance operation now, if this reduces the number of occasions when routine maintenance is needed in the future. The "cost" of maintenance works needs to include a consideration of the disruption and congestion that works cause.

Powers and Duties for Highway Maintenance

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

4.6 The [Highways Act 1980](#), sets 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 the grounds that the authority has taken reasonable care to ensure that the part of the highway in question was not dangerous for traffic.

- 4.7 The **Traffic Management Act 2004** introduced in England a number of provisions including a duty for local traffic authorities to manage their road network to achieve, so far as may be reasonably practicable having regard to their other obligations, efficient and effective movement of traffic on the authority's road network.
- 4.8 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.
- 4.9 The Act changed significantly the provision of the **New Roads and Street Works Act 1991** but much of that Act remains valid, including:
- * utilities 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; and
 - * the highway authority has a right to inspect all works.

The Road Network

- 4.10 A vital part of planning for future maintenance requirements is knowledge of the current size and condition of the network. 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

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

Description	Carriageway length (km/miles)		
	Built-up	Not built-up	Total
Principal (A) Roads	126/78	467/292	593/371
B roads	163/102	317/198	480/300
C roads	343/214	799/499	1142/714
Unclassified Roads	1,556/973	839/524	2,394/1497
Back lanes	8/5	0	8
Total	2,195/ 1,372	2,421/ 1,513	4,617/ 2,885

4.12 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. 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.

4.13 Oxfordshire County Council is also responsible for 2,799km/1,739 miles of footpaths, 1,086km/675 miles of bridleways, 251km/156 miles of restricted byways, 78 km/48 miles of byways open to all traffic (BOATS) and 50km/31 miles of purpose built cycleways. Of the public rights of way 272 km/ 170 miles (or 6.4% of the network) is recorded as having an asphalt or similar surface.

Footways

4.14 Oxfordshire County Council has developed a classification for all the footways for which it is responsible based on location and 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

- 4.15 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

- 4.16 Oxfordshire County Council maintains nearly 150,000 street lights, over 6,700 illuminated bollards and other miscellaneous electrical assets such as pay & display ticket machines, CCTV cameras, drainage pumps and even a level crossing.

Bridges and other structures

- 4.17 Oxfordshire County Council maintains 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.
- 4.18 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.
- 4.19 Oxfordshire has more River Thames crossings than any other county; there are 21 road and or footbridges in or on the boundary of Oxfordshire. The two oldest bridges in the county; dating from the 12th century; cross the Thames at Radcot and Newbridge.
- 4.20 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). There are two privately owned toll bridges across the River Thames: at Whitchurch and Swinford. The tolls for these two bridges are regulated by Parliament.

Programming Maintenance Works

Strategy

4.21 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; and
- * the development of networks that are resilient to the impact of climate change.

Asset management

4.22 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.

4.23 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.

4.24 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.

4.25 A high priority will be given to maintaining the condition of roads which are part of the Premium Bus Routes network. This will also apply to routes where there is a high cycle flow or marked cycle lanes.

4.26 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

4.27 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

4.28 We will annually assign part of the maintenance budget for carrying out community-led schemes recommended by area stewards after consultation with local representatives (parish, county and district councillors and other community groups or organisations). These could be either for small maintenance schemes or minor improvements. This process is still being developed and more details will be added as it develops.

Maintenance activities

4.29 The range of maintenance activities that will be covered by these policies will include the following (the percentage of 2009/10 expenditure is shown in brackets):

- * principal roads carriageway major schemes (7%);
- * non-principal roads carriageway major schemes (7%);
- * footway schemes (6%);
- * surface dressing treatments (10%);
- * a range of maintenance activities including structural maintenance and smaller schemes (18%);
- * bridge maintenance (10%);
- * routine operations e.g. gully emptying, verge clearance etc. (7%);
- * village maintenance (6%);
- * signs & lines (5%);
- * winter maintenance (5%);

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- * electrical maintenance (16%); and
 - * drainage Improvements (2%).

Drainage

Best Practice

- 4.30 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.
- 4.31 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.
- 4.32 These solutions can contribute significantly to controlling flood risk and reducing our future liability by reducing run-off and increasing water 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.
- 4.33 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

- 4.34 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.

4.35 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.

4.36 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;
- * develop 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;
- * 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.

Winter Maintenance

4.37 Oxfordshire County Council is committed to keeping a network of major roads free from ice to minimise the risk of accidents and ensure the smooth flow of traffic. Precautionary salting (sometimes called 'gritting') helps achieve this aim. Spreading

crushed rock salt on the roads before the surface reaches freezing point prevents ice forming in most cases. However, ice may still form if conditions are extremely cold, and other weather conditions may reduce the effectiveness of salt.

4.38 We decide when to carry out precautionary salting using:

- * regular weather forecasts specifically for road conditions on Oxfordshire's roads;
- * a computerised ice prediction system which compares forecast conditions against actual road temperatures measured at five weather stations around the county;
- * a through-the-night watch on conditions; and
- * the local knowledge of staff to judge where and when to best carry out precautionary salting.

4.39 Even if freezing temperatures are predicted, there may be no need for precautionary salting if there is enough salt left on the road from a previous salting or if no rain has fallen and roads are dry, as ice will not form.

4.40 It would be unrealistic and uneconomic to salt all roads, although we do manage to treat 43% of the county council's road network - higher than the national average. Certain county roads have been identified as important routes because they:

- * carry large volumes of traffic;
- * provide vital access for rural communities;
- * are known problem sites;
- * provide access to hospitals and fire stations; and/or
- * are main bus routes.

4.41 Full details of the winter service can be found in the Oxfordshire Highway Maintenance Plan, Section L.

Resilience to Climate Change

4.42 The last couple of winters have been more severe than has been usual 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.

4.43 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.

4.44 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 significantly 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.

4.45 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.

4.46 Measures to arrest or mitigate the effects of severe weather events can include the specification of more resilient assets and materials, higher capacity drainage solutions or roadside equipment which can tolerate higher winds.

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

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