Appendix A

Approach to Delivering a Sustainable Highway Network

2011

CONTENTS

EXECUTIVE SUMMARY

The majority of our local highway has generally evolved over time. For a typical length of carriageway various structural strengthening, surfacing or repair treatments have been undertaken over the years. This has resulted in a highway network which is variable both in terms of thickness and types of construction materials. Consequently, these pavements are significantly different from designed highways such as motorways, trunk roads, and estate roads built post Second World War, which perform in a stable and long life manner. In comparison, the local evolved highways are much thinner and more susceptible to structural changes resulting from increased traffic loading and sub grade moisture conditions.

Road surface materials have varying life expectancies dependant upon the timings of the maintenance treatment, volume of traffic (especially HGVs) and the treatments appropriateness in dealing with any underlying problems.

Roads deteriorate due to traffic usage, weather conditions and the need for utility companies to lay and maintain their equipment. These factors can cause cracks and holes to appear on the surface, a loss of skid resistance and uneven, undulating surfaces, which affect ride quality, and increased stress on the road which accelerates deterioration.

The highway network provides essential infrastructure to support all other functions. Central Bedfordshire's highways provide links for industry and the economy, emergency services, and schools and leisure to name but a few. If this infrastructure is not prepared or maintained with the effects of climate change in mind, the impacts could be severe.

A new road is normally designed to last 40 years, with most major maintenance interventions designed to last around 20 years which normally take the form of deep inlays resurfacing or overlay surfacing. Minor treatments such as slurry sealing or surface dressing are used to seal the road surface to prevent the ingress of water into the road structure. Ingress of water leads to long term to failure of the pavement layers (N.B. Pavement is the engineering term referring to the carriageway and pedestrian areas, comprising the surface and sub-layers). Sealing the road surface also has the effect of restoring skid resistance in wet conditions. These types of treatments normally last around 8 to 10 years and would be applied around 2/3 of the way through the design life of the pavement.

Road surfaces normally fail in two ways:

- The binder begins to oxidise and harden and when this occurs, water and "freeze-thaw" action causes de-bonding of the aggregate, so stones are lost from the surface. If this is left untreated, potholes will start to develop.

- Surface cracks allow water to enter into the lower pavement layers and if untreated these layers will deteriorate and ultimately fail leading to costly reconstruction.

The most cost effective way of maintaining roads is to make sure that treatments are undertaken at the correct time in the life cycle of the road minimising the life cycle costs. As this report will demonstrate capital maintenance is far more cost effective than carrying out ad hoc repairs. The ideal time to intervene is when signs of the above become evident from our routine surveys. The normal treatment would be to apply a surface dressing on rural roads or a surface course inlay on a busy urban road.

It is therefore important to make sure that treatments are undertaken at the correct time in the life cycle of the pavement to minimise the life cycle costs. The ideal time to intervene is when signs of the above become evident from our routine surveys. The normal treatment would be to apply a surface dressing on rural roads or a surface course inlay on a busy urban road.

If a road is allowed to deteriorate beyond this point, potholes will occur ever more frequently. These are expensive to repair at approximately £50 each and do not contribute to remedying the underlying problem. Over a short time of say 6 months, many potholes will re-appear which adds to the reactive maintenance budget. Increases in third party claims for damages to motor vehicles which are costly to defend are also much more likely. If a road is left to deteriorate to a point where the surface layer and the underlying layers have failed this will require costly reconstruction. The average costs of the various treatments on all categories of road, excluding traffic management costs are;

- Patching and surface dressing (at the appropriate time) £5.00 m^2
- Resurfacing £15.00 m^2
- Deep inlay £30.00 m^2
- Reconstruction £90.00 m^2

During the period 2005 -2009 the former Bedfordshire County Council made significant investment in the highway network. At the time that road network within Central Bedfordshire was handed over to the newly formed council in 2009 the classified (A, B and C) roads had been brought up to top quartile nationally while the unclassified road network and footways were in decline. There was also a considerable backlog in maintenance relating to street lighting and other highways structures.

Since its formation the Council has provided the following funding for structural maintenance

- 2009/10 £7.32m
- 2010/11 £5.486m and
- 2011/12 £3.857m

In setting the budget for 2011/12 it was reluctantly accepted that the whole of the road network would decline throughout the year and that the classified road network would drop to median from top quartile. It was acknowledged that funding would need to be increased in future years to prevent further decline. It was also accepted that the proportion of the revenue budget used to repair dangerous defects would increase during 2011/12 reducing the amount that could be spent on small preventative maintenance works.

Life cycle plans showing the costs of maintaining the network in Central Bedfordshire are given towards the end of this report. These have been developed to show the relationship between capital and revenue expenditure on the highway. These life cycle plans demonstrate that ad hoc revenue expenditure on the highway represents poor value for money and shows how best value for money can be achieved by carrying out capital maintenance at the optimum time.

The life cycle plans show how maintaining roads to an optimum level where capital maintenance is carried out when required costs less than half that of maintaining roads on an ad hoc basis.

In the current economic climate it is necessary to develop an approach for maintenance which provides best value with the available budget. This could be to allow some roads to deteriorate so that the strategic road may be maintained more efficiently. Alternatively the maintenance budget could be spread evenly across a wider network with an acceptance that the condition of the roads, particularly strategic roads, will be lower.

This report enables the council to take the first steps in consulting the wider public on the standards and priorities for highway maintenance in Central Bedfordshire.

INTRODUCTION

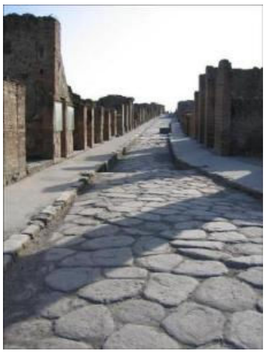
A Brief History of Asphalt and Roads

Asphalt

Asphalt in road building can be recorded back as far as 625 B.C. The ancient Greeks were also familiar with asphalt. The word asphalt comes from the Greek "asphaltos," meaning "secure."

Asphalt occurs naturally in both asphalt lakes and in rock asphalt (a mixture of sand, limestone and asphalt). Apparently even the infant Moses' basket was waterproofed with asphalt!!

Roads



The first road builders of any significance in Western Europe were the Romans, who saw the ability to move quickly as essential for both military and civil reasons. It is from the Romans that the term 'highway' comes as all their roads were elevated 1m above the local level of the land. The standards set by the Romans in terms of durability far exceeded anything achieved after the fall of the empire.

After the fall of the Roman Empire the road system fell into a state of disrepair and by the end of the middle ages, there was in effect no road system in the country.

In 1555 an Act of Parliament was passed imposing a duty on all parishes to maintain its roads. Lack of resources meant that the first major roads known as turnpikes were not established until the latter part of the seventeenth century. The first section was known as the Great North Road and has since become the A1 trunk road which of course passes through Central Bedfordshire. –

In latter years the production of refined petroleum asphalt outstripped the use of natural asphalt. As automobiles grew in popularity, the demand for more and better roads led to innovations in both producing and laying asphalt. Steps toward mechanization included mechanical spreaders for the first machine-laid asphalt.

In recent years the national energy crisis underscored the need for conservation of natural resources. Since that time, an increasing amount of recycled asphalt has been incorporated in road surfacing. In Central Bedfordshire to date we are recycling around 75% of previously used road surfacing materials, however this does not mean that we are saving money or are able to resurface more roads with the available budgets.

It should be noted that recycling generally costs more than providing new material as the old material needs transporting away from, and back to, the site together with quite complicated treatment processes to enable it to be reused as effectively a new material. For this reason only a limited amount of this type of treatment has been carried out, allowing the Council to satisfy requirements for a particular national indicator.

TYPES OF MODERN ROAD RESURFACING MATERIALS

Materials

The structure of a road comprises several layers and asphalt is widely used to form the structural layers, or courses. At the surface there are many traffic braking, accelerating and turning manoeuvres and consequently any surfacing material has to be capable of absorbing these forces in addition to working in harmony with the underlying pavement

Different mixes of bitumen and aggregate are used to produce the main types of asphalt as detailed below.

The table below indicates the various road surfacing treatments commonly in use across Central Bedfordshire and across the country, together with their general properties.

Material	Initial Cost / m^2	Life Expectancy Durability (Years)	Benefits	Dis-benefits
Hot Rolled Asphalt (HRA)	£9	20	• Adds strength • Can be planed • Can be surface dressed • Highly resistant to pot-holing / fretting	• Relatively noisy • Offers nothing in spray reduction • Lack of experienced operatives
Stone Mastic Asphalt (SMA)	£8	10	• Quiet surface • Quick to lay • Spray reduction	• Half life expectancy of HRA but similar cost • Can't predict failure • Prone to de-bonding / fretting / pot-holing • Poor early-file skid resistance
Thin Surfacing	£6	6	• Cost effective in pre-longing pavement life • Improves ride quality • Quick to lay	• Not suitable in highly stressed areas • Unpredictable failure mode
Surface Dressing & Slurry Seals	£3	8	• Very cost effective in prolonging pavement life • Restores skid resistance and surface texture	• Noisy • No structural improvement

Hot Rolled Asphalt (HRA)

Hot rolled asphalt has been used in the UK for nearly 100 years and is the most common surface on the country's road network. High polished-stone-value (a measure of skid resistance) chippings have helped to make the UK network the safest in the EU. This material is the recommended solution to use in all locations except those where road surface noise will create a particular issue for the community.

Stone Mastic Asphalt (SMA)

Developed in Germany and Scandinavia, stone mastic asphalt is now widely used in the UK. However experience across the country shows that its life expectancy has not been a great as originally envisaged. Therefore this material is the recommended solution only in the more urban densely populated areas where road surface noise will create issues for the community.

Thin Surfacing

Thin surfacing represents one of the most significant developments in asphalt in recent years. As the name suggests, this applied in thin layers, usually between 20-40mm, compared with traditional wearing course thicknesses of around 30-50mm, and provide good surface texture and high-quality riding surfaces. They have important cost benefits as they are quick to lay thus cutting maintenance programme times. In addition, they contribute significantly to the reduction of spray and traffic noise. Thin surfacing is favoured for use in mainly in urban areas. The striking features are the relatively low levels of noise generated by traffic together with good surface regularity which gives good ride quality. A further advantage is the speed of laying that may reduce the period during which the road needs to be closed.

Slurry Sealing and Surface Dressing

Slurry surfacing is the generic term for surfacing materials which are mixed on site in the form of a slurry and are then screeded out to form a new surface. The thinnest options are sometimes called slurry seals and the thicker ones are usually called microasphalts. The main ingredients are graded aggregates and bitumen emulsion which is often polymer modified. Other minor constituents, used for modifying the mix for different substrates or different weather conditions are water, cement, and fibres.

Surface dressing is basically the spraying of a thin film, (e.g.1.5mm.), of bituminous binder on the road surface followed immediately by an application, at a suitable rate, of correct size and type chippings. It could prolong the life of a road by over 10 years and is excellent value for money at a cost of under 30 pence per square metre per year. That is up to three to four times cheaper than alternative ways of maintaining a road. It plays an important part in reducing skidding accidents and restoring texture depth, particularly on fast stretches of road.

These treatments add nothing to the structure strength of the road. They are recommended for use on the more rural road network, and where practicable in the more urban environments, when the strength of the road is assured.

STATE OF THE NATION

WEATHER AND CLIMATE

February 2009 was described as the worst winter in three decades, but was surpassed by the icy conditions and heavy snowfalls of December 2009, January and February 2010. The extreme weather has again highlighted the fragility of the road network with extensive pothole damage being caused by the freeze-thaw cycle. The highway condition surveys carried out in summer 2010 show that some roads which previously would only have required minor treatments now require full, more expensive, structural repair.

In 2007 there was extensive flooding in the UK which claimed 13 lives and devastated parts of the country. There was further flooding in 2009. On both occasions roads and bridges were damaged however the road network in Bedfordshire was not badly affected. The Flood and Water Management Bill 2010 made local authorities responsible for taking a stronger overall lead on flooding within their areas.

Emerging Central Government legislation makes local authorities responsible for the management of flood risk from all sources. For the first time, local authorities are accountable for the coordination of all relevant organisations to prevent or reduce the impact of regional flooding.
Due to the increasing number and frequency of high - profile flood events in recent years, national concern over this hazard has been growing. There has been significant consideration of drainage recently in connection with major flooding.

Drainage is extremely important within the maintenance strategy and assumes that the subgrade is properly drained by a system that keeps it free of water for the life of the road. ie the system must be maintained on a regular basis. If the drainage fails the life of a road can be more than halved and indeed nearly 100% of all failures of a road structure include water as the main or a significant contributor cause.

To summarise, the likely and current impacts of climate change on highways are:

- Increased incidents of flooding with increased need for incident response, highway repair from surface damage and repair/replacement of older bridges/structures.
- Intense heat from hotter summers causing melting of road surfaces, followed by severe flash flooding of parched soils.
- Extreme cold winters giving rise to freeze-thaw damage such as pothole damage to road surfaces and cracks in bridges and structures, leading to increased essential repair costs.
- Increasing statutory requirements to reduce carbon and energy usage, driving the need for investment in more efficient buildings, materials and logistical assets.

Utility Company Road Openings

Within Central Bedfordshire there are just over 8000 utility openings each year and approximately 2 million road openings in total in England and Wales. These works are necessary for the maintenance of utility equipment and the provision of new services. However, there are concerns about the quality of reinstatements and it is estimated nationally that repairs to poor utility works consumes 13% of the road maintenance budget.

To identify defects each local authority can carry out sample inspections of 10% of utility works at the following stages

- work in progress
- 6 months after work has been completed
- prior to end of the two year guarantee period.

In addition, within Central Bedfordshire routine inspections are carried out on utility works within the district. In 2009/10 316 utility trench failures were identified during routine inspections and a further 322 failures in 2010/11. In these cases the utility companies were forced to remedy the defects identified where previously these repairs may have been funded from the council's revenue budget.

Road User Compensation Claims

There are large differences in the average amounts paid by each authority, with the highest being paid in London. Amey and the CBC Risk Management Team have to spend enough time to robustly defend these claims and generally we are getting better at dealing with them and the amounts being paid out should be reducing.

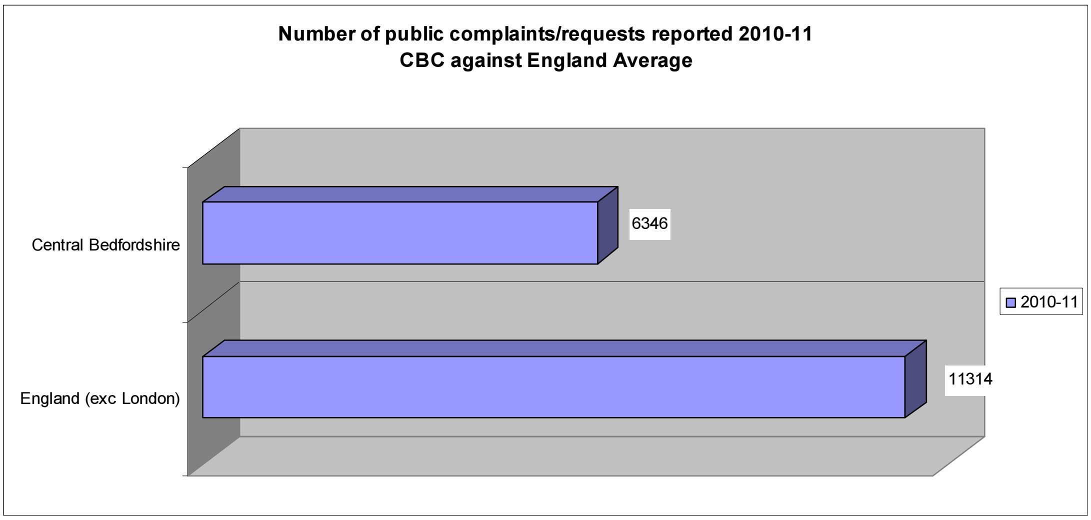
However, due to adverse weather conditions and the effects of climate change we have to expect there will be an increase in the number of claims as a direct reflection of the winter weather impacts.

As well as the cost of damages, significant time is spent assisting the local authority to provide records to aid the defence of these claims and carry out necessary site visits to ascertain the validity of the claim.

Public Reporting

A high number of faults are now also being reported by the public as more local authorities now have an electronic or web based system to report potholes and other highways faults.

The average number of complaints/reports received from the public to each local authority in the past year is over 11,000 in England (excluding London).

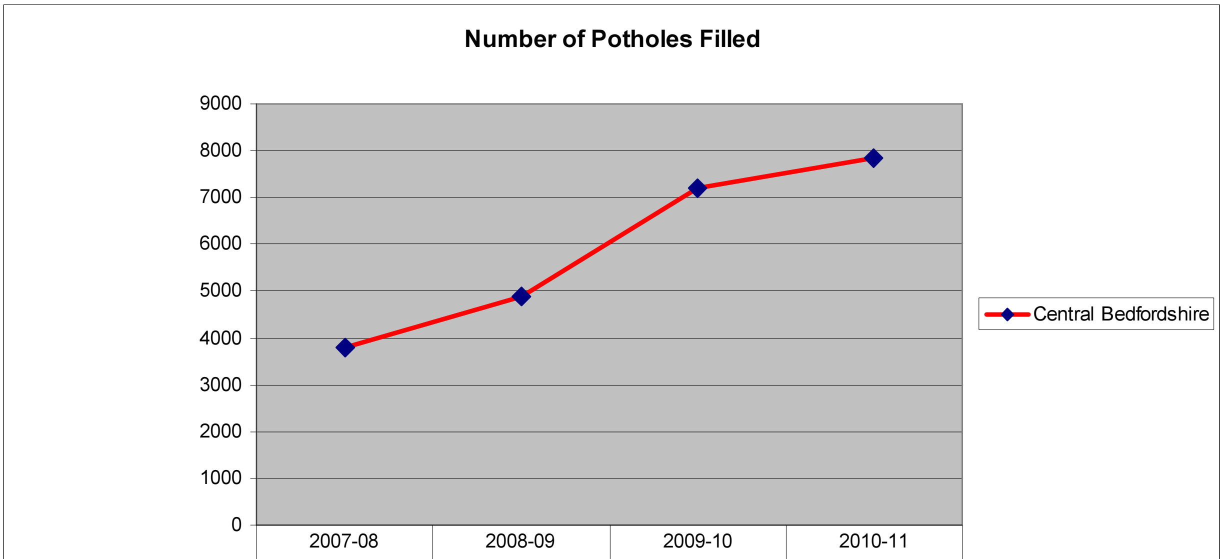


N.B. It should be noted that Central Bedfordshire is a small authority compared with the national average, so an indication of lower than average public complaints / requests for service should be viewed with caution.

Potholes

The average number of potholes filled by authorities in England during 2010/11 represents a 59% increase compared to the previous year 2009/10 which in itself was 42% higher than in 2008/09.

These large increases indicate the severity of the damage caused by the weather at the start of 2010. With the average cost of filling in a pothole approximately £50, it cost Central Bedfordshire nearly £400k to fill in the 7848 potholes in 2010/11.



	2007-08	2008-09	2009-10	2010-11
Central Bedfordshire	3800	4900	7189	7848

It is also important to note the cost for some pothole repairs on high speed roads can be anything between £500 and £1000 where there is a considerable extra cost to provide traffic management or lane closures.

HOW ROADS FAIL

There are six distress features that form the basis of condition evaluation for the existing road and these are as follows:

Oxidisation

Oxidisation of the surface results in a dull or burnt appearance due to the degradation of the exposed hydrocarbon binder. This can result in wrinkle cracks and the road surface has a tired appearance since the binder component has reached the end of its ductile life. The depth of distress is probably not great unless the oxidisation is well advanced or other deeper seated distress factors are also present.

Fretting

Fretting of the aggregate and/or matrix from the pavement surface occurs when the bond between binder and aggregate reaches a critical point. The mechanisms which cause this to occur are complex and frequently interactive but are likely to be triggered by environmental factors. Rapid failure can occur with water pressure and suction effects on the surface resulting from the passage of vehicle tyres. In a matrix dominated material, such as HRA, this process occurs slowly as these materials are generally impermeable and environmental intrusion is very limited, but in aggregate dominated materials, such as NTS, once the lateral support of one particle is lost, fretting can occur swiftly and progressively.

Cracking

Once water has entered a road pavement, damage is initially caused by hydraulic pressure, i.e. vehicles passing over the road pavement impart considerable sudden pressure on the water, this pressure forces the water further into the road fabric and breaks it up, this process can be very rapid once it begins.

Water that has entered the road pavement and is subject to the process of freezing and thawing during the winter also brings about the swift failure of the road pavement.

Eventually the water will descend to the subgrade layer below the road pavement and weaken this layer thus lowering the CBR (or the strength of the subgrade) which the road pavement design was based upon, and deep seated failure of the road will begin.

The four main attributes to cracking are as follows:

Thermal expansion

Cracking due to thermal expansion and contraction is created by horizontal movements in the pavement base. When coupled with forces from traffic loading, cracks in the base will progress into the asphalt pavement surface.

Traffic Loading

Cracking is predominantly in the form of longitudinal cracking. Shear horizontal forces induced in the wheel paths cause high tensile stresses and strains at the pavement surface, perpendicular to the direction of traffic loading. Strains are mainly observed along the edges of the wheel paths and propagate in the longitudinal direction of the pavement.

Material Fatigue

Cracking is seen as a series of interconnected cracks and is created by high tensile stresses and strains which propagate to the pavement surface in the form of longitudinal or transverse cracking. Cracks which are initiated top-down are associated with the bending and shearing of motion of traffic loading and an aged pavement (weakened asphalt binder). After repeated loading the cracks connect and form patterned cracking.

Moisture Damage

Moisture is widely recognised as the leading factor behind the premature deterioration of asphalt pavement structures, it is reasonable to assume that moisture damage constitutes the basis for pavement distress and pothole formation. Stripping is a process associated with asphaltic pavements subject to excess water content and weakening of the pavement structure.

Wheel Track Rutting

This is where, during hot weather, the surface course bituminous mixture in the vehicle wheel tracks softens and is pushed to each side of the actual track of the vehicle wheel when meeting resistance from the stable binder course material beneath the surface course (wearing course), with rutting you actually have a depression in the wheel track and a hump each side. This is more prevalent on high speed heavy vehicle routes such as motorways and trunk roads.

Surface texture

This is a key safety feature for high speed skid resistance. Any texture loss or gain will only occur within the existing surface layer and is a defect which can be corrected relatively easily with a single layer solution.

CURRENT APPROACH TO THE MAINTENANCE OF ROADS WITHIN CBC

CBC is responsible for maintaining approximately 1400 km of roads and uses a number of methods to do this. Minor repairs such as potholes are repaired throughout the year when they come to our attention.

Along with this we have a data led Structural Maintenance programme where we carry out resurfacing treatments such as Surface Dressing, Patching / Haunching and Resurfacing.

Major maintenance is undertaken where there are problems in the underlying road structure. Our highway maintenance budget for 2011-2012 is just less than 4 million pounds and so there is a need to prioritise the work carefully to ensure that we use these limited funds effectively.

Each year we survey the road network to establish the condition of the carriageway and footways using a range of visual and machine based surveys. These surveys are used to monitor performance (National Indicators) and produce effective structural maintenance programmes.

Survey types include:

- SCANNER – on the A, B and C network. This is a machine survey that measures:

Rutting
Cracking
Longitudinal profile (ride quality)
Transverse profile (including edge failure)
Surface texture

- Coarse Visual Inspections CVI – on the unclassified network. These surveys are carried out from a slow moving vehicle. The following defects being recorded:
  Rutting
  Cracking
  Edge deterioration
  Fretting and potholing

- Skid resistance of the main roads is measured using a Sideway-force Coefficient Routine Investigation Machines SCRIM machine on the A, B and C network only.

Each section of road is assigned an investigatory level dependent on its geometry. Sections below investigatory level are investigated against accident records and those with significant 'wet' accident numbers have warning signs erected and are prioritised and added to the maintenance program.

- Deflectograph (structural survey) – Limited use in assessing through a machine based survey whether the structure of the road has failed and at what state.

Based on the results of the above surveys an assessment is carried out by a pavement engineer and each scheme is given an engineers priority.

Other factors are also taken into consideration such as:

- Customer call volume

- Social inclusion (vulnerable users)
- Road usage
- Annual reactive spend
- LTP requirements
- Accident statistics

Each of these is given a weighting and a prioritised list of schemes is produced. The three year structural maintenance programme is then formed in a priority order taking in to account Central Bedfordshire's priorities, for example Local Transport Plan 3. The first year schemes are tied in to the available budget. The following year, schemes next on the list are re-prioritised along with any new sites that require attention based on the results of the next years surveys and the above mentioned factors. In effect we have a three year rolling programme of structural maintenance schemes.

Maintenance covers a wide range of possibilities ranging from a minimum intervention of 'patch and make do' to a significant structural overlay, or on rare occasions, total reconstruction. Different treatments have different properties and the choice will depend on the required final outcome. Availability of finance should not be part of the initial decision making process. If insufficient funds are available and a lower level of maintenance is carried out than is justified technically then the fact should be recorded and the site monitored to determine, for future use, the cost effectiveness of the reduced maintenance.

Case example - A507 Hitchin Road Roundabout

A maintenance need at this location was identified in December 2007 as part of a targeted programme to resurface roundabout circulatory areas.

The initial budget need for this scheme at the time was £71,000 however funding was not made available until the 2010 / 2011 financial year. The scheme was finally built in May 2010 and the final out-turn cost was £141.5k. This extra cost was due to the further deterioration on this roundabout since 2007.

In 2007 the planned treatment was for a 50mm inlay to the circulatory area. However, delaying the works to 2010 resulted in a deeper intervention (110mm) in isolated sections due to accelerated deterioration over the winter period.

In the period between December 2007 and May 2010 Central Bedfordshire Council received 62 complaints regarding the surface condition on this roundabout which led to spending nearly £5000 reactively repairing category 1 safety defects. There were also many potential insurance claims and one claim that was successfully repudiated.

THE FUTURE MAINTENANCE APPROACH OF ROADS WITHIN CBC

ASSET MANAGEMENT PLAN

The standard process of managing the highway network is changing from a simple, need based approach to a much longer term asset management approach. Central Bedfordshire has the following lengths of the various classes of highway

- Urban A or B road 48.6km
- Rural A or B road 173.4km
- Urban C road 85.8km
- Rural C road 226.9km
- Urban UC road 608.8km
- Rural UC road 171.6km

Central Bedfordshire's highway assets represent an investment of £6.5 billion making it one of Central Bedfordshire's most valuable assets. Maintaining this asset requires both routine and planned activities, such as filling potholes through to major structural maintenance.

It is important to note that Government advocates an asset management approach to maintaining a highway authority's infrastructure. Of late, the development of asset life cycle plans which will obviously link in to a financial need are recognised.

The main advantage of an asset management approach is that the cost of maintenance is calculated on a whole life basis so that the maintenance option which maximises the asset value with the lowest total expenditure over the life of the pavement can be determined.

An asset valuation for roads and footways has already been required by DoT and our submission for 2010 is attached at Appendix A

Central Bedfordshire already has an initial Transport Asset Management Plan (TAMP) developed by Amey in 2006. This has been updated to 2011 as part of the process for LTP3 development. This TAMP does not currently differentiate between what is classed as an evolved road and a designed road.

EVOLVED ROADS

An evolved road is one that originally started its life as basically a dirt road, connecting communities before the advent of mechanised vehicles. Since then has received layers of various surfacing materials, none to a formal expected design life, and suffers more and more from the stresses of traffic usage and weather. These types of road are not ideally suited to heavy goods vehicles as the roads have limited structural strength.

DESIGNED ROADS

A designed road is one that was built to recognised life expectancies. These tend to be restricted to the new roads that have been built over the last 20 or 30 years such as bypasses, urban estate roads serving developments, and where we have reconstructed full depth, existing evolved roads to a designed thickness.

It is important to note that if all roads were of a designed nature, then there would be substantial cost savings to the authority over time in reactive maintenance costs.

A designed road is more than adequate for usage by heavy goods vehicles.

MAINTENANCE STRATEGIES

The main aim of pavement management is to determine and implement the best possible maintenance strategies to ensure adequate network levels of safety at the lowest possible life cycle costs. Essential maintenance can be justified on the grounds of safety but preventative maintenance can be more difficult to justify. This is despite the fact that preventative maintenance can reduce the amount of essential work required in the future.

In the Department for Transport Design & Maintenance Guidance for Local Authority Roads on Whole Life Costing for Local Highway Authorities there are three typical maintenance strategies that should be considered and these are as follows.

Do Nothing – A commonly used but rather unsuitable term as all highways authorities have a duty of care to maintain the network to a safe standard. Under this strategy we undertake reactive repairs on safety defects reported by members of the public and through routine highways inspections. These are superficial repairs and would possibly be temporary only and frequent visits are likely. Such repairs do not stop the asset from declining and the costs of the maintenance are high due to Central Bedfordshire Councils duty to repair Category 1 safety defects. The risk of personal injury claims is increased resulting in further legal consequences.

Do Minimum – This approach sets out to do the minimal amount of routine maintenance work to keep the asset safe and serviceable. Works will normally be restricted to the repair of Category 1 defects. However the repairs will normally be of a permanent nature although again they add no real value to the asset. This approach will be limited to isolated permanent repair of potholes and small patching works.

Do Something – This involves Central Bedfordshire Council providing capital expenditure as well as routine expenditure. Works will include wholesale replacement or major repair of an asset to a level that will enhance its long term durability and minimise future routine maintenance.

Options have been evaluated later in this report.

MAINTENANCE STRATEGY EXAMPLES – LIFE CYCLE PLANS

In the following options, structural maintenance treatments are identified as being capital funded and are shown in **RED**, whereas routine maintenance is revenue funded and are shown in **BLUE**. This is compliance with government rules on funding.

Various assumptions have been made in the formulation of the following options which follows DfT guidance in the formulation of life cycle plans. The main assumption is that in all four examples it is assumed that all roads are in a prime condition at the outset of the life cycle

Life Cycle Plan 1 – Bringing A and B up to a design standard with capital funding, plus optimum capital funded treatments on rest of network

This option provides for bringing all A and B roads up to a design standard, and keeping them at that standard, in order to make them adequate over the full 20 year life cycle for use by heavy goods vehicles.

It also provides for undertaking maintenance treatments on the C and UC road network at the optimum time to preserve these roads in a safe state commensurate with traffic usage.

Expected benefits

- Road network in top quartile condition
- A and B road network suitable for freight transport in to the future
- Low level of third party claims to CBC
- Very high CBC reputation
- Very high public perception

Expected dis-benefits

- Large annual capital funding requirement

Costs

- £19.5m capital per annum
- £0.77m revenue per annum

Timescales

- 20 year life cycle

Risks

- Sustainment of funding through 20 year life cycle

Life Cycle Plan 2 – Capital treatments at right time resulting in minimal revenue reactive maintenance

This option provides for undertaking maintenance treatments on the total road network at the optimum time to preserve the overall asset value over the full 20 year life cycle.

Expected benefits

- Top quartile and improving nationally with regards to NIs
- Whole road network being maintained with correct treatments at right time
- Low level of third party claims to CBC
- Increased CBC reputation
- High public perception

Expected dis-benefits

- Increased annual capital funding requirement than at present

Costs

- £14.2m capital per annum
- £0.95m revenue per annum

Timescales

- 20 year life cycle

Risks

- Sustainment of funding through 20 year life cycle

Life Cycle Plan 3 – Revenue funded reactive maintenance with capital funded treatments at critical time

This option provides for undertaking maintenance treatments on the total road network when the road is failing structurally. Therefore there is a higher reliance on routine reactive maintenance in order to preserve the overall asset value over the 20 year life cycle. This is broadly in line with capital expenditure this year 2011/12, however the revenue expenditure this year is only £1.88m.

Expected benefits

- Nil

Expected dis-benefits

- Depreciating network asset value and NI indicator positions.
- Higher level of third party claims to CBC
- Lower CBC reputation
- Lower public perception

Costs

- £4.5m capital per annum
- £3.33m revenue per annum

Timescales

- 20 year life cycle

Risks

- CBC reputation
- Potential for large third party claims

Life Cycle Plan 4 - Revenue reactive maintenance only with no capital funded resurfacing / surface dressing

This option relies solely on routine reactive maintenance

Expected benefits

- Nil

Expected dis-benefits

- Massive annual revenue funding requirement
- Depreciating network asset value and NI indicator positions.
- High level of third party claims to CBC
- Low CBC reputation
- Low public perception

Costs

- £0m capital per annum
- £33m revenue per annum

Timescales

- 20 year life cycle

Risks

- Massive reputational issues for CBC
- Large third party claims

Life Cycle Plan 1 – Bringing A and B up to a design standard with capital funding, plus optimum capital funded treatments on rest of network

	Unit	Urban A or B Road	Rural A or B Road	Urban C road	Rural C Road	Urban UC road	Rural UC Road
Design life	Years	20	20	20	20	20	20
Treatment 1 type		Reconstruct	Reconstruct	35mm inlay	SD 10-6mm racked in plus patching 5% of area	35mm inlay	SD 10mm plus patching 5% of area
Treatment 1 life	Years	20	20	15	8	18	10
Treatment 1 Cost m2	**£ / m2**	**£150.00**	**£100.00**	**£20.00**	**£4.50**	**£17.50**	**£3.50**
Treatment 1 cost per annum	**£ / m2 / year**	**£7.50**	**£5.00**	**£1.33**	**£0.56**	**£0.97**	**£0.35**
Treatment 2 type				35mm inlay	SD 10-6mm racked in plus patching 5% of area	Slurry seal plus 1% patch of area	SD 10mm plus patching 5% of area
Treatment 2 Life	Years			12	8	10	10
Treatment 2 Cost m2	**£ / m2**			**£20.00**	**£4.50**	**£4.50**	**£3.50**
Treatment 2 cost per annum	**£ / m2 / year**			**£1.67**	**£0.56**	**£0.45**	**£0.35**
Annual Reactive maintenance costs /m2	**£ / m2**	**£0.00**	**£0.00**	**£0.10**	**£0.15**	**£0.10**	**£0.15**
Length of network m	m	48600	173400	85800	226900	608800	171600
Average width of network m	m	8.7	8.1	7.5	6.1	6	5.2
Capital annual cost	**£ / year**	**£3,171,150**	**£7,022,700**	**£1,930,500**	**£1,557,101**	**£5,195,093**	**£624,624**
Revenue annual cost	**£ / year**	**£0**	**£0**	**£64,350**	**£207,614**	**£365,280**	**£133,848**
Capital Annual Total	**£ / year**	**£19,501,169**					
Revenue Annual Total	**£ / year**	**£771,092**					

Life Cycle Plan 2 – Capital treatments at right time resulting in minimal revenue reactive maintenance

	Unit	Urban A or B Road	Rural A or B Road	Urban C road	Rural C Road	Urban UC road	Rural UC Road
Design life	Years	20	20	20	20	20	20
Treatment 1 type		50mm inlay	50mm inlay	35mm inlay	SD 10-6mm racked in plus patching 5% of area	35mm inlay	SD 10mm plus patching 5% of area
Treatment 1 life	Years	12	12	15	8	18	10
Treatment 1 Cost m2	**£ / m2**	**£24.50**	**£22.00**	**£20.00**	**£4.50**	**£17.50**	**£3.50**
Treatment 1 cost per annum	**£ / m2 / year**	**£2.04**	**£1.83**	**£1.33**	**£0.56**	**£0.97**	**£0.35**
Treatment 2 type		50mm inlay	Premium SD 10-6mm racked in plus patching 1% or area	35mm inlay	SD 10-6mm racked in plus patching 5% of area	Slurry seal plus 1% patch of area	SD 10mm plus patching 5% of area
Treatment 2 Life	Years	12	12	12	8	10	10
Treatment 2 Cost m2	**£ / m2**	**£24.50**	**£6.00**	**£20.00**	**£4.50**	**£4.50**	**£3.50**
Treatment 2 cost per annum	**£ / m2 / year**	**£1.67**	**£0.50**	**£1.67**	**£0.56**	**£0.45**	**£0.35**
Annual Reactive maintenance costs /m2	**£ / m2**	**£0.10**	**£0.10**	**£0.10**	**£0.15**	**£0.10**	**£0.15**
Length of network m	m	48600	173400	85800	226900	608800	171600
Average width of network m	m	8.7	8.1	7.5	6.1	6	5.2
Capital annual cost	**£ / year**	**£1,567,958**	**£3,277,260**	**£1,930,500**	**£1,557,101**	**£5,195,093**	**£624,624**
Revenue annual cost	**£ / year**	**£42,282**	**£140,454**	**£64,350**	**£207,614**	**£365,280**	**£133,848**
Capital Annual Total	**£ / year**	**£14,152,536**					
Revenue Annual Total	**£ / year**	**£953,828**					

Life Cycle Plan 3 – Revenue funded reactive maintenance with capital funded treatments at critical time

	Unit	Urban A or B Road	Rural A or B Road	Urban C road	Rural C Road	Urban UC road	Rural UC Road
Design life	Years	20	20	20	20	20	20
Treatment 1 type		50mm inlay	50mm inlay	35mm inlay	SD 10-6mm racked in plus patching 5% of area	Slurry Seal plus patching 1% of area	SD 10mm plus patching 5% of area
Treatment 1 life	Years	20	20	20	20	20	20
Treatment 1 Cost m2	**£ / m2**	**£24.50**	**£24.50**	**£20.00**	**£4.50**	**£6.50**	**£3.50**
Treatment 1 cost per annum	**£ / m2 / year**	**£1.23**	**£1.23**	**£1.00**	**£0.23**	**£0.33**	**£0.18**
Treatment 2 type							
Treatment 2 Life	Years						
Treatment 2 Cost m2	**£ / m2**						
Treatment 2 cost per annum	**£ / m2 / year**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.00**
Annual Reactive maintenance costs /m2	**£ / m2**	£1.50	£2.00	£1.75	£2.50	£1.75	£2.50
Length of network m	m	48600	173400	85800	226900	608800	171600
Average width of network m	m	8.7	8.1	7.5	6.1	6	5.2
Capital annual cost	**£ / year**	**£517,955**	**£1,720,562**	**£643,500**	**£311,420**	**£1,187,160**	**£156,156**
Revenue annual cost	**£ / year**	**£634,230**	**£2,809,080**	**£1,126,125**	**£3,460,225**	**£6,392,400**	**£2,230,800**
Capital Annual Total	**£ / year**	**£4,536,752**					
Revenue Annual Total	**£ / year**	**£16,652,860**					

Life Cycle Plan 4 - Revenue reactive maintenance only with no capital funded resurfacing / surface dressing

	Unit	Urban A or B Road	Rural A or B Road	Urban C road	Rural C Road	Urban UC road	Rural UC Road
Design life							
Treatment 1 type							
Treatment 1 life							
Treatment 1 Cost m2	**£ / m2**						
Treatment 1 cost per annum	**£ / m2 / year**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.00**
Treatment 2 type							
Treatment 2 Life	Years						
Treatment 2 Cost m2	**£ / m2**						
Treatment 2 cost per annum	**£ / m2 / year**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.00**	**£0.00**
Annual Reactive maintenance costs /m2	**£ / m2**	£3.00	£4.00	£3.50	£5.00	£3.50	£5.00
Length of network m	m	48600	173400	85800	226900	608800	171600
Average width of network m	m	8.7	8.1	7.5	6.1	6	5.2
Capital annual cost	**£ / year**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**
Revenue annual cost	**£ / year**	**£1,268,460**	**£5,618,160**	**£2,252,250**	**£6,920,450**	**£12,784,800**	**£4,461,600**
Capital Annual Total	**£ / year**	**£0**					
Revenue Annual Total	**£ / year**	**£33,305,720**					

PROPOSALS TO MITIGATE ANY FUNDING GAPS BETWEEN LIFE CYCLE PLANS AND ACTUAL BUDGETS

Length of carriageway network

There are lengths of carriageway across Central Bedfordshire that could be considered unnecessary for public use. There is an opportunity in stopping up such roads, thereby reducing the amount of road network requiring maintenance.

A proposal is attached at Appendix B.

Creating a hierarchy of roads where only minimal maintenance is undertaken

Some roads in the more remote rural areas of Central Bedfordshire are only lightly or infrequently used by traffic and another route may be available albeit creating a slightly longer diversion.

There is an opportunity in only undertaking emergency safety repairs on such roads.

A proposal is attached at Appendix C.

OPTIONS BASED ON INDICATIVE LIFE CYCLE PLANS

Having demonstrated that capital maintenance at the right time represents best value for money, it is recommended that a pro-active approach needs to be maintained. This means that road repair takes place before or when the condition intervention level is reached. In the context of a road scheme this could be when the road is classified as being in the 'Amber' condition category (as defined by UKPMS).

As shown in the Life Cycle Plans the most cost effective way of maintaining the roads in Central Bedfordshire would be to adopt Life Cycle Plan 2 below.

Life Cycle Plan 2 – Capital treatments at right time resulting in minimal revenue reactive maintenance

	Unit	Urban A or B Road	Rural A or B Road	Urban C road	Rural C Road	Urban UC road	Rural UC Road
Design life	Years	20	20	20	20	20	20
Treatment 1 type		50mm inlay	50mm inlay	35mm inlay	SD 10-6mm racked in plus patching 5% of area	35mm inlay	SD 10mm plus patching 5% of area
Treatment 1 life	Years	12	12	15	8	18	10
Treatment 1 Cost m2	**£ / m2**	**£24.50**	**£22.00**	**£20.00**	**£4.50**	**£17.50**	**£3.50**
Treatment 1 cost per annum	**£ / m2 / year**	**£2.04**	**£1.83**	**£1.33**	**£0.56**	**£0.97**	**£0.35**
Treatment 2 type		50mm inlay	Premium SD 10-6mm racked in plus patching 1% or area	35mm inlay	SD 10-6mm racked in plus patching 5% of area	Slurry seal plus 1% patch of area	SD 10mm plus patching 5% of area
Treatment 2 Life	Years	12	12	12	8	10	10
Treatment 2 Cost m2	**£ / m2**	**£24.50**	**£6.00**	**£20.00**	**£4.50**	**£4.50**	**£3.50**
Treatment 2 cost per annum	**£ / m2 / year**	**£1.67**	**£0.50**	**£1.67**	**£0.56**	**£0.45**	**£0.35**
Annual Reactive maintenance costs /m2	**£ / m2**	**£0.10**	**£0.10**	**£0.10**	**£0.15**	**£0.10**	**£0.15**
Length of network m	m	48600	173400	85800	226900	608800	171600
Average width of network m	m	8.7	8.1	7.5	6.1	6	5.2
Capital annual cost	**£ / year**	**£1,567,958**	**£3,277,260**	**£1,930,500**	**£1,557,101**	**£5,195,093**	**£624,624**
Revenue annual cost	**£ / year**	**£42,282**	**£140,454**	**£64,350**	**£207,614**	**£365,280**	**£133,848**
Capital Annual Total	**£ / year**	**£14,152,536**					
Revenue Annual Total	**£ / year**	**£953,828**					

Alternative lower cost options have been prepared to show what can be achieved from different levels of expenditure, including where lightly trafficked roads can be considered for downgrading or stopping up. Appendix B identifies an initial trawl of road that the Council may wish to consider, although this is not exhaustive and if the Council is interested in this option, it is recommended that a more detailed assessment is made across the road network in Central Bedfordshire.

Carriageway and Footway Gross Replacement Cost (GRC)

to be used where footway lengths are not assessed separately from R199B lengths

Notes for users

The spreadsheet uses HAMFIG default widths and rates, by inserting lengths of carriageway from your inventory the GRC is calculated

1. The R199B lengths to be inserted into the yellow boxes

   If a know length of dual carriageways is included within the R199B length - add this length to the R199B length to allow for the second carriageway

2. The 'HAMFIG default' rates should not be varied, however default widths may be altered if inventory data is available
3. The rates are for a complete construction

   Carriageways - include all elements associated with the area of the carriageway and an allowance for footways associated with the road hierarchy

   Linear items - includes for kerbs; drainage; road traffic signs and line marking associated with that road hierarchy

4. Fees for design; supervision and others associated with the construction element are included within the HAMFIG default rates
5. The GRC figure calculated has to be adjusted by inserting the 'Regional Factor' into the summary

Notice for compilers - ONLY use this sheet if FOOTWAY HIERARCHY lengths are not known - if they are known then the sheet using R199B carriageway lengths must be used

Quantities shown are for indication purposes only

INVENTORY DATA

To be completed by compiler

CALCULATIONS

Default values - for better local information on widths and areas these can be over-written

HAMFIG default rates should not be over-written without ensuring that there is an audit trail related to the calculation of any replacement rates

FOOTWAY (Inventory data): Included within R199B length if Footway hierarchy data not available

FOOTWAY (Calculations): Included within R199B length if Footway hierarchy data not available

CARRIAGEWAY: Road Classification	CARRIAGEWAY: R199B Length (Km)	CARRIAGEWAY: Carriageway Width HAMFIG Default (m)	CARRIAGEWAY: Calculated Area (m^2)	CARRIAGEWAY: GRC Rate HAMFIG Default value (£/m^2)	CARRIAGEWAY: GRC Value (£)	Linear items: GRC Rate HAMFIG Default value (£/m)	Linear items: GRC Value (£)
M Urban	1.000	10.8	10,800	160.91	1,737,828	715.13	715,130
A Urban	392.030	8.7	3,410,661	158.39	540,207,846	604.60	237,022,931
A Rural	364.510	8.0	2,916,080	112.85	329,079,628	457.98	166,938,290
B Urban	265.790	7.2	1,913,688	151.72	290,344,743	554.47	147,372,581
B Rural	159.260	5.2	828,152	100.16	82,947,704	255.15	40,635,189
C Urban	327.450	7.2	2,357,640	133.80	315,452,232	482.58	158,020,821
C Rural	350.760	5.2	1,823,952	79.92	145,770,244	217.98	76,458,665
U/C Urban	2,715.800	6.4	17,381,120	129.71	2,254,505,075	352.39	957,020,762
U/C Rural	687.200	3.8	2,611,360	74.87	195,499,968	166.08	114,131,196
TOTALS	5,263.800		33,253,453		4,155,545,268		1,898,315,565

Regional factors	
Northern Region	94.7
Yorkshire and Humberside Region	95.7
East Midlands Region	94.7
East Anglia Region	94.1
South East Region (excl Greater London)	107.8
London	
Outer London boroughs	116.6
Inner London boroughs	124.5
Central London boroughs	131.4
South West Region	98.3
West Midlands Region	95.4
North West Region	93.9
Wales generally	97.3
Cardiff	98.3
Scotland generally	102.0
Scottish Isles	135.7
Edinburgh city	105.8
Glasgow city	106.5

SUMMARY

Carriageway	4,155,545,268
Footway	with c'way
Linear items	1,898,315,565
Total of above	6,053,860,833
Regional Factor *insert Region and factor from table* Region: South East	107.8
Carriageway and Footway Gross Replacement Cost	6,526,061,978

Version - HAMFIG-2010/03
Scottish Isles added

Appendix B

INTRODUCTION

In a review of the highway asset it is considered that there is a potential to secure year on year savings through assessing whether parts of the network are essential for public use. The parts of the network considered are roads that;

- Carry very low volumes of traffic and where there are adequate alternative routes to use
- Are no through roads and serve only a limited number of properties, in particular where they serve only a farm business.

BACKGROUND

The road network in Central Bedfordshire has been reviewed on a broad basis to assess which roads fall in the above two categories.

The results of this broad review are as follows, although a more detailed in depth review may identify further roads.

Parish	Road Name	From	To	Length	Approx Annual Cost £ of Maint. Ideal Spend (see below)	Approx Annual Cost £ of Maint. Actual Spend (see below)	Initial Proposals (Will need site visits to confirm or otherwise)
Maulden	Moor End	Outer boundary of last property	End of public highway	480	3720	586	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Has been recently surface dressed. Leads to Right of Way (RoW)
Houghton Conquest	Chapel End	Outer boundary of last property	End of public highway	200	1550	244	Downgrade status to to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)
Steppingley	Preston Lane	Whole length	Whole length	100	775	122	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)
Salford	Mill Lane	Outer boundary of last property	End of public highway	130	1008	159	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)
Cranfield	Wood End Road	Outer boundary of last property	End of public highway	400	3100	488	Revert to landowner if land both sides is owned by same person, if not then downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Only serves Wood End Farm at end. Does not lead to Right of Way (RoW)
Cranfield	Stilliters Farm Road	Whole length	Whole length	170	1318	207	Revert to landowner if land both sides is owned by same person, if not then downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Only serves Stilliters Farm Adjacent to Cranfield Airpart. Does not lead to Right of Way (RoW)

Cranfield	Merchant Lane	Whole length	Whole length	250	1938	305	Revert to landowner if land both sides is owned by same person, if not then downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Only serves one property, not a farm. Does not lead to Right of Way (RoW)
Old Warden	Unnamed	Bedford Road	Keepers Warren	2050	15888	2501	Serves 2 properties, so probably not possible to stop up, but to downgrade
Tempsford	Station Road	Railway Crossing	End of public highway - two separate forks	1050	8138	1281	Each fork serves a building. Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to RoW
Sandy	Sand Lane	Brickhill Road	Swaden	760	5890	927	Accessed through narrow railway underbridge. Serves 1property, so probably not possible to stop up, but to downgrade
Pulloxhill	Highambury Lane	Church Road	End of public highway	1000	7750	1220	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)
Pulloxhill	Blackhill Lane	Highambury Lane	End of public highway	140	1085	171	Serves 3 or 4 properties, so probably not possible to stop up, but to downgrade
Clifton	Church St	Clifton Farm	End of public highway	550	4263	671	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. No properties involved. Leads to Right of Way (RoW)
Henlow	Middlefield Lane	A6001	End of public highway	110	853	134	Serves 2 or 3 properties, so probably not possible to stop up, but to downgrade as leads to Right of Way (RoW)
Greenfield	Hermitage Lane	High St, Greenfield	End of public highway	550	4263	671	
Westoning	Sampshill Rd	Junction with Bunyan Road	End of public highway	1800	13950	2196	Serves 3 or 4 properties, so probably not possible to stop up, but to downgrade as leads to Right of Way (RoW)s
Harlington	The Bottoms	Whole length	Whole length	2000	15500	2440	Used as a cut through from Sundon Road to Harlington Road. Adjacent landowners are probably different so not easy to stop up.
Tingrith	Wood End	First right angle bend mid way along whole length	End of public highway	600	4650	732	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)
Battlesden	UC192	Hill Farm	Battlesden Village		0	0	This is part of a loop road serving Battlesden Village. Stopping this up would leave one end serving Battlesden Farm only, other end serving the hamlet. Adjacent landowners are probably different so not easy to stop up.
Eversholt	Brook End	Whole length	Whole length	170	1318	207	Serves 3 or 4 properties, so probably not possible to stop up, but to downgrade
Potsgrove	Sheep Lane	A4012	End of public highway		0	0	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)

Ridgmont	Beckerings Park Road	Whole length	Whole length	500	3875	610	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)
Ridgmont	Segenhoe Maor	Eversholt Road	End of public highway	350	2713	427	Serves a number of properties, so probably not possible to stop up, but to downgrade
Kensworth	Land Park Lane	Orchard Estate	End of public highway		0	0	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)
Kensworth	Hollicks Lane	Hollicks Lane Farm	Church End, Kensworth	700	5425	854	This is part of a through road linking Kensworth to Church End, Kensworth although there is an alternative route via The Lynch. Stopping this up would leave one end serving Hollicks Lane Farm only from Kensworth. Adjacent landowners are probably different so not easy to stop up.
Kensworth	Isle of White Lane	B4541	Kensworth Quarry Entrance	100	775	122	This is a Parish Council reqest as tarrfic parks in this narrow lane to avoid parking charges at the NT visitor centre on the downs. Would need turning head at Quarry entrance
Studham	Studham Lane	Chequers Cottages	Residential Home	660			This length of road is already gated and has reverted to a quiet lane. No real need to formally stop up.
Tebworth	The Lane	Outer boundary of last property	End of public highway	1200	9300	1464	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)
Sharpenhoe	Harlington Service Road	Whole length	Whole length	150	1163	183	In effect a layby, serving 5 properties, difficult to stop up unless agreement is with all 5, not all have direct frontages, so agreement to revert highway to adjoining landowners difficult. Not really feasible to downgrade.
Hyde	Farrs Lane (part)	Hyde Lane	County boundary	220	1705	268	This is part of a through road linking Peters Green to Chilten Green although there is an alternative route via Peters Green itself. Road runs along county boudary with Herts, so they should be consulted. Adjacent landowners are probably different so not easy to stop up.
Hockliffe	Church End	Outer boundary of last property	End of public highway at Ground Farm	530	4108	647	Downgrade status to Bridleways Open to All Traffic (BOAT) or bridleway. Leads to Right of Way (RoW)
				TOTAL	**126015.5**	**19227.2**	

COST OF MAINTAINING THIS NETWORK

1. Ideal notional spend

In assessing the costs of maintaining this network is considered that they only receive a low level of maintenance per kilometre, as detailed below;

Emergency repairs	£2-50p per metre per annum
Surface dressing	£17-50p per metre every 7 years
Resurfacing	£55-00p per metre every 20 years

This equates to an annual expenditure of £7-75p per metre of stopped up / declassified road

Given the total length of the road network currently under consideration, this could equate to an annual saving to CBC of £122k

2. Actual spend

09/10 spend on 830kms of unclassified roads £1,014,000
This equates to an annual expenditure of £1-22p per metre of stopped up / declassified road

Given the total length of the road network currently under consideration, this could equate to an annual saving to CBC of £20k

PROPOSED PROCESS TO STOP UP / DECLASSIFY NETWORK

It is considered sensible to approach each prospective stopping up / reclassification on an individual basis but as part of an overall project. There after to gain the greatest benefit with regard to prospective cost savings to consider the longest length roads as a priority.

CBC

1. Initial commission to Bedfordshire Highways to manage project.

Bedfordshire Highways

2. Review existing schedule of possible roads to stop up / declassify to ensure completeness across the network
3. Finalise schedule
4. Prioritise schedule in a longest length per road
5. Agree with CBC final draft schedule

CBC

6. Agree with Bedfordshire Highways detailed project brief and costs to enable following process

Bedfordshire Highways

7. Consult with respective town / parish councils
8. Agree with CBC any revised schedule and priorities
9. Undertake Land Registry search to obtain adjoining landowners
10. Consult with utility companies to seek approval for them to enter in to agreements with adjoining landowners and estimate of costs for doing so
11. Consult with adjoining landowners and if agreement can be reached then agree physical works necessary to achieve objective.
12. Agree revised schedule with respect to stop up / declassify
13. Undertake cost benefit analysis of up front costs necessary to achieve annual savings and payback period thereon.

CBC

14. Agree final schedule for implementation
15. Undertake CBC legal process with respect to individual roads

Bedfordshire Highways

16. Complete stopping up / reclassification process

RISKS IN SUCH AN APPROACH

- Objections from affected properties in that they would be responsible for maintenance when stopped up.
- Stopped up highway would revert to adjoining landowners if land under highway has been registered at the Land Registry. If not then adjoining landowners would need to register land.
- If there are utility services under any public highway proposed to be stopped up, then there will be a need for the utility to negotiate a way leave with the proposed owner in order to continue to access their property. Utility could require their plant to be moved so as to remain in the public highway which could preclude any stopping up on cost grounds.

Appendix C

INTRODUCTION

In a review of the highway asset it is considered that there is a potential to secure year on year savings through assessing whether parts of the network are barely essential for public use. The parts of the network considered are roads that;

- Carry very low volumes of traffic and where there are adequate alternative routes to use.

BACKGROUND

The road network in Central Bedfordshire has been reviewed on a broad basis to assess which roads fall in the above category.

The results of this review are as follows, although a more detailed in-depth review may identify further roads.

Parish	Road Name	From	To	Length	Approx Annual Cost £ of Maint. Actual Spend (see below)	Initial Proposals (Will need site visits to confirm or otherwise)
Lidlington	Thrupp End	Sheeptick End	Old A421	1200	1500	
Lidlington	Boughton End Lane	A507	High St	1500	1900	
Aspley Guise	Salford Rd	Railway Station	Cranfield Rd	1200	1500	
Eversholt	Froxfield	Tyrells End	Woburn Park	1100	1400	
Flitton	Silsoe Rd	End of houses Wardhedges	Sand Rd	1100	1400	
Clophill	Great Lane	Haynes Church End	High St	6000	7200	
Clophill	Warren Farm Rd	A507	A6	2000	2500	

Meppershall	Campton Rd	Campton	Meppershall	2000	2500	
Sandy	Drovers Rd	A603	Thorncote Green	1000	1300	
Heath and Reach	Overend Green Lane 3 legs	Woburn Rd	Eastern Way	4000	5000	
Heath and Reach	Sandhouse Lane	A5	Woburn Rd	400	500	
Toddington	Long Lane	Tingrith	Toddington	3500	4300	
Tebworth	Chalgrave Rd	A5120	Tebworth	2000	2500	
Hockliffe	Woodcock Lane	A4012	End	700	1000	
Stanbridge	Billington Rd	Leighton Rd	A505	1000	1500	
Totternhoe	C228	A505	Totternhoe	1200	1600	
Eaton Bray	Doolittle Lane	Dunstable Rd	Harling Rd	2500	3000	
Kensworth	Spratts Lane	Church End	Common Rd	1000	1500	
Kensworth	Dovehouse Lane	Common Rd	Buckwood Lane	1500	2000	
				TOTAL	**44100**	

COST OF MAINTAINING THIS NETWORK

3. Actual spend

09/10 spend on 830kms of unclassified roads £1,014,000
This equates to an annual expenditure of £1-22p per metre of stopped up / declassified road

Given the total length of the road network currently under consideration, this could equate to an annual saving to CBC of £44k