

draft

Transport Infrastructure Assets Code

Guidance To Support Asset Management,
Financial Management And Reporting

October 2009

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Foreword

This Code provides guidance on the development and use of financial information to support asset management, financial management and reporting of local transport infrastructure assets. This first version deals with local highway assets, but next year it will be extended to cover light rail, tram and underground systems. The Code has been prepared at the request of the Government and implements a key recommendation from CIPFA's review of local authority transport assets which reported last year. Implementation of the Review is being overseen by a Project Implementation Steering Group which includes representatives from national and local government and audit bodies in England, Scotland and Wales. Membership and terms of reference for the Group are given at Annex A.

The Code has been developed in collaboration with the Highways Asset Management Financial Information Group (HAMFIG):

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To support implementation of the Code a new Structures Asset Management Planning Toolkit is being developed, building on work undertaken by the London Bridges Engineering Group (LoBEG). The project is being undertaken by Atkins and overseen by a Steering Group:

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CIPFA would like to thank all those who have contributed to the development of the Code

1 Overview – The purpose and use of the Code

1.1 Purpose of the Code.

- 1.1.1 The purpose of this Code is to support an asset management plan (AMP) based approach to the provision of financial information about local authority transport infrastructure assets. The intention is that each authority should develop a single set of financial management information about these assets which is robust and consistent between transport authorities and supports:
- good, evidence based, asset management, including the development of more cost effective maintenance and replacement programmes;
 - delivery of efficiency savings and service improvements;
 - long term financial planning and budgeting;
 - corporate capital planning and the operation of the Prudential Code;
 - performance assessment and benchmarking;
 - resource allocation, locally, at regional level and nationally;
 - production of transparent information for stakeholders on the authority's management of its highway assets;
 - production of financial information that is compliant with International Financial Reporting Standards (IFRS) and meets the needs of Whole of Government Accounts (WGA) and National Accounts;
 - any future move to current value financial reporting of the assets in local authorities' own accounts.

1.2 The importance of transport asset management

- 1.2.1 The local highway network and other local transport infrastructure assets represent by far the biggest capital asset that the UK public sector holds. It is vital to national economic prosperity. The comfort and safety in which people can move from place to place and the appearance of local streets are important contributors to the quality of life. But few authorities know what their infrastructure is worth, and detailed information on what it consists of, and the condition it is in, is patchy and often out of date. Nationally there is a perception that spending is insufficient to maintain our transport infrastructure to satisfactory standards. However, Government does not have robust consistent about the true cost of holding and maintaining the assets, or the size of maintenance and investment backlogs. And most authorities do not have the detailed information they need to drive down the cost base and improve service delivery.
- 1.2.2 Asset management could and should play a key role in tackling these problems. In other countries and other UK sectors where infrastructure asset management is well established, it has delivered significant value for money savings and service benefits. In Great Britain those authorities that have made good progress in implementing transport asset management have demonstrated both the potential to achieve equivalent benefits and that it is possible to prioritise implementation so as to gain early benefits from focused initial investment.

1.3 Potential benefits

1.3.1 Section 2 describes the Code's approach to generating financial information and provides some advice on how this can be used to support better decision making and the delivery of efficiency savings. Potential uses include:

- whole life cost based modelling, to understand and minimise costs/maximising value over the long term;
- scenario planning and option appraisal to model and understand the cost consequences of different maintenance strategies;
- prioritising work programmes to maximise the return on a given level of investment;
- reducing the amount of unplanned, reactive maintenance;
- reducing the number/value of successful third party claims;
- understanding and adjusting trade offs between capital and revenue spend to achieve the best balance;
- using the detailed information that the system will provide about the cost of individual maintenance activities to drive down the cost base, and to monitor whether treatments deliver the expected performance;
- informing better procurement;
- monitoring performance trends over time;
- benchmarking.

1.4 Scope

1.4.1 This version of the Code deals with highway infrastructure assets, but the intention is that it will be extended to cover other local transport network assets, i.e. tram, light rail and underground systems.

1.5 Users

1.5.1 Primary users, i.e. those with the chief responsibility for implementing and applying the Code, will be highway engineers responsible for managing and operating the assets and finance staff responsible for highways' financial management, corporate budgeting and financial planning

1.5.2 The Code is intended to serve as best practice guidance for those who are responsible for the management of the assets and as a tool for those who audit their performance. As explained in Section 2, the Code uses accounting principles and other financial disciplines and techniques to ensure that the financial information generated for asset management is robust, consistent and fit for purpose. It also generates asset management data in a form that can be readily used to report the assets on a current value basis in Whole of Government Accounts. HM Treasury has set a timetable for a gradual transition to reporting on this basis, started with limited, unaudited data submissions for 2009/10, building up to a full audited dry run in 2011/12 and the withdrawal of historic cost based reporting from 2012/13.

1.6 Implementing the Code

- 1.6.1 Effective implementation will require highway engineers and finance staff to work closely together to ensure that financial information is timely, consistent and of high quality to meet the needs of both. They will jointly need to make sure that the information produced also meets the needs of other internal stakeholders – in particular members, to support decisions on policy and funding - and that there is clear, transparent information for taxpayers and other external stakeholders on the authority's management of its assets.
- 1.6.2. Internal audit can also play a valuable role in supporting implementation and reducing the risk of any external audit issues further down the line, by providing interim assurances from testing inventory, cost data and systems as they are developed.
- 1.6.3 The Code sets out a long term approach so that authorities can see where they should be aiming. However some things will not be capable of being fully implemented initially. It takes time to develop good asset management, building up and refining inventory and condition data and support systems. Progress so far has varied considerably between authorities. In recognition of this, the Code also sets out interim approaches where necessary, including ways of dealing with issues such as lack of data. It is designed to allow authorities to plug in initially at the level that their own data and systems will support and then to develop and move forward over time.

- 2 The approach to developing and using financial information**
- 2.1 Using accounting principles to support asset management and financial management**
- 2.1.1 A key principle that underpins the Code is that the same data should be capable of serving the needs of asset management, financial management, budgeting and financial reporting. Data used for financial reporting is of high quality and consistency because it is collected according to professional accounting rules and is subjected to strong internal controls and a formal audit regime. Applying those principles to the production of information about highway assets not only ensures that the data is fit for use for Whole of Government Accounts, but also provides high quality information to support the management of the assets and maximise the value delivered from both past investment and future expenditure.
- 2.1.2 It also supports the production of information on a consistent basis between authorities, which facilitates benchmarking and means that information can be aggregated to provide information at regional and national level on spending patterns and needs. This can be used to inform national decision making on both policy and resource allocation.
- 2.1.3 Within accounting, depreciation is used to provide a measure of the cost of the economic benefits embodied in an asset that have been consumed during the accounting period. Depreciation can be measured in various ways. For commercial undertakings a key aim should be to reflect changes in market value or income generating potential, but for long life public sector infrastructure a more appropriate measure is what needs to be spent to maintain the asset in a stable condition. The present, historic cost based approach to valuing local authority infrastructure is not a good basis for dealing with assets that have very long lives. It provides some information about what is being spent on the assets, though even this is not necessarily consistent between authorities but it says nothing about the effect the expenditure has on the condition of the assets or how far it matches spending need.
- 2.1.4 This Code therefore uses a different accounting approach. **Depreciated Replacement Cost (DRC)** is a method of valuation that provides the current cost of replacing an asset with its modern equivalent asset less deductions for all physical deterioration and impairment. Gross replacement cost (GRC) is therefore based on the cost of constructing an equivalent new asset and the difference between the gross and depreciated cost is therefore the cost of restoring the asset from its present condition to "as new". Annual depreciation is calculated by identifying all the capital treatments needed to maintain assets or key components over their life cycle and then spreading the total cost evenly over the number of years in the life cycle. Calculated in this way, annual depreciation not only represents the annual consumption of service benefits but also provides a measure of what on average needs to be spent year on year to maintain the assets.
- 2.2 Developing and using financial information**
- 2.2.1 Financial modelling**
- 2.2.1.1 Good asset management needs appropriate inventory plus up to date local cost data and condition information. It also needs an understanding of how assets or components deteriorate and, in particular when they will have to be replaced or treated. Management and maintenance strategies should be life

cycle plan based and designed to optimise value over the life cycle. The code sets out a financial modelling approach which, together with the application of professional accounting practice in the way it is implemented, is designed to bring all these things together in a consistent, systematic way. Figure 1 below summarises the key inputs, processes and outputs used by the Code in modelling financial information.

2.2.2 Life cycle plans and whole life costs

2.2.2.1 The life cycle plan identifies and costs all the capital works and their projected timing, and so provides the information needed to undertake long term expenditure forecasting and to undertake a variety of financial modelling.

2.2.2.2 Because the financial information is produced and aggregated across the life cycle, it supports – and the code requires – a whole life cost approach, rather than simply looking at the cost of the next treatment. The base position should be to produce plans that reflect local standards of service, which may reflect affordability considerations, but otherwise to plan on the basis that the assets are fully funded. This provides a starting position from which to assess the cost consequences of alternative scenarios, for example the trade offs between cheaper, more frequent maintenance treatments or allowing the asset to deteriorate until it requires a single more fundamental treatment.

2.2.2.3 Developing life cycle plans and exploring options for street lighting, traffic management systems and street furniture is relatively straightforward. Carriageways, footways and structures are more complex and also account for the great majority of asset value and maintenance expenditure.

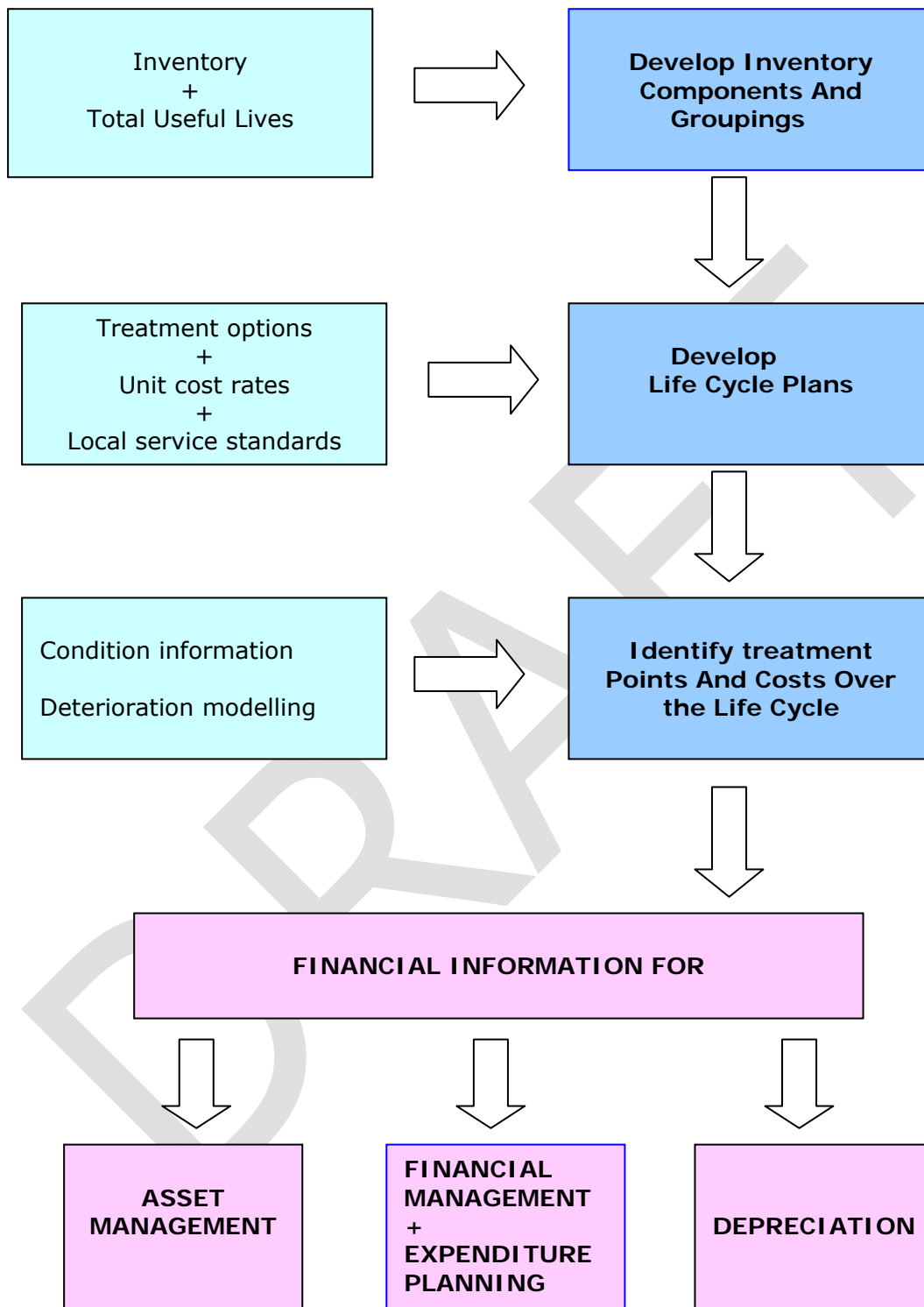
2.2.3 Using condition information

2.2.3.1 All authorities hold data about the condition of their carriageways and footways in the UK Pavement Management System (UKPMS). Although, UKPMS was developed as a system to support the management of maintenance strategies and programmes, in recent years its prime use has been to generate national performance indicators. The intention is that UKPMS will be used to support the implementation of the code in respect of carriageway and footway data. Some initial modifications have already been made and its asset management capabilities will be enhanced over the next few years, in particular to provide for more detailed deterioration modelling. Authorities will be able to use UKPMS as a tool to explore and cost alternative maintenance strategies and their effects on the condition of the network, and to prioritise work so as to maximise value for a given budget.

2.2.3.2 There is no existing equivalent national system for structures so a new model is being provided from March 2010, which will be consistent with the principles in the code and will support asset management planning and financial modelling, including valuation.

2.2.3.3 Good practice in asset management requires that the strategy for maintaining an asset should be based on appropriate life cycle planning that endeavours to anticipate the future performance of the asset under various different scenarios. Where possible, this analysis should take into account operational costs as well as maintenance and renewal costs and any other significant factors or constraints and the end product will be a series of 'options and consequences' – different possible costed outcomes. This scenario planning needs to include risk assessments as well as financial analysis.

Figure 1: Modelling financial information



2.2.3.4 This kind of modelling exercise allows the authority to make an informed decision, selecting either the scenario that delivers the desired level of performance for the least money or (in a budget-constrained situation) the scenario that delivers the level of service closest to the desired level within the available resources.

2.2.4 Cost, inventory and treatment lives

2.2.4.1 By their nature, life cycle plans attempt to predict the future performance of the asset. As with any modelling, the nature and quality of the outputs will depend on the quality of the input data. Cost information will generally be readily available and, so long as it is input consistently, should be robust. Inventory will need to be developed and the code gives some advice on prioritisation. Essentially the priorities are the obvious ones – to concentrate on the big high value/high spend items first and then tackle the lower value, lower spend items and extend the detail of the inventory.

2.2.4.2 The most complex part of the analysis is predicting how the asset will perform and therefore when it will reach a treatment point. Asset managers will be able to take a reasonable view, across a group of assets, of the average useful life of an asset or treatment, but the performance of individual assets within the group will vary considerably. Also for many assets, especially the big spend items like carriageway surfaces, authorities may well not have information about the timing and nature of past treatments. In these cases, condition will need to be used to estimate the remaining useful life.

2.2.5 Monitoring and using information

2.2.5.1 Monitoring future changes in condition will be an important part of checking whether the life cycle plan assumptions about treatment lives are realistic. Assumptions will need to be reviewed and, if necessary, revised at least annually. Comparisons between annual expenditure and condition will also provide a good indication of the realism of useful life assumptions. If, say, an authority's spending broadly matches its annual depreciation, then if the useful life assumptions are right, the condition of the asset should broadly remain at steady state over time, with only minor annual fluctuations. If the condition of the asset shows a deteriorating trend, then the assumed useful life is probably optimistic. Conversely, if the asset's condition shows a steady improvement, the life assumptions are probably too pessimistic.

2.2.5.2 Initially, life cycle plans will probably be at a relatively high level and, since it will take time to explore alternatives, may well tend to reflect past practice which may not be optimal. However the resulting financial information should provide a reasonable estimate of the expenditure needed to implement those strategies at the network level. The interim approaches described in the code will allow authorities even with limited data to deliver network level approximations of the work required to maintain the assets. They will also support the exploration of alternative strategies and thus can start to deliver efficiency gains. However, particularly for the more complex assets such as carriageways, to maximise efficiency the interim approaches will need to be refined. For carriageways, this will mean a gradual shift from a network or road hierarchy based approach to one that works at the level of individual road sections. Further systems developments, particularly in UKPMS, are planned to support this.

- 2.2.5.3 The model uses authorities' own maintenance and replacement cost rates. As discussed above, the amount of annual depreciation/annual spending requirement depends on the whole life cost effectiveness of the maintenance strategy adopted, but it is also affected by the efficiency with which it is procured. The detailed cost data in the model can be used to drive down the cost base. Initially the focus is likely to be on identifying and targeting those activities that generate significant regular expenditure so that these can be examined to see if alternative, more cost effective approaches are possible. In time the approach can be extended until it covers all regular activities. Because cost data is being compiled on a consistent basis, it can also be used to track performance over time and for benchmarking between authorities.
- 2.2.5.4 Depreciation only applies to capital expenditure. However, it is important that life cycle plans and asset management financial systems also reflect revenue expenditure. This is needed anyway for expenditure planning, but it is also an important element of life cycle planning and whole life cost optimisation so that trade offs between capital costs and routine (revenue) maintenance can be explored.
- 2.2.5.5 Finally a word of caution about using Depreciated Replacement Cost as an indicator of the state of the asset base. DRC will be adjusted annually to deduct annual depreciation and any impairment charges and to add the value of capital works undertaken in the year. Thus if annual expenditure matches depreciation the DRC should remain stable. However, it is important to note that because all information is produced on a current value basis, the asset values are indexed and uprated annually in line with inflation. It is therefore possible, for example, that an authority was spending less than the annual spending requirement but the effect of this was masked by indexation so that a comparison of the DRC for successive years still showed the DRC as increasing. It is therefore important to look at the underlying changes that influence movements in DRC rather than simply comparing the absolute figures.
- 2.2.5.6 Asset managers also need to be careful about drawing conclusions from the relationship between GRC and DRC, particularly at the level of individual asset types. There are two points to remember here. Firstly, some asset types, eg traffic management systems, have finite lives and will be depreciated down to zero by the end of their useful lives. For other assets, notably carriageways, a substantial part of the total value is in underlying layers which will not normally require treatment and therefore will not normally be depreciated. Secondly, even for assets which have the same depreciation regime, the DRC will vary depending on the age profile of the group. For assets that have a fairly even spread, for example a 20 year life with approximately 5% being replaced each year, DRC will remain stable at around 50% of depreciable value. However, if the age profile is skewed, then DRC could be much higher or lower, even if in each case spending matches need.

2.3 Tools to support implementation of the Code

- 2.3.1 In implementing the Code authorities will wish to decide for themselves how to structure systems to store and manipulate asset management and financial data, and to make interfaces between asset management and financial systems. Clearly for the long term there are advantages in having a high degree of systems integration but in the short to medium term at least it seems likely that most authorities will store data and generate financial information, including valuation data as well as management information, within asset management systems and where required, eg for WGA reporting, transfer aggregated data into the relevant finance systems, either electronically or manually.

- 2.3.2 As mentioned above, UKPMS is being modified to support the implementation of the Code in respect of carriageways and footways. For structures a new financial planning model is being developed and will be available from April 2010. To facilitate the calculation of Gross Replacement Cost a number of simple spreadsheets are being provided, together with composite rates for carriageways, footways, structures and land. Figure 2 below shows that even for authorities with limited asset management systems, GRC and depreciation can be calculated using a combination of UKPMS, the structures planning tool and simple spreadsheets linked to the inventory data.
- 2.3.3 All materials to support implementation of the Code will be available at www.cipfa.org.uk/pt/infrastructure

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Figure 2: Sources of financial information

ASSET TYPE	GRC (simple spreadsheet approach)	DEPRECIATION
Carriageway	Composite rate per sq m + rate by length for linear add ons (length/width/type)	Surface layers through UKPMS Other items in composite rate, eg drainage, retaining walls, fencing – based on average annual replacement spending requirements.
Footways +cycletracks	Composite rate per sq m (length/width/surface)	Done through UKPMS
Structures	Structures planning tool	Structures model (works as spreadsheet, London BMS, spec for other BMS modules)
Lighting	Spreadsheet Based on inventory/unit rates.	Spreadsheet Based on inventory/age/life/unit rates.
Traffic management	Spreadsheet Based on inventory/unit rates.	Spreadsheet Based on inventory/age/life/unit rates.
Street furniture	Spreadsheet Based on inventory/unit rates.	Spreadsheet Based on inventory/age/life/unit rates.

3 How the Code fits with other guidance

3.1 Relationship with other asset management guidance.

- 3.1.1 This Code replaces the CSS/TAG Guidance Document for Highway Infrastructure Asset Valuation published in July 2005. It needs to be read in conjunction with the CSS Framework for Highway Asset Management which provides overall guidance on the implementation of highway asset management. Other key reference documents are the Roads Board Asset Management Working Group Quickstart Guidance series, which are particularly useful to authorities still in the early stages of developing asset management, and the Department for Transport publication "Maintaining a Vital Asset". These documents are all available on the UK Roads Liaison Group website.
- 3.1.2 Other guidance that is relevant to consideration of particular asset groups or issues is referred to as appropriate in the asset specific sections of this Code. A full bibliography is given at the end of the Code.
- 3.1.3 Highways Codes are subject to revision from time to time and, where appropriate, future updates will include changes to make text consistent with this Code. For the avoidance of doubt, if there are inconsistencies in respect of matters that are the subject of this Code, then it should be regarded as the authoritative source of guidance on those matters.

3.2 Relationship to other accounting guidance and requirements – the IFRS based Local Authority Code and Whole of Government Accounts reporting and the CIPFA Financial Management Model.

- 3.2.1 From 2010 local authority accounting in general is moving to an IFRS based Code of Practice. That has been prepared under new governance arrangements whereby local authority accounts are now prepared under the oversight of the Financial Reporting Advisory Board, rather than the Accounting Standards Board. For the time being the IFRS based Local Authority Code will continue to require that infrastructure assets are reported on a historic cost basis. However, to provide the necessary consistency of accounting policies for Whole of Government Accounts purposes, and to support the production of information for the national accounts, H M Treasury has set a timetable which will require authorities to move to reporting their infrastructure assets for Whole of Government Accounts purposes on a current value, depreciated replacement cost basis, in accordance with the approaches set out in the Infrastructure Code.
- 3.2.2 The Infrastructure Code has been prepared in accordance with the relevant International Accounting Standards, and with regard to the guidance in the FReM. It is designed to work with the IFRS-based Local Authority Code and therefore to support a future change to the basis on which asset values are reported in local authority accounts.
- 3.2.3 For asset managers the Infrastructure Code is intended to work as a free-standing document, and they should not need to have regard to the Local Authority Accounting Code or other accounting guidance.
- 3.2.4 For accountants, the Infrastructure Code includes guidance on the DRC based measurement (carrying value) of infrastructure assets that are in use for operational purposes following initial recognition. All other aspects of accounting for infrastructure assets - initial recognition, assets under construction, derecognition of assets at the end of their useful life, disposal of obsolete or surplus assets, adjustments following revaluation or impairment,

and other reporting requirements - should be dealt with in accordance with the guidance in the Local Authority Accounting Code. Accountants will need to satisfy themselves that asset management systems and the arrangements for updating inventory and other information are appropriate for WGA reporting purposes.

- 3.2.5 In implementing the Code, accountants should also have regard to the CIPFA Financial Management Model. As noted in Section 1, highways and other transport infrastructure represent by far the biggest value asset that the authority holds. Successful implementation of the financial systems in the Code should materially assist authorities in the management of their transport infrastructure assets and, if used effectively and further refined and developed over time, the resulting financial information should increasingly support performance and enable service transformation. The model should therefore be used as a tool to measure progress. The good practice statements in respect of measurement and management of assets and liabilities will be particularly relevant here, but other aspects of the model will also be relevant, including those relating to responsibilities for delivering cost effective services, providing challenge and support on value for money and performance, evidence based decision making, operating financial information systems that meet users' needs and delivering value for money through procurement.
- 3.2.6 The Code also supports corporate capital planning and the operation of the Prudential Code.

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4. The Code's approach to producing financial information – the essential building blocks

4.1 What has changed in this Code

4.1.1 The approach taken in the Code has some important differences from the way in which infrastructure assets have been valued and depreciated in local authority accounts. In particular, it is based on current values rather than historic costs, and the information used for financial reporting is derived from the authority's asset management plans.

4.1.2 There are also some changes from the approach set out in the CSS/TAG valuation guidance. That also used an AMP based current value approach, but it was based on renewals accounting which, with the move to IFRS based accounts across the public sector, is no longer allowed. Also, the approaches set out in the present Code makes much greater use of componentisation (discussed below). There are also some important differences in the way assets are valued and depreciated.

4.2 Asset classification

4.2.1 Assets need to be grouped in a consistent manner so that data can be aggregated for regional or national purposes, eg to determine actual expenditure made or estimated spending need for a particular asset class, to allow authorities to benchmark performance with that of others, and to allow individual authorities to track performance over time.

4.2.2 The classification used in this Code is shown in Figure 3. It is based on the one in the CSS/TAG guidance but with some adjustments. The most significant change is that attached and segregated footways and cycletracks have been brought together as a single asset type. The separate category for off highway drainage has been removed since most sustainable drainage systems are not dedicated highway assets; all highway drainage other than large structures is now included with carriageways. The table is not exhaustive. If the listed asset types and groups do not provide adequate coverage then an authority may extend this scheme to make it appropriate for its own network. Authorities should not however vary the level 1 groupings.

4.2.3 The classification has three levels. These are defined as

Level 1: Asset Types – broad categories based on the general function of the assets. They divide the asset base into categories that may be suitable for reporting in the financial statement and provide an appropriate basis for high level management information.

Level 2: Asset Groups – used to distinguish between assets that have a similar function and form.

Level 3: Components - distinguishes between components that are likely to require individual depreciation and impairment models, e.g. different service lives and/or rates of deterioration.

Figure 3: Classification of Highway Assets

Level 1 Asset Type	Level 2 Asset Group	Level 3: Components that Level 2 implicitly covers in valuation
Carriageway	<p>Area (sq m) based elements</p> <ul style="list-style-type: none"> • Flexible pavements • Flexible composite pavements • Rigid concrete pavements • Rigid composite pavements <p>Linear elements</p>	<ul style="list-style-type: none"> • Pavement layers • Other surface types e.g. paved • Central reservation, roundabout, lay-by traffic island etc • Earthworks (embankments & cuttings) • Traffic Calming • Fords and Causeways • Kerbs • Line markings • Road studs • Road drainage elements (gullies, drains etc, but not large structures) • Boundary fences and hedges • Hard strip/shoulder Verges/vegetation
Footways and cycletracks (attached to the road or segregated)	<ul style="list-style-type: none"> • Footways • Pedestrian areas • Footpath • Cycletracks 	<ul style="list-style-type: none"> • Pavement layers • Other surface types e.g. block paving, unbound materials
Structures	<ul style="list-style-type: none"> • Bridges (span > 1.5m) • Cantilever road sign • Chamber/cellar/vault • Culverts (span >0.9m) • High mast lighting (height > 20 m) • Retaining walls (height > 1.35m) • Sign/signal gantries and cantilever road signs • Structural earthworks, e.g. strengthened/reinforced soils (all structures with an effective retained height of 1.5m or more) • Subway: pipe • Tunnel (enclosed length of 150 m or more) • Underpass/subway: Pedestrian (span of 1.5m or more) • Underpass: Vehicular • Special structure 	<p>All elements identified on the CSS inspection pro forma..</p> <p>Smaller water carrying structures are considered as road drainage.</p>

Level 1 Asset Type	Level 2 Asset Group	Level 3: Components that Level 2 implicitly covers in valuation
Highway lighting	<ul style="list-style-type: none"> • Lighting columns • Lighting unit attached to wall/wooden pole • Heritage Columns • Illuminated Bollards • Illuminated Traffic Signs 	<ul style="list-style-type: none"> • Column and foundations • Bracket • Luminaries • Control equipment, cables • Control gear, switching, internal wiring cabling (within ownership)
Street furniture	<ul style="list-style-type: none"> • Transport • Highway • Streetscene/Amenity 	<ul style="list-style-type: none"> • Traffic signs (non illuminated) • Safety fences • Pedestrian barriers • Street name plates • Bins • Bollards • Bus shelters • Grit bins • Cattle grids • Gates • Trees/tree protection etc. • Seating • Verge marker posts • Weather stations
Traffic management systems	<ul style="list-style-type: none"> • Traffic signals • Pedestrian signals • Zebra Crossing 	<ul style="list-style-type: none"> • Different types
	<ul style="list-style-type: none"> • In-Station 	<ul style="list-style-type: none"> • Complete installation
	<ul style="list-style-type: none"> • Information Systems • Safety Cameras 	<ul style="list-style-type: none"> • Variable Message Signs • Vehicle Activated Signs • Real Time Passenger Information
Land	<ul style="list-style-type: none"> • Freehold land • Rights land 	Features on the land are not taken into account in the valuation.

4.3 Inventory

- 4.3.1 Inventory items need to be appropriately classified into types and groups using the classification framework.
- 4.3.2 It is essential that inventory is updated regularly to take account of all items added to or removed from the asset base. This will include updating at the component level where component breakdowns apply. (See section 4.4 below).
- 4.3.3 Guidance on developing an inventory for asset management is given in the CSS Framework for Highway Asset Management. The development of a robust, fully detailed inventory requires both expenditure and manpower. It needs to be carefully prioritised within the context of a considered information strategy. For authorities who do not already have it, the first priority should be to establish good information about carriageway widths (to set alongside the very good information all authorities hold on lengths), and about footway lengths and widths.
- 4.3.4 For most authorities carriageways and footways typically represent 70-80% of gross asset value, and account for the majority of capital maintenance expenditure. Having good information about these is essential for both asset management and valuation. Structures typically represent between 10 and 20% of the gross asset value. The majority of authorities, if not all of them, have good information on bridges (e.g. inventory and condition data in accordance with recognised CSS guidance), and bridges normally constitute the major part of highway structures. Information on other structure types (e.g. retaining walls, structural earthworks) is typically not as good, though most authorities have good information on the number/quantity of these assets and condition information is improving. Most authorities have good information about street lighting and traffic management systems. Authorities may not have good information about street furniture, but since this typically accounts for a very small proportion of gross value it is not a first priority.
- 4.3.5 To avoid double counting, authorities will need to make sure that they do not include in their highway inventory assets that sit on highway land but are held and accounted for by another part of the authority (eg as amenity or housing assets) or owned by another authority or body (eg street lighting provided by parish councils).
- 4.3.6 **PFI/PPP assets:** assets that are the subject of Private Finance Initiatives (PFI) and Public Private Partnerships (PPP) arrangements need to be kept clearly separate from an authority's other highway assets, even where the arrangement is on the authority's own balance sheet. This is because PFI/PPP assets are maintained and funded differently. However, for Whole of Government Accounts purposes, PFI/PPP assets should be valued in accordance with the guidance in the Infrastructure Code, with the transition from historic cost reporting being made to the timetable set by H M Treasury. Other financial disclosures that are required in respect of PFI/PPP arrangements should be made in accordance with the Local Authority Code.

4.4 Componentisation

- 4.4.1 The International Accounting Standard (IAS) that deals with accounting for property, plant and equipment, including infrastructure, is IAS 16. This requires that where an asset can be broken down into identifiable components with different useful lives, those components should be accounted for separately. It needs to be applied at an appropriate level of materiality and components with similar lives can be grouped together.

4.4.2 The systematic application of componentisation is fundamental to the way in which the Infrastructure Code generates financial information. Under this approach componentisation is driven by the level of detail that is needed to identify those replacement and capital maintenance activities that are significant enough to need to be taken into account to support the development of detailed work programmes and forward budgets. Groupings will therefore also reflect works practice, with components that are renewed or maintained on the same cycle being grouped together.

4.4.3 The Code also applies componentisation in a way that fits with and supports the use of other management tools. For instance, for major structures it is designed to follow and reinforce the inspection regime set out in "Management of Highway Structures – A Code of Practice." For carriageways and footways the approach uses and further develops the asset management capability of the UK Pavement Management System (UKPMS). Detailed guidance on the application of componentisation to different types of infrastructure assets is given in the sections that deal with each asset type.

4.4.4 In summary, the Code will require a more detailed approach to componentisation than has been the case with other methodologies, or than would be needed simply to satisfy IFRS accounting requirements. Instead the level of detail and the grouping of infrastructure components should be determined by what is necessary to support detailed maintenance planning and associated budgeting over the life cycle of the assets.

4.5 Asset and treatment lives

4.5.1 Having broken down assets into appropriate components, it is necessary to determine the life of each component or treatment. As indicated above, useful lives also determine whether or not it is appropriate to group components.

4.5.2 Assets and components fall into one of two categories:

- those with a **finite life**, at the end of which they will need to be replaced – typically 20 – 40 years though some assets will have considerably shorter or longer lives; and
- those which, given any necessary capital maintenance, will have an **indefinite life**.

Indefinite life components can be further sub-divided into ones that require capital maintenance to allow them to achieve their expected life and those that do not.

4.5.3 For a finite life asset or component, the life cycle period will be the whole of the anticipated life. For an indefinite life component the period will be based on the life of any capital treatments necessary to keep it in use. Judgement needs to be applied here. If, say, over time an asset would receive a number of cheaper, shorter lasting treatments, plus a single major long-lasting one, then the life cycle should be based on the latter, to ensure that the activities and costs captured are fully representative over the longer term.

4.5.4 If, exceptionally, a component that had been categorised as not requiring any treatments to maintain its life indefinitely does experience deterioration (for example due to inadequate maintenance of surface layers), then it will need to be re-categorised and an appropriate life cycle plan developed.

4.5.5 It is essential that assumptions about the remaining life of an asset, component or treatment are reviewed annually and revised where necessary.

4.6 Cost information

4.6.1 Rates used for the calculation of Gross Replacement Cost (GRC) should be new build rates. Section 6, which explains what GRC is and how it should be calculated and used, includes detailed guidance on GRC rates.

4.6.2 For all other financial management and reporting purposes, the unit cost rates used should be up to date maintenance and replacement cost rates, ie rates for the latest reporting period (financial year). Wherever possible they should be the authority's own rates. They should reflect **actual** rates at the time: proposed improvements in procurement or other factors that might lower rates in future years should not be anticipated.

4.6.3 There may be cases where authorities do not have sufficiently recent rates of their own. This is most likely to arise with certain infrequent maintenance or replacement activities on structures; for these separate guidance is being provided. For anything else authorities should take appropriate steps to obtain a realistic estimate, for example by seeking rates from neighbouring authorities.

4.6.4 Replacement costs should be net of any residual (disposal) value of the asset or component. In most cases disposal will be part of the replacement works contract and will therefore already be reflected in the unit cost rates. For example, in a street lighting replacement contract, the contractor will normally be responsible for removing and disposing of the old assets as well as installing the replacements, and the rates will take account of any scrap value. However, where that is not the case, any residual value will need to be netted off from the replacement costs.

4.6.5 All costs rates used in the AMP should be revised annually to bring them up to current values. In using financial information to support longer term asset management and financial planning, authorities will need to take a view on whether or not costs for future years should be further up-rated in some way to allow for future inflation. This is a matter for local discretion, but our advice would be that it is generally preferable to use a constant price basis for long term financial planning. As well as avoiding the difficulties involved in making long term inflation projections, it is much easier to identify other trends or peaks and troughs in expenditure requirements if the effects are not masked by inflation assumptions. For budgeting purposes, however, authorities will want the ability to up-rate forecast expenditure over the short to medium term.

4.6.6 **VAT.** Local authorities' business activities will generally be treated in the same way as those of ordinary traders. However, their statutory and other non-business activities will be outside the scope of the tax and VAT falling on any purchases by them of goods and services for these activities will not be deductible under the normal credit mechanism. In order to avoid the tax on these purchases burdening the rates or the rate support grant, special arrangements exist under S33 of the Value Added Tax Act of 1994. As such, VAT should generally be excluded from all such calculations including those relating to PFI schemes.

4.7 Costs that may be capitalised

- 4.7.1 Under IAS 16, the cost of an item of infrastructure shall be recognised as an asset if, and only if, it is probable that future economic benefits associated with the item will flow to the entity; and the cost of the item can be measured reliably. Items that qualify for recognition under IAS 16 should be capitalised.
- 4.7.2 Costs that meet the recognition principle in the previous paragraph include initial costs of acquisition and construction, and costs incurred subsequently to enhance, replace part of, or service the asset. In this context, enhancement means the carrying out of works which materially lengthen the useful life of the asset or materially increase the standard of performance or service potential of the asset.
- 4.7.3 Only costs that are directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management may be capitalised.
- 4.7.4 Directly attributable costs for highway infrastructure assets include all costs incurred by the authority when constructing the asset, e.g. labour, plant, material, site preparation, traffic management and professional fees. However, certain costs such as pre-feasibility costs, the authority's overall programme management, monitoring and overhead costs not directly attributable to a specific asset or scheme, are not admissible.
- 4.7.5 Any abortive costs including those related to design errors, industrial disputes, idle capacity, wasted resources and production delays are also not admissible. The actual outturn costs incurred in constructing a highway asset can be broadly grouped under the following cost elements:
- Direct cost of material, labour, plant and equipment including site clearance and preparation costs, including contractor's profit margin and finance costs.
 - Project management and supervision costs including scheme design, from the preferred scheme stage.
 - Costs of authority's own staff time from preferred route stage.
 - Costs of site clearance (net of any scrap value).
 - Costs of Landscaping and Environmental Works. This will include items such as noise insulation etc.
 - Cost of temporary works, e.g. diversions and temporary bridging.
 - Temporary traffic management costs, e.g. coning, traffic lights and signage.
 - Diversion of non-highway utility (e.g. gas, water, telephones and cables)
 - Diversion of water courses.
 - Possession costs for assets over, or that impact on, railway lines, canals, etc.
 - Purchase and compensation costs associated with land acquisition.

- 4.7.6 Further guidance on costs to be capitalised on maintenance schemes is given in section 8.8.5.
- 4.7.7 Expenditure on existing assets should be capitalised in the following circumstances:
- It provides enhancement as described above;
 - Where a component that has been treated separately for depreciation purposes is replaced or restored at the end of its useful life;
 - Where the expenditure relates to a major inspection or overhaul consistent with IAS 16.
- 4.7.8 Put simply, the intention is to capture anything that enhances, maintains or restores the service potential of the asset. Therefore routine activities cannot be capitalised, nor can activities that do not improve the inherent strength or performance of the structure. For example, filling potholes in a carriageway would not normally be regarded as capital works because while they improve safety, they are in effect temporary repairs that do not directly affect the structure of the asset or prolong its life.
- 4.7.9 Preventative treatments may be either capital or revenue depending on the nature of the treatments. Gully cleaning, for example, is a routine current maintenance activity even though a failure to clean sufficiently often eventually leads to damage to the structure of the carriageway. This is because the cleaning is not actually enhancing or restoring the service potential of a physical asset or component. On the other hand, surface treatments that prevent water penetration are capital works because they are providing a new or replacement component.
- 4.7.10 Works carried out for purely aesthetic reasons should not be capitalised. Thus while, for example, preventative painting of a structure should be capitalised, repainting to improve its appearance would not. In practice of course if an authority does, say, a preventative painting early for aesthetic reasons, then that would still be treated as capital. But it is providing a new physical component and would attract depreciation over the actual rather than the theoretical life of the treatment, and impairment would need to be applied to the remaining value of the previous treatment. Another example of aesthetic works that should not be capitalised would be if a bituminous footway had been dug up for Statutory Undertaker works and satisfactorily reinstated, but the authority chose to resurface it to produce a consistent appearance.
- 4.7.11 Engineers should take advice from their accountants about any areas of uncertainty as to whether a particular treatment or activity can be capitalised. In cases of difficulty, accountants will wish to consult their auditors at an early stage.

4.8 Condition information and deterioration modelling

- 4.8.1 Condition information needs to be collected with sufficient frequency and consistency to provide a representative view of the condition of the asset and to track how this changes over time on a consistent basis. It can then be used to support deterioration modelling.
- 4.8.2 In many cases authorities may not know the age of an asset or component or how long ago a particular capital maintenance treatment was carried out. In these cases it is necessary to use condition as a basis for estimating age.

Deterioration modelling is important in estimating and then monitoring the future performance of an asset or treatment, in particular when the asset will need to be replaced or treatments carried out.

- 4.8.3 Further advice on the collection and use of condition data is given in some of the sections on individual assets.

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5. **A model for developing financial information to support asset management and financial reporting**

5.1 **Introduction**

5.1.1 As explained in section 1, a key principle of this Code is that the same data should serve the needs of asset management, financial management, budgeting and financial reporting. Section 5 describes a basic standard model for developing financial information which will serve all of these purposes. It draws on the “building blocks” described in section 4.

5.1.2 Good asset management needs:

- up to date cost information (as defined in section 4.6);
- good inventory data, with an appropriate degree of componentisation;
- good current condition data and deterioration modelling;
- to be life cycle plan based;
- to be whole life cost based.

The model described below seeks to bring all these things together in a consistent, systematic way. It should be used for all types of infrastructure asset, although application will vary depending on the complexity of particular asset types.

5.2 **The basic model**

5.2.1 **Step 1:** determine component breakdowns and groupings as in section 4.4.

5.2.2 In the rest of this section the term “component” is used. However, it should be understood as applying also to groups where grouping of components is appropriate and to whole assets where there is no componentisation.

5.2.3 **Step 2:** determine whether individual components have finite or indefinite lives and for the latter whether any treatments are required to allow the component to maintain in use indefinitely.

5.2.4 **Step 3:** for each component type identified, develop a life cycle plan which includes:

- the expected life of the component or for indefinite life components the life of the treatment cycle;
- the timing, nature and cost of all the capital treatments (in-life maintenance and end-life replacement) needed to maintain the service potential of the component over its useful life.

The plan should be designed to optimise value on a whole life cost basis over the cycle.

5.2.5 It should be noted that whole life cost optimisation is not simply about achieving the lowest economic cost over the cycle. The assumptions built into the life cycle plan need to reflect non-economic benefits as well. This should be done through setting local service standards. Whole life cost optimisation can then be targeted at delivering the required service specification at the lowest economic cost.

5.2.6 Authorities will need to use condition data, supported as appropriate by deterioration modelling, to develop the initial assumptions, particularly about

component lives, and then to monitor and, where necessary, adjust those assumptions.

5.2.7 **Step 4:** for each component the assumptions and outputs from the life cycle plan should be modelled. The key elements here are estimated asset life, treatment type and treatment costs, including replacements. The latter should be assigned to the year in which they are expected to arise.

5.2.8 The starting point for life cycle planning should always be whole life cost based and reflect good engineering practice. Except insofar as affordability has been taken into account in setting local standards of service, the life cycle plan should not initially take account of future funding constraints, though it will of course reflect the consequences of past funding constraints. This way the model can provide a clear and consistent measure of the true cost of holding the assets. This also provides a fixed starting point from which to model the consequences of alternative funding scenarios.

5.2.9 Regular monitoring and updating is essential. The model needs to be updated:-

- when a component is added to or removed from the inventory;
- whenever a capital treatment is carried out;
- annually to update cost rates and to review assumed asset lives and life cycle plans.

If something happens in-year which indicates that the assumptions made about the life of a particular component are wrong, then the issue should be investigated immediately and the model revised as appropriate without waiting till the annual review.

Estimated life should not be extended if the component is no longer in a serviceable condition, but affordability or other constraints prevent its timely replacement. The model should however be revised to pick up the cost consequences of the failure to carry out works at the optimal time. An example of this would be where failure to renew a surface treatment in time resulted in damage to underlying layers.

5.2.10 Further guidance on componentisation and distinguishing finite and indefinite life components is given in the later sections that deal with individual asset types. The degree of detail and complexity required for modelling will vary between different types of asset. For example, street furniture, even in a developed form, will be relatively simple, with a limited number of components and treatments. For the most complex assets, carriageways, footways and major structures, specific modelling approaches are being developed. Again these are described in greater detail in the asset specific sections of the Code.

5.2.11 It is recognised that authorities will not initially have all the information needed to produce detailed life cycle plans and models. In these cases the approach should be to start with whatever data is available and to refine assumptions and increase the level of detail over time as systems and data improve. For example, an authority might initially have only two life cycle plans for its lighting stock i.e. recognising the different life cycles of column and luminaire and with broad brush assumptions about age and average life across the stock as a whole. But in time, as data allows, separate life cycle plans might be produced to reflect factors such as different types of column or local circumstances where these materially affect performance, for example to recognise that lighting in exposed rural areas will have a significantly shorter life than in more sheltered areas.

- 5.2.12 Authorities may also wish to identify and build the costs of revenue treatments into their life cycle plans and financial models. Indeed this is necessary for whole life cost purposes. However revenue costs must be clearly and separately identified so that the two types of expenditure can be aggregated separately. This is important not only for financial planning but also because only the capital expenditure will be taken into account when the model is used to calculate depreciation.
- 5.2.13 Advice on how to undertake life cycle planning is given in the Roads Board Asset Management Working Group's Quickstart Guidance on Life Cycle Planning.
- 5.2.14 In developing and implementing the model it is important that asset managers and finance staff work closely together to ensure that the model as implemented and maintained delivers outputs that are robust, consistent and up to date, and serve the needs of both.

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6. Gross replacement cost

6.1 Introduction

6.1.1 When infrastructure assets are constructed or purchased or a component is added or replaced, the new works will initially be recognised in the accounts at cost. They should then be valued on a fair value basis, using a depreciated replacement cost approach. Accounting adjustments are made to reflect any differences between cost and initial carrying value. This section of the Code deals with the calculation of gross replacement cost (GRC) which is the starting point for calculating depreciated replacement cost.

6.1.2 Gross replacement cost (GRC) is the total admissible cost of replacing either the whole of an existing highway network or some part of it. It is the starting point for calculating the net current value of highway assets, that is their value after taking account of depreciation and impairment. Putting a current monetary value on the assets is important because it emphasises the substantial value that is tied up in them and hence the need to invest in maintaining their value. It puts the asset valuation on a comparable basis with all other public sector fixed assets. This is particularly important for WGA and National Accounts purposes because local highway networks are the single largest public sector asset and therefore account for a significant share of national economic activity and national investment.

6.1.3 The CSS/TAG guidance required authorities to develop their own unit cost rates for GRC. However, in recent years there has been little local highways authority new build work and authorities have had difficulties in establishing sufficient data across the various different road categories to develop robust unit cost rates. The effort required has been considerable. Action needed to be taken to address the data problem and to produce an approach which would deliver a robust GRC that is consistent between authorities and, given appropriate inventory, can be easily calculated. For the future therefore, composite rates for carriageways, footways and structures will be provided centrally for the purpose of calculating GRC. Rates will be provided at regional and where necessary sub-regional level to reflect geographical cost variations. Authorities will continue to use their own data for lighting, traffic management and street furniture.

6.1.4 It should be emphasised that central rates should be used only for GRC purposes. Depreciation and other financial information should continue to be calculated using maintenance and replacement rates, for which good up to date information, is generally available at the individual authority level.

6.1.5 The Code also provides new guidance on valuing land. Again this adopts a simplified approach, using rates to be provided centrally.

6.1.6 Authorities are reminded that assets held as part of a PFI or PPP arrangement need to be valued separately. (Section 4.3.6 refers.)

6.2 Basis of valuation

6.2.1 Highway assets should be valued at fair value on a depreciated replacement cost (DRC) basis. Depreciated replacement cost represents the net current value of the asset, ie gross replacement cost less depreciation and impairment. A DRC approach is used because of the specialist nature of the assets, which are non-cash generating and rarely if ever sold. Gross replacement cost is measured as the current cost of replacing the network or part of it as if it were a newly constructed asset. An authority's network should cover all the roads,

and the assets associated with them, that are included in the register kept in accordance with S36 of the Highways Act 1980 (England and Wales) or the list in accordance with S1 of the Roads (Scotland) Act 1984. This guidance does not extend to Public Rights of Way (PRoW) that are not on the register. These do not count as highway assets even if some maintenance is undertaken by the highway authority.

6.3 Modern Equivalent Asset

6.3.1 Apart from heritage assets, the concept of the Modern Equivalent Asset (MEA) normally applies. The MEA is defined as one which provides the same potential performance as the existing asset but takes account of up to date technology. A key purpose of the MEA approach is to ensure that an asset is not over-valued as it might be if the construction cost assumed the replication of the methods and materials used in the original construction instead of reflecting the use of modern methods and materials. An MEA also needs to recognise costs such as enhanced safety requirements which may not have existed when the asset was constructed. However, an MEA does not mean re-designing a road. If, for example, a particular road was being constructed today, it might well be built with wider carriageways and new features to cope with current traffic. However, that would be an increase in service potential and would therefore be an enhancement, rather than a modern equivalent.

6.3.2 The methodology for calculating carriageways and footways that is set out below should largely remove the need to consider MEA issues for those asset types. It is important however that the new asset should be valued on the basis of the same or an equivalent footprint to the old one. This could be either a green field or a brown field location; a new rural road would predominantly be built on green field land, an urban one on brown field land, and costs will reflect typical land clearance costs for each type.

6.4 Heritage assets and other assets important to the character of an area

6.4.1 Many authorities have a significant number of heritage and/or listed highway assets, principally bridges, e.g. Tower Bridge, but they may also have other assets that are deemed to be important to the character of the area, e.g. ornate lighting columns and cobbled streets. If the asset would be replaced on a like for like or "nearly as like as feasible" basis, it would not be appropriate to value it using the Modern Equivalent Asset (MEA) approach because this would not reflect the true costs incurred by the authority in maintaining and/or replacing the existing asset, compared to replacing it with an MEA. Therefore, the standardised Unit Rates derived for MEA groups, or sub-groups, should not be used to calculate the asset value for heritage assets or other assets important to the character of an area.

6.4.2 Unit Rates and Gross Replacement Cost models may be determined for individual heritage type assets or groups/sub-groups of them. The approach adopted depends on the type and number of such assets in the authority and their value.

6.4.3 The Unit Rates and Gross Replacement Cost models should be based on an optimised replacement cost that provides the required appearance and function but seeks to make cost savings and efficiencies where appropriate. Examples include:

Lighting Column – an existing cast iron lighting column with decorative features that reflects the character of the area has been classified as a heritage asset. The column should be valued by assuming it will be

replaced by a lighting column that looks the same and provides the same service, although a modern material (steel) may be used to optimise the cost.

Pavement – a cobbled street is deemed to reflect the character of the area and is an important aspect of tourism. The pavement should be valued by assuming it will be replaced by structural layers of appropriate modern materials and standards but the surface layer will be cobbled stone.

If sufficient (re)construction cost data is not available from within the authority or other similar authorities then engineering judgement and experience should be used in valuing special structures and heritage assets. Authorities may wish to consult other authorities who hold similar assets and, if necessary, advice may also be sought from a quantity surveyor.

6.5 Admissible costs

6.5.1 Guidance on the items of costs to be taken into account in valuing and revaluing the assets is given in Sections 4.6 and 4.7.

6.6 Key cost drivers and data issues

6.6.1 The key cost drivers for GRC are inventory and unit rates. So far as is possible and appropriate these need to reflect asset type, construction form and location, ie urban or rural, and regional/sub-regional price differences.

6.6.2 It is recognised that both the coverage and quality of inventory varies widely between authorities. The methodology set out below recognises this and provides some short term solutions that authorities can use to produce initial valuations.

6.7 Methodology for calculating GRC for the built network

6.7.1 Classification framework

6.7.1.1 The starting point is the asset types as defined in the classification framework shown in Section 4. To provide the necessary degree of consistency, assets must be grouped and valued in accordance with those asset types, i.e.

- carriageways,
- footways,
- structures
- lighting
- traffic management systems
- street furniture

6.7.2 Carriageways

6.7.2.1 The Carriageway length is taken as the road length agreed annually by each authority with the relevant national administration and used for the compilation of national transport statistics (in England known as the R199B road length)

The 'model' utilises the following carriageway groups:

Urban – (roads with a speed limit up to and including 40 mph)

- 'A' Roads
- 'B' Roads
- 'C' Roads
- Unclassified Roads

Rural – (roads with a speed limit of more than 40 mph)

- 'A' Roads
- 'B' Roads
- 'C' Roads
- Unclassified Roads

6.7.2.2 This is the breakdown used for centrally provided rates. Two types of rate will be provided for each road type: a composite carriageway rate per square metre; and a linear rate for items which relate to road length rather than area.

6.7.2.3 The area rates take account of all the relevant admissible costs identified above. They include allowances as appropriate for all the components described in level 3.

6.7.2.4 The composite rates do not necessarily reflect the actual incidence of the various components in existing networks. Instead they are intended to provide a good proxy for what would typically be provided across a network on a Modern Equivalent Asset basis.

6.7.2.5 Using the appropriate central rates, carriageway GRC can be calculated simply as:

carriageway area (or road length x width) x appropriate composite cost
rate plus
road length x appropriate linear rate.

The carriageway GRC for each road type can then be aggregated to give a total carriageway GRC.

6.7.2.6 The width of the carriageway is the most significant factor in the calculation of GRC; it is also one where there may be limited information currently available. For authorities who do not have width data initially, the spreadsheet includes default values for each road type that can be used until local data is available. The area of the carriageway is calculated within the model but if area data is available this can be inserted.

6.7.2.7 An example of a completed spreadsheet showing the calculation of both carriageways and footways is given in Spreadsheet A below. NB the composite rates used in this are specimen rates, not the rates to be provided centrally. A version that authorities can use to calculate their own carriageway and footway GRC, using either their own or default data, has been provided.

Spreadsheet A: Carriageway and Footway Gross Replacement Cost (GRC)

to be used where footway lengths are assessed separately from R199B lengths

Notes for users
 The spreadsheet uses HAMFIG default widths and rates, by inserting lengths of carriageway and footway from your inventory it produces a GRC

- The R199B lengths and the Footway hierarchy lengths to be inserted into the shaded boxes
If a know length of dual carriageways is included within the R199B length - the second carriageway length to be added to the R199B length
- It is recommended that the 'HAMFIG default' rates are not varied
- The rates are for a complete construction
 Carriageways - includes an allowance for areas not indicated by R199B length - e.g. roundabouts
 Footways - includes a linear allowance for edgings
 Kerbs etc - includes for drainage assets associated with that road hierarchy
- The vale of other assets which the authority understands are excluded from the default values can be inserted into the summary
- Fees for design; supervision and others associated with the construction element are included within the HAMFIG default rates

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

Quantities shown are for indication purposes only

INVENTORY DATA				CALCULATIONS									
To be completed by compiler				Default values - for better local information on widths and areas these can be over-written HAMFIG default rates should not be over-written without first ensuring that there is an audit trail related to the calculation of any replacement rates									
CARRIAGEWAY		FOOTWAY		CARRIAGEWAY				FOOTWAY				Linear Items	
Road Classification	R199B Length	Footway Hierarchy	Hierarchy Length	Carriageway Width HAMFIG	Calculated Area	GRC Rate HAMFIG Default value (draft)	GRC Value	Footway Width HAMFIG	Calculated Area	GRC Rate HAMFIG Default value (draft)	GRC Value	GRC Rate HAMFIG Default value (draft)	GRC Value
	(Km)		(Km)	Default value	(m ²)	(£/m ²)	(£)	Default value (draft)	(m ²)	(£/m ²)	(£)	(m)	(£)
M Urban	0.00	1A Urban	50.00	10.8	-	108.50	-	1.8	90.00	45.00	4,050	350.00	-
A Urban	1,000.00	1 Urban	2,000.00	8.7	8,700.00	156.50	1,361,550	1.8	3,600.00	40.00	144,000	200.00	200,000
A Rural	1,000.00	1 Rural	500.00	8.0	8,000.00	130.00	1,040,000	1.8	900.00	40.00	36,000	175.00	175,000
B Urban	1,000.00	2 Urban	2,000.00	7.2	7,200.00	135.80	977,760	1.8	3,600.00	35.00	126,000	175.00	175,000
B Rural	1,000.00	2 Rural	250.00	5.2	5,200.00	107.00	556,400	1.8	450.00	35.00	15,750	100.00	100,000
C Urban	1,000.00	3 Urban	3,000.00	7.2	7,200.00	130.00	936,000	1.8	5,400.00	35.00	189,000	150.00	150,000
C Rural	1,000.00	3 Rural	250.00	5.2	5,200.00	87.40	454,480	1.8	450.00	35.00	15,750	75.00	75,000
U/C Urban	1,000.00	4 Urban	3,000.00	6.4	6,400.00	103.50	662,400	1.8	5,400.00	35.00	189,000	120.00	120,000
U/C Rural	1,000.00	4 Rural	100.00	3.8	3,800.00	72.50	275,500	1.5	150.00	35.00	5,250	25.00	25,000
TOTALS	8,000.00		11,150.00		51,700.00		6,264,090		20,040.00		724,800		1,020,000

SUMMARY	
Carriageway GRC	6,264,090
Footway GRC	724,800
Kerbs etc GRC	1,020,000
Other Assets	-
Calculated separately	
Total of above	8,008,890

6.7.3 Footways

6.7.3.1 Central rates will also be provided for footways. These will be composite rates per sq metre.

6.7.3.2 For authorities that do not have their own footway data, the spreadsheet 'model' includes an assumed configuration of footway for each road hierarchy, as a basis for estimating length e.g. urban 'A' Roads a footway to each side of the carriageway. A default width has also been included within the 'model'.

6.7.4 Structures

6.7.4.1 The Gross Replacement Cost of a transport structure is calculated as:

$$\text{GRC} = \text{Dimensions} \times \text{Unit Rate} \times \text{Adjustment Factor/s}$$

Where

Dimensions – those relevant to the structure type, e.g. m², m and number

Unit Rate - the cost per dimension relevant to the structure type, e.g. £/m²

Adjustment Factor/s – reflect criteria that have a significant impact on GRC

6.7.4.2 The following structure types should be used when calculating GRC and, where appropriate, subdivisions (such as those shown) adopted where there are significant differences in Unit Rates. Unit Rates are derived using the concept of Modern Equivalent Asset (MEA) as described in section 6.3, although heritage and special structures may require an alternative approach (as discussed in Section 6.7.4.6).

Figure 4: Structure Types

Structure Types	Description	Dimensions	Possible Subdivision
Bridge: Vehicular	A structure with a span of 1.5m or more spanning and providing passage for vehicular traffic over an obstacle, e.g. watercourse, railway, road	Deck Area (m ²) = length × average width	Single span
			2 and 3 span
			4 and more span
Bridge: Pedestrian/cycle	As for vehicular bridge, but provides passage for pedestrians and cyclists.	Deck Area (m ²) = length × average width	Single span
			Multi span
Cantilever road sign	A structure with a single support that projects over the network in order to carry a traffic sign	Number	-
Chamber/cellar/vault	An underground room or chamber with a plan dimension of 1.5m or more	Plan Area (m ²) = average length × average width	-
Culvert	A drainage structure with a span of 0.9m or more passing beneath a network embankment that has a	Plan Area (m ²) = length × average width	Single cell
			Multi cell

Structure Types	Description	Dimensions	Possible Subdivision
	proportion of the embankment, rather than a bridge deck, between its uppermost point and the road running courses		Depth of fill >1m Depth of fill ≤1m
High Mast Lighting	Lighting columns over 20m in height	Number	-
Retaining Wall	A wall associated with the network where the dominant function is to act as a retaining structure (>1.35m)	Length (m)	Height ≤ 3m
			Height > 3m
Sign/signal gantry	A structure spanning the network, the primary function of which is to support traffic signs and signalling equipment	Length	Cantilever
			Spanning
Structural earthworks - reinforced/strengthened soil/fill structure	A structure associated with the network where the dominant function is to stabilise the slope and/or retain earth. All structures with an effective retained height of 1.5m or greater.	Plan Area (m ²)	Height ≤ 3m
			Height > 3m
Subway: Pipe	Subways that provide passage for utility service pipes and cabling	Plan Area (m ²) = length × average width	-
Tunnel	An enclosed length of 150 metres or more through which vehicles passes	Plan Area (m ²) = length × average width	Bored
			Cut and Cover
Underpass (or subway): Pedestrian	A structure with a span of 1.5m or more that provides passage for pedestrians	Plan Area (m ²) = length × average width	-
Underpass: Vehicular	The underpass includes approach slab, retaining walls, bridge, drainage etc.	Plan Area (m ²) = average length × average width	-
Special structure	For example, moveable bridges, Tower Bridge	As appropriate	Dealt with individually

Table Notes:

Bridge Deck Area = (Deck Width)

Bridge Deck Length = centreline to centreline of end supports; or
= distance between end support faces + 0.6m

Bridge Deck Width = measured from outside edge to outside edge

Retained Height = as recorded or (actual height + 0.6m)

Culvert Length = headwall to headwall

Culvert Width = as per Bridge Deck **Length**

6.7.4.3 National Unit Rates will be provided for each of the above structure types as part of the structures support documentation and will be available at www.cipfa.org.uk/pt/infrastructure.

6.7.4.4 The Unit Rate must be adjusted, where appropriate, to take account of criteria that have a significant impact on replacement cost. Factors that may have a significant impact are listed in the table at Figure 5 below.

Figure 5: Adjustment Criteria

ID	Criteria	Description	
1	Heritage	Exact replacement (materials and look and feel) of existing structure	
2	Replica Heritage	Same finish as existing structure - impacts on aesthetics, type of material and quality of finish	These two criteria are considered to cover similar criteria, therefore a structure can only have one of these assigned against it in order to avoid double counting
	Conservation area	Impacts on aesthetics, type of material and quality of finish	
3	Environmentally sensitive	To take account of protected flora and fauna	
4	Route supported - A, B or C	To take account of the route type supported by the structure	
5	Route Supported - unclassified		
6	Obstacle (Highway)		
7	Obstacle (Railway)	To take account of the different activities and costs incurred when constructing a bridge over different obstacles. This should take account of costs such as possessions (for railways), traffic management, access etc.	
8	Obstacle (Watercourse - Nav)		
9	Obstacle (Watercourse - Non-nav)		
10	Obstacle (Footway/cycleway)		
11	Obstacle (Tenanted/business)		
12	Obstacle (Land/disused)	To take account of the lower cost of constructing a bridge with a substandard capacity	
13	Substandard structure		
14	Location - Urban	To take account of the difference in cost between rural and urban locations	
15	Location - Rural		
16	River, costal etc. walls	To take account of the specific activities involved in the construction of river walls	
17	Tunnel (150 to 400m)	To take account of the different safety, drainage and M&E required for tunnels > 400m	
18	Tunnel (> 400m)		

6.7.4.5 Values will be provided in the supporting documentation for each of the above factors.

- 6.7.4.6 **Heritage and Special Structures** Special Structures are those that due to a combination of their size, construction and/or character are not suitable to be valued using standardised Unit Rates, for example, the Jubilee Bridge.
- 6.7.4.7 Special Structures should be valued individually using the principles given in this Code, including the concept of Modern Equivalent Asset.
- 6.7.4.8 In many cases this information is unlikely to be available; therefore Heritage/Special Structure Unit Rates can be either:
- MEA Unit Rates adjusted by an appropriate factor, either the default factor provided [Note: will be provided in supporting documentation] or a locally derived/agreed factor; or
 - Unit Rates derived using engineering judgement and experience (and advice sought from a Quantity Surveyor if appropriate).

6.7.5 Other asset types

- 6.7.5.1 For lighting, traffic management systems and street furniture, the GRC should be based on the current cost of the assets, using authorities' own local rates. The cost rates used in the various spreadsheets are therefore for illustrative purposes only. The degree of detail used in the calculations will depend on the quality of inventory and cost information available. Most authorities seem to have reasonably good inventory for lighting and traffic management systems but many do not have good data on street furniture.
- 6.7.5.2 Any costs likely to be included in other highway or local authority assets should be excluded. So, for example, while the cost of ducting for cables would be included with lighting, the cost of carriageway and footway surfacing would be excluded for GRC purposes since these would be picked up as part of the construction cost for those asset types.
- 6.7.5.3 Over time, as authorities refine their asset base and break items down into greater detail, they may wish to use these for GRC purposes. More detailed breakdowns are desirable where they support better management of the asset and better financial planning. However, given that total GRC of a highway network will be a very large value to which each of these three asset groups will make only a modest contribution, it is probably only worth using the more detailed data for GRC if it is likely to make a material difference to the value of the asset.

6.7.6 Lighting

- 6.7.6.1 The simplified GRC methodology provides for the valuation of street lighting assets at the unit level - lighting columns, illuminated bollards, illuminated signs etc. It is recognised that the physical costs for an urban network may differ from a rural network.
- 6.7.6.2 Spreadsheet B gives an example of how this simplified asset valuation would be recorded. This merely involves multiplying the number of units by the relevant unit cost rate and aggregating the totals. In time authorities might wish to refine the valuation and increase the level of detail provided, but subject to the caveat in Section 6.7.5.3 above.

Spreadsheet B: Street Lighting

This spreadsheet utilised the number of units from the authority's own inventory and locally derived rates to create a Gross Replacement Cost (GRC)			
<i>The following example is used to illustrate the use of the spreadsheet</i>			
Calculation Of GRC	No of Units	Illustative Rate/unit	GRC Value (£)
Columns			
The GRC cost includes: columns, lanterns; lamps, cables, and civils required for cables. Cost is for supply and installation.			
Columns up to 6.0m	50,000	800	40,000,000
Columns up to 8.0m	20,000	1,000	20,000,000
Columns up to 10.0m	7,000	1,100	7,700,000
Columns up to 12.0m	5,000	1,400	7,000,000
Subway units	500	450	225,000
Heritage columns	1,400	2,000	2,800,000
Feeder Pillar			
Small	75	450	33,750
Medium	25	900	22,500
Large	75	2,000	150,000
Bollards			
The GRC cost includes: bollard; lamps, cables, and civils required for cables. Cost is for supply and installation.			
Illuminated bollards	6,100	800	4,880,000
Illuminated Signs			
GRC cost includes: posts; foundations; lanterns; lamps; signplates; civils for cabling, but excludes any reinstatement. Cost is for supply and installation.			
Externally Illuminated Signs			
Signface up to 600mm	4,000	600	2,400,000
Signface 600 to 1200mm	2,750	800	2,200,000
Signface up to 0.75m ²	1,500	600	900,000
Signface 0.75 to 2.00m ²	1,000	800	800,000
Signface 2.00 to 3.00m ²	800	1,200	960,000
Signface 3.00 to 4.00m	500	1,500	750,000
Signface 4.00 to 6.00m	225	2,000	450,000
Internally illuminated signs - up to 900mm dia.	165	1,200	198,000
Other Assets			
Other assets which are not detailed above <i>The details of which will be calculated separately</i>			50,000
GROSS REPLACEMENT COST (GRC)			91,519,250

6.7.7 Traffic management systems

- 6.7.7.1 Initially a simple procedure based on the known number of asset groups,(traffic signal junctions, crossings etc) is proposed to provide the GRC.
- 6.7.7.2 This procedure estimates the overall costs for the gross replacement of the traffic systems asset, assuming it was being installed in its entirety as part of a new build scheme, but excluding those costs likely to be included in other highway or local authority assets.
- 6.7.7.3 Specific Information Technology System instation equipment like Urban Traffic Control and Real Time Passenger Information systems will be valued as an asset (excluding building costs).

- 6.7.7.4 The aim is to achieve a consistent record of the ITS asset. Spreadsheet C shows an example of how this simplified asset valuation might be produced. A version of the spreadsheet which authorities can use to calculate the GRC for their own traffic management systems is available.

Spreadsheet C: Traffic Signals and Integrated Traffic Systems

Traffic Signals and Integrated Traffic Systems			
This spreadsheet utilised the number of units from the authority's own inventory and locally derived rates to create a Gross Replacement Cost (GRC)			
The following example is used to illustrate the use of the spreadsheet			
Example of GRC Calculation	No of Units	Illustrative Rate/Unit	GRC Value (£)
Traffic Signals			
The GRC costs per site include: heads, controllers, cables, and civils required for cables, but excludes civils associated with the c/way or f/way e.g., anti-skid surface, tactile paving, OMU/OUT and remote comms included in site costs; installation costs provided elsewhere/ Cost is for supply and installation.			
Traffic Signal Junction			
Number of Approaches	75	35,000	2,625,000
Crossings: OMU/OUT and remote comms included in site costs; installation costs provided elsewhere. Cost is for supply and installation (Note - dual crossings count twice)			
Puffin Crossing	15	55,000	825,000
Pelican Crossing	85	45,000	3,825,000
Toucan Crossing	5	55,000	275,000
Pegasus Crossing	1	75,000	75,000
Zebra Crossing	35	5,000	175,000
School Crossing (flashing amber lights per sign)	110	4,000	440,000
Wig Wags	5	40,000	200,000
Information Systems			
GRC cost per site includes: on-site equipment such as controllers and remote comms, including civils for cabling, but excludes any reinstatement. Cost is for supply and installation.			
Real Time Passenger Information (display and remote comms)	2	4,500	9,000
Real Time Passenger Information (bus fits)	10	3,500	35,000
Variable Message Signs - 50-100mm x-height	3	11,000	33,000
Variable Message Signs - 101-175mm x-height	5	18,000	90,000
Variable Message Signs - 176-225mm x-height	8	25,000	200,000
Vehicle Activated Signs - (VAS)	20	5,000	100,000
Safety and Speed Camera Equipment	35	15,000	525,000
CCTV (including posts)	10	15,000	150,000
Car Park Monitoring Systems	1	8,000	8,000
Instation			
GRC includes the cost of hardware, including instation communications, plus software required to operate the system. Excludes reinstatement of the building and any associated environmental systems.			
UTC	1	30,000	30,000
UTMC common database	1	20,000	20,000
RTPI central server	1	30,000	30,000
RTPI bus depot computer instation	1	20,000	20,000
ANPR	1	10,000	10,000
VMS	1	10,000	10,000
Other Assets			
Other assets which are not detailed above The details of which will be calculated separately			50,000
GROSS REPLACEMENT COST (GRC)			9,760,000

6.7.8 Street furniture

- 6.7.8.1 The approach for street furniture depends on the level of inventory information available. Where there is no data or there are gaps in coverage, this will need to be addressed in due course. However, street furniture inventory is not a first

priority since for most authorities it represents only a small part of total asset value, depreciation and expenditure. (It may be more significant in some areas, eg highly urbanised authorities, in which case that needs to be reflected in the priority attached to it.

- 6.7.8.2 Asset Composition: the street furniture items listed in level 3 of the asset classification should be included if they are owned as part of the highway network. The list is not comprehensive and authorities should add additional items relevant to their network. In doing so regard should be had to the classification framework to make sure that there is no mis-classification.
- 6.7.8.3 It should be noted that safety fences and pedestrian guardrails have been classified with street furniture rather than carriageway because they do not form part of the composite carriageway or linear rates.
- 6.7.8.4 For authorities that do have inventory data, GRC can be calculated simply by multiplying the number of units of a particular item by the appropriate cost rate, then aggregating the totals.
- 6.7.8.5 For authorities that do not yet have sufficient street furniture inventory to do this, as a temporary measure, a default value will be provided based on a %age of combined carriageway and footway GRC. Given that street furniture represents only a very small proportion of GRC the use of a default value for this asset type should not have a significant impact on total GRC. However, authorities will need to collect such inventory in due course.
- 6.7.8.6 **Trees** - Trees should only be treated as highway assets where they serve a specific highway function, eg they have been provided to act as a sound barrier or provide screening. Other trees, for example those on estate roads that have been provided to improve the appearance of the street scene should be classed as community rather than highway assets. For the purpose of calculating GRC it is suggested that highway trees should normally be valued at a nominal cost of £100 per tree. For special categories of trees, for example those subject to a Tree Preservation Order where there is a duty to replace like for like, a higher GRC rate might be applicable. However, such refinements will not normally be material to the calculation of GRC.

6.8 Highway Land

- 6.8.1 Highway land must be valued as part of GRC but should be treated as a distinct class of asset, ie the value should be identified separately from that of the other highway assets that comprise the "built GRC". It will need to be reported separately.
- 6.8.2 Since the authority is the beneficial occupier, all land designated as highway land should be included in the valuation, regardless of whether it is actually owned by the authority, and valued in accordance with the approach described below. The only exception to this would be any land which is occupied on a short time based lease, eg land acquired to provide temporary access or diversion while works are carried out. Such lease arrangements should be treated in accordance with the guidance in Chapter 4.2 of the Local Authority Accounting Code.
- 6.8.3 The following detailed points should be noted:
 - (i) land used for depots and compounds should be valued separately in accordance with the RICS valuation standards;

(ii) land owned by the authority that is surplus to requirements and suitable for disposal should be reported separately at its market value;

(iii) after initial recognition land under new works that have been brought into use should be valued on the same basis as the existing network.

6.8.4 Authorities who have good information about the extent of their highway land should use it for valuation. For authorities who do not have good information, guideline average widths will be provided, extending the approach proposed for dealing with inadequate information about carriageway and footway widths to provide boundary to boundary notional widths. *[The aim is to provide notional standard widths for each of 8 types of road: A, B, C and unclassified, each broken down between urban and rural. As a minimum, average national widths will be provided, but if sufficient data is available it may be possible to provide some advice on regional differences.]* Authorities would multiply the relevant average width by the road length to produce estimates of highways land area.

6.8.5 Land should be valued in accordance with the following procedure, using land values to be provided centrally. Two values, one urban and one rural, expressed as rates per hectare, will be provided for each local authority district. The urban or rural rate should be used depending on the urban or rural classification (i.e. based on road speeds) of the highway running through the land. The total area of urban and rural highway land for each should then be calculated using known or, if necessary, estimated boundaries and the relevant rate applied.

6.8.6 Authorities who have to rely initially on default values in calculating areas of highway land will be expected firstly to develop good information about carriageway and footway widths, which will better inform estimated total land widths, and then in due course to identify and base valuations on the actual area of highways land held.

6.9. Revaluation and indexation

6.9.1 Centrally provided rates for the built network will be revised every five years to support a full revaluation. Between revaluations, rates used for GRC should be updated annually using an appropriate index. For lighting, traffic management systems and street furniture, for which local authorities are using their own rates for GRC, the rates should be updated annually using actual rates where available. If up to date rates are not available between revaluations, rates may be indexed.

6.9.2 Centrally provided rates for land valuation will be updated annually. Land valuations should be revised annually using the latest provided rates.

6.10 Departing from the approaches in this guidance

6.10.1 An authority may if it wishes depart from the methodology described above or substitute its own rates for centrally provided ones. However, it will need to demonstrate to its auditors that the approaches applied follow the same principles, produce comparable valuations and can be repeated consistently from year to year. It will also wish to have regard to the costs and benefits involved.

7. Depreciation and impairment

7.1 Accounting definitions and requirements for depreciation

7.1.1 Definitions

Depreciation is the systematic allocation of the depreciable amount of an asset over its useful life. Each part of an item of infrastructure with a cost that is significant in relation to the total cost of the item shall be depreciated separately.

Depreciable amount is the cost of the asset or component less residual value.

Depreciated Replacement Cost (DRC) is a method of valuation which provides the current cost of replacing an asset with its modern equivalent asset less deductions for all physical deterioration and all relevant forms of obsolescence and optimisation.

Useful life is the period for which an asset is expected to be available for use by an entity.

7.1.2 Requirements: As explained in Section 4, IAS 16 requires that where an asset can be broken down into identifiable components with different useful lives, those components should be accounted for separately. For practical purposes, this means breaking assets down into their key parts at a sensible level of materiality, not trying to separately identify and account for every individual element. Components need to be distinguished in terms of those which have a finite life, at the end of which they will be replaced and those which, given appropriate capital maintenance (i.e. replacement of sub-components), will last indefinitely.

7.2 Basis for calculating depreciation.

7.2.1 For finite life components, depreciation is based on the cost of replacing the component plus any other capital treatments needed to allow it to achieve its anticipated life/performance. Some indefinite life components, for example, most underlying road layers, would normally be non-depreciable. However, because of the need to identify components/assets at a sensible level of materiality, some indefinite life components may include elements that do require capital maintenance/replacement in order that the component as a whole can continue to operate indefinitely. In these cases, the costs of the maintenance/replacement activity would need to be treated as depreciation, but the total value of the component would not be depreciated. For highway assets the main indefinite life components are underlying layers of carriageways and footways, although in certain circumstances these will attract depreciation. There may also be some indefinite life components to structures. Other asset types – lighting, traffic management systems and street furniture – consist entirely of finite life components.

7.2.2 For each component (or group or asset, depending on the level of componentisation) annual depreciation should be calculated as:

the aggregated cost of all the capital replacements/treatments needed to maintain/ restore its service potential over the life cycle, spread over the estimated number of years in the cycle.

- 7.2.3 The information needed to calculate depreciation – capital costs and estimated lives - should be available in and taken from the financial model described in Section 5. (NB the rates in the model are specified as net of any residual value and therefore do not require further adjustment to provide the depreciable amount.)
- 7.2.4 The only additional requirement for the model to calculate depreciation is to spread the depreciable amount over the total useful life. It is proposed that spreading should be done on a straight line basis since this will provide an even spread for budgeting purposes and spread the consumption of the economic benefits evenly across generations.
- 7.2.5 The requirements specified for reviewing and keeping the data and assumptions in the financial model up to date, if properly met, should provide the necessary assurance for valuation and financial reporting.
- 7.2.6 Changes in estimated asset life will of course need to be reflected in the way annual depreciation is charged. If the estimated life is extended, then the remaining depreciable amount should be spread over the longer period. If the life is reduced, then either the remaining depreciable amount must be spread over the shorter period or a one off impairment charge made to cover the difference.
- 7.3 Applying the approach – practical issues**
- 7.3.1 The principles described above are relatively straightforward. However, there are significant practical difficulties in applying them initially to highway network assets. The first issue is the scope and quality of inventory data. The second is that even authorities who have good inventory data may well not know the age of a particular component or where it stands in its life cycle. This is not a major problem for annual depreciation so long as the costs and estimated life over a typical cycle are robust. However, it is a significant problem in measuring the initial depreciated replacement cost. Various approaches are possible for this. In some cases, an authority may be able to do no better than to assume an even age spread across a particular asset type, or apply such evidence as is available to modify that. A preferable approach, where it is possible, is to use condition information to provide reasonable estimates of initial depreciated replacement cost.
- 7.3.2 For long life assets, it will take considerable time for authorities to gather age data, and at least in the early years while inventory, groupings and asset life data is still developing, authorities are recommended to re-run the initial DRC calculations annually rather than simply adjusting the initial DRC by the value of annual movements. Authorities may find it useful to calculate DRC both ways and compare the two.
- 7.3.2 Further guidance on calculating depreciation for individual asset types is given in sections 8 – 11.
- 7.4 Impairment**
- 7.4.1 An **impairment loss** is defined as the amount by which the carrying amount of an asset exceeds its recoverable amount. The **carrying amount** is the amount at which an asset is recognised after deducting any accumulated depreciation and accumulated impairment losses.
- 7.4.2 Impairment is therefore a reduction in the net value of an asset due to a sudden or unforeseen decrease in its previously measured condition and/or

performance that has not already been accounted for through depreciation. One example would be an asset or component that failed or otherwise needed replacement before the end of its estimated useful life. Another might be damage due to an accident or natural phenomenon such as flooding, landslide or severe adverse weather conditions. However because the Code is using the same information for expenditure planning and accounting, its approach is where possible to predict and allow for things that would otherwise have to be treated as impairment. For example, on the basis of experience it is possible – and prudent – to make allowances for replacement of a certain number of lighting columns, traffic signs and barriers each year as a result of accident damage and build those into the relevant life cycle plans. Similarly, life cycle plans for carriageways might assume, for example, one severe winter weather event every ten years and allow for the impact of that in determining maintenance treatments and useful lives. Such effects would therefore already be reflected in the calculation of annual depreciation and an impairment loss would only arise if there were material additional events or costs.

7.4.3 At the end of each reporting period an assessment shall take place as to whether there is any indication that an asset may be impaired. If an indication exists, the recoverable amount shall be estimated having regard to the application of the concept of materiality in identifying whether the recoverable amount of an asset needs to be estimated. If no indication of an impairment loss is present the Code does not require a formal estimate of the recoverable amount.

7.4.4 The objective is to ensure that the assets are carried at no more than their recoverable amount. An asset is carried at more than its recoverable amount if its carrying amount exceeds the amount to be recovered through use or sale. Provided highway assets are adequately maintained and depreciated in an appropriate manner, they are unlikely to become materially impaired unless events or changes in circumstances cause a sudden and unforeseen reduction in the performance. A reduction in the remaining service life of an asset/component could be treated using accelerated depreciation, or alternatively impairment is calculated.

7.5 Calculating impairment

7.5.1 The approach used for calculating impairment should be established and consistently applied. After an approach is established, if it is identified that a change in the approach would provide a fairer valuation, then this should be applied at the next benchmark valuation and described in the Valuation Report. Damage to highway assets resulting in an impairment charge is calculated as the cost of restoring/replacing the asset (or component) to a fully serviceable condition, minus depreciation already charged. It must be charged within the year that the impairment occurs.

7.5.2 Impairment needs to be considered over the total value of the asset, including components such as earthworks or underlying carriageway layers that would not normally be depreciable. As with depreciation any residual value, including scrap value, would be netted off.

7.5.3 Valuation affects availability of an asset as well as its condition. If an asset is unavailable for more than 12 months then impairment has to be charged on the whole asset eg bridge closed for more than 12 months for major repairs then its full DRC value would be charged to impairment, rather than just the cost of the work required to restore its condition.

7.5.4 Further advice on impairment in relation to individual asset types is provided in the later sections of this report.

7.6 Replacements funded by insurance.

7.6.1 Where an asset is damaged as a result of an accident, the authority will where possible seek to recover the costs of replacing the asset or component(s) through a claim on the party's insurance. Although there is no net cost to the authority, the replacement should be treated for asset management and valuation and budgeting in the same way as any other component replacement. The insurance payment can then be used as a contribution to net off against the cost.

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8. Carriageways – detailed guidance

8.1 Introduction

8.1.1 This section provides more specific guidance on the valuation, depreciation and impairment of carriageways. It is proposed that the UK Pavement Management Systems (UKPMS) should be used as a tool to support both management (including the associated financial planning) and valuation of pavement assets.

8.1.2 This section deals with only with carriageway surface and underlying layers. Other assets that have been included with carriageways in the composite rates for GRC, eg drainage, kerbs, fencing, are dealt with in section 11.

8.2 UKPMS

8.2.1. The UK Pavement Management System (UKPMS) is the national standard for management systems for the assessment of local road network condition and for the planning of investment and maintenance on paved areas of roads, kerbs, footways and cycle-tracks on local roads within the UK.

8.2.2 The primary use of UKPMS is to assist local authorities in the planning of maintenance on the local road and footway network through the systematic collection and analysis of condition data. This is recommended as good practice and is a vital element of an effective highway asset management regime. Because the UKPMS approach ensures consistency between the different pavement management systems operated by different local authorities, it is also used across the UK to report performance information to national administrations.

8.2.3 In general, all pavement management systems consist of a representation of a road network divided into uniquely referenced road lengths. Against this network, it is possible to locate other data including condition data collected by visual or machine surveys and inventory such as construction details and width information. By applying rules to the condition data held against each section a depreciated value can be calculated, as described below. Further information about UKPMS is available on the system website: www.pcis.org.uk.

8.2.4 Rule Sets are released by the UKPMS Support Contractor in an annual cycle to meet the needs and timescales for both national reporting and the Annual Health Check. The 2009 Health Check includes guidance on the provision of new financial information to support asset management, and is the basis for some of the interim approaches described below. The relevant note is TN46. Further developments to support the process will be made to UKPMS as necessary in future years.

8.3 Asset composition, componentisation and life cycle planning

8.3.1 For simplicity most carriageways can be divided into 'surface' and 'underlying' layers.

Surface: The top 100mm or the total thickness of the bound layers, whichever is least. The primary purpose is to seal the road and to provide grip and a reasonable ride quality and shape.

Underlying: The layers below the surface that give the road strength. In the case of a major road this might include further bound layers as well as unbound layers and could be of substantial thickness. In the case of a minor

road the underlying layer(s) might all be unbound and could be quite thin. Or in some case non-existent.

8.3.2 Surface layers will need maintenance treatments from time to time and are therefore finite life, depreciable components. Under normal circumstances wholesale replacement or major repair of underlying layers would not be part of the life cycle plan of most roads. Replacement of the underlying layers would be the exception rather than the rule and underlying layers should therefore normally be treated as non-depreciable.

8.3.3 However, there are some circumstances in which underlying layers may need capital treatments and therefore attract depreciation. Problems in the underlying layers of the road are usually attributable to one or a combination of:

- Utility company openings
- Poor underlying ground conditions
- Heavy goods vehicle traffic

8.3.4 There are two possible approaches to dealing with these problems. For utility openings and relatively localised subsidence, an appropriate allowance should be made in the life cycle plan for a small amount of work to underlying layers to be undertaken as part of the programme of works to surface layers. This might be as simple as an additional percentage, based on historic trends, that needs to be spent over and above the cost of the treatments to surface layers to rectify underlying defects.

8.3.5 More widespread poor underlying ground conditions or roads which carry a high number of heavy goods vehicles may require periodic repair or replacement of some or all of the underlying layers. These roads need to be identified and life cycle plans produced which provide for the works to the underlying layers as well as the more frequent works to the surface layers. Life cycle plans need to be based on the longer timescale of the major works, rather than just the surface treatment cycle.

8.3.6 Rigid concrete pavements and rigid composite pavements

8.3.6.1 Although in a minority of construction types for carriageways, there are still a considerable number of roads that are either of a rigid concrete construction or have been modified over their working lives to become rigid composite pavements. This section deals with those roads and offers information to enable local highway authorities to extend the classification advice to cover these types of highways.

8.3.6.2 Any concrete road which has effectively been broken up in situ and the broken material used to form a foundation layer to the re-constructed road with flexible material above should be considered as a flexible road and the advice given elsewhere applied.

8.3.6.3 Guidance, on failures in and deterioration of Concrete Pavements, is given in the UKPMS User Manual, Volume 2 Visual Data Collection for UKPMS, Chapter 6. Reference should also be made to Section 3 DVI Defect Definitions which contains a section on Concrete Pavements.

8.3.6.4 It is acknowledged that the condition and planned maintenance of concrete pavements can be a very complex operation and in many cases each length of concrete pavement will have to be considered separately. The authority will have to decide the scale of the investigations and the associated costs.

8.3.6.5 As an interim approach, if the concrete pavement is in good condition and shows no signs of distress it may be treated as an indefinite life asset and depreciation would only apply to any capital treatments required to keep it in that condition. If however a pavement, either now or in future, shows any signs of deterioration it should be to assume that the concrete pavement has a finite life and a life cycle plan developed that provides for either replacement of components or replacement in due course with a flexible construction.

8.4 Data issues

8.4.1 As discussed in Section 7.3.1, there are some practical issues in applying the principles for calculating depreciation to particular asset types because of deficiencies in data. For carriageways, UKPMS will, as an interim measure allow authorities to use default width data where they do not have their own data. It will also provide a consistent methodology, described below, for using the condition data in UKPMS as a means of estimating the age of the carriageway surface.

8.5 DEPRECIATED REPLACEMENT COST - INTERIM SOLUTION

8.5.1 The following methodology has been devised to calculate the depreciated replacement cost (DRC) of carriageway assets. The method uses condition survey data, including CVI, DVI and SCANNER, in UKPMS. It applies to bituminous surfaces which account for around 99% of the local network.

8.5.2 Road Grouping / Section Data Definition

8.5.2.1 The depreciation methodology is designed to operate in association with groupings of pavement sections. For GRC, the methodology is based on CoP road classification and urban/rural splits, since those are readily available to all authorities. However, it is not necessary to use this as the grouping for calculating depreciation. Groupings are however limited to section data contained within UKPMS and will be based around standard attribute data such as:

- Road Hierarchy
- Urban or Rural
- Speed Limit
- Road Type
- The classification in the 'Well Maintained Highways' Code of Practice.

So far as data and systems allow, authorities should use whichever groupings are most suitable as component groupings for life cycle planning purposes, ie which bring together road lengths that would receive comparable treatments and have broadly similar lives. Groupings must cover all road lengths with bituminous surfaces.

8.5.3 Other required inputs

8.5.3.1 Having specified road groupings, each authority is required to develop a simple life cycle plan and input for each grouping:

Total Useful Life: The average time (in years) after which the pavement surface has been fully consumed and needs replacement. This is usually the time when it makes economic sense to renew the surface as unplanned reactive maintenance has accumulated to a point where surfacing renewal is economically viable. In assessing average total useful lives authorities should

in appropriate cases make allowances for occasional factors such as severe weather events as well as ongoing ones such as traffic growth.

Renewal Unit Rate: The average surfacing renewal rate for all the capital treatment(s), including interim ones, specified in the life cycle plan for that group, expressed £/m². (This should be based on the authority's own current rates).

Deterioration Initiation: the point (measured in years from the start of the life cycle) at which surface deterioration first becomes measurable. This is explained in greater detail in Section 8.5.3.2.

The methodology is sensitive to each input and therefore it is important that a robust approach is devised for determining inputs, making the best use of available data.

8.5.3.2 New pavement surfaces can appear in "as new" condition for a period of time before they show any deterioration in UKPMS. Since depreciation needs to be allocated over the total useful life of the asset, an adjustment has to be made to allow for this, otherwise the condition data would treat as new not only surfaces that have just been constructed or renewed but also somewhat older surfaces that have not yet started to show deterioration. Without the adjustment, the methodology would under-represent the true level of depreciation. For high volume roads the "deterioration initiation" point could be as soon as one year. For very low volume roads it could be considerably longer. Engineers will need to apply judgement and experience in estimating the deterioration initiation point, and then monitor and adjust the inputs for individual groupings as appropriate in the light of experience.

8.5.3.3 Figure 6 below shows an example of groupings and data inputs. In this case road lengths are grouped using the Code of Practice classification and an urban/rural split. The data in it s provided for illustration only and is not intended to be used as default values.

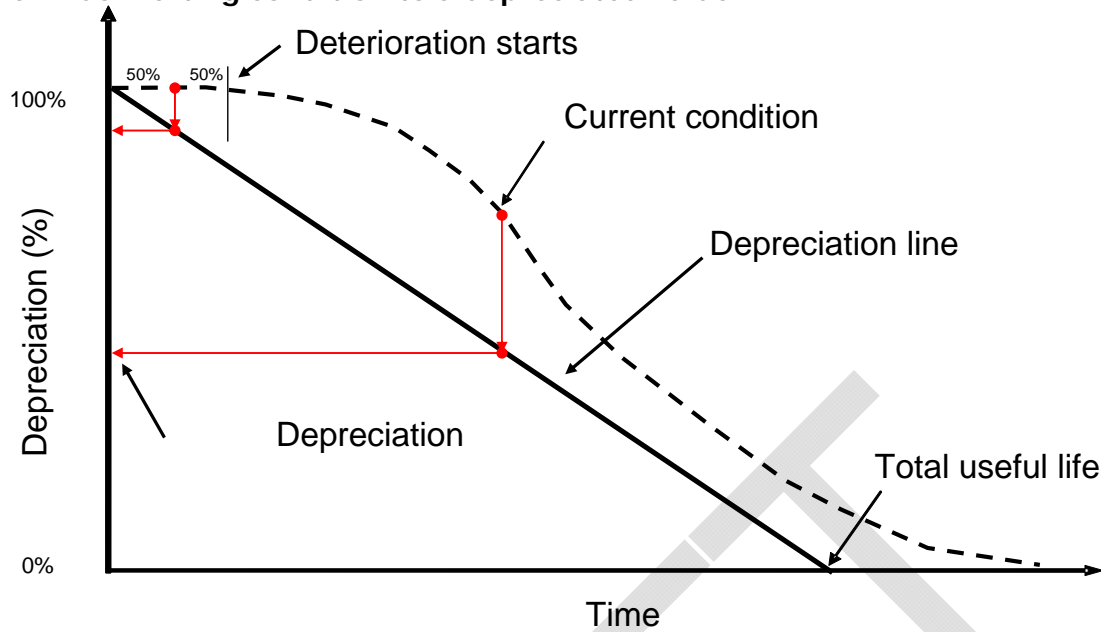
Figure 6: Example of groupings and data inputs

CoP Classification	Urban or Rural	Deterioration Initiation - T _{INI}	Total Useful Life -T _{TUL}	Default Width (m)	Renewal Rate £/m ²
3	U	2	15	6.5	£30
3	R	2	15	5.0	£25
4	U	3	17	5.5	£25
4	R	3	17	4.5	£20

8.5.4 The calculation of DRC

8.5.4.1 Once an authority has determined its groupings and input values for deterioration initiation, total useful life and cost rates, plus appropriate width data, UKPMS can calculate depreciated replacement cost. It does this by using UKPMS condition data for each length to calculate an overall condition for each section. The condition value is then converted to a depreciated value, via a deterioration curve and depreciation line. The depreciated value is then used to obtain the DRC. The process is illustrated in the graph at Figure 7 below.

Figure 7: Converting condition to a depreciated value



- 8.5.4.2 The formula for the deterioration curve includes both the total useful life and the deterioration initiation time and so it is automatically adjusted to fit these two parameters. The depreciation line (the straight line in the diagram) depends only on the total useful life. The diagram also illustrates that surfaces which have not yet started to show deterioration are assumed to have incurred depreciation corresponding to half-way between newly constructed (i.e. with no depreciation) and the point at which deterioration begins.
- 8.5.4.3 The details of the calculation, including the formulae used, are provided in UKPMS Technical Note 46.
- 8.5.4.4 It should be noted that this calculation will only calculate DRC for the surface layers and to underlying layers of the kind described in Section 8.3.5, and that life cycle plans and input values relate to the management of that portion of the asset. UKPMS developers will be asked to provide a facility to allow authorities to add in an allowance (%age add on or a monetary value) to deal with the depreciation of smaller scale treatments to underlying layers described in Section 8.3.2.
- 8.5.4.5 New condition indexes have been derived for CVI (bituminous only), DVI (bituminous only) and SCANNER condition data. Condition data needs to reflect the present condition of pavements. For unclassified roads where there are no nationally set requirements as to survey frequency, authorities will need to take a view in the light of traffic and other factors as to what is an appropriate frequency and coverage to achieve this. Additional surveys may be required to measure the effects of significant weather events, for example following a period of severe winter weather.
- 8.5.4.6 UKPMS will provide a standard report containing the depreciated value (%), depreciated replacement cost (£) and survey coverage (%).
- 8.5.4.7 A detailed explanation of the methodology, including the definition of the depreciation curve and the way it is used to convert condition data to DRC, and of the reporting formats that it can provide is given in UKPMS Technical Note 46, which provides guidance to UKPMS developers to allow them to produce

financial information to support asset management. TN 46 is available at www.pcis.org.uk.

8.5.4.8 UKPMS is likely to be subject to further modifications in future years either to refine the initial approach in the light of experience or otherwise enhance its capability to generate financial information to support asset management. These will be defined in later (annual) versions of Technical Note 46. In applying this Section of the Infrastructure Code, authorities should use the most up to date version of Technical Note 46.

8.5.5 Moving forward on DRC

8.5.5.1 Eventually all authorities should have actual age data as a basis for calculating DRC – and all authorities need to start recording this whenever they carry out capital work - but, given the very long lives of surface treatments for many unclassified roads, authorities are going to need to use condition as a proxy for age for some considerable time to come.

8.6 Annual depreciation

8.6.1 There will be two levels for this:-

- An interim version which uses the data inputs (other than deterioration initiation) required for interim DRC as described above;
- an aspirational version which adopts the same life cycle based approach but will use deterioration modelling and UKPMS data to refine the inputs.

8.6.2 The interim version

8.6.2.1 Using the data from the interim DRC calculation, annual depreciation should be calculated for each of the groupings in Section 8.5.2 as

$$\frac{\text{total area (sq m)} \times \text{renewal unit rate}}{\text{total useful life}}$$

8.7 A more developed life cycle approach for the future

8.7.1 Introduction

8.7.1.1 The interim network-level approach described above looks at a discrete sub-set of the network (unclassified urban roads for instance) and estimates, based on engineering judgement, how long a road of this type will typically last and what the most efficient generic life cycle treatment for this type of road would be.

8.7.1.2 However, even within a general category, there will be a wide variety in the performance of roads based on differences in traffic, construction and a host of other factors. This means that while the interim approach provides a good starting point for general planning and forecasting of need, it is not sufficiently refined to work as a decision-making tool to support detailed work planning – authorities should not plan to resurface a road every 20 years (for example) simply because the grouped life cycle plan for that part of the asset is based on that frequency and treatment.

8.7.1.3 Because of this and because the carriageways are by far the most valuable part of the highway asset for most authorities, it makes good sense to aim to move to a more advanced level of life cycle planning for them in the future,

one that directly supports the production of maintenance works programmes as well as underpinning the financial information.

8.7.1.4 Such an approach would need to work at a road section level, rather than a network level, and should effectively produce a mini-life cycle plan for each road section within the network, predicting future condition and optimal treatment strategy. These could then be aggregated to a network level to give an overall level of demand, identifying both the annual depreciation charge and the (ideal) long-term works programme through the same process.

8.7.1.5 The following section sets out the blueprint for how this could work and could be delivered but it is stressed that this is a longer-term solution towards which authorities should be working, not one most will be able to deliver in the short or medium term.

8.7.2 Optimised road section level approach

8.7.2.1 Component depreciation is assumed for all examples. The model applies to all the layers that need capital treatments. Depending on how assets are grouped for life cycle planning, different models may be needed for different components/layers.

8.7.2.2 To achieve this each section of carriageway would need a mini life cycle plan which includes:

- the expected life of the maintenance cycle;
- the timing, nature and cost of all the treatments needed to maintain the (current specified) service potential of the asset over its life cycle on a whole life cost basis;
- condition data and deterioration modelling to monitor performance of the carriageway against the assumptions, particularly the assumed treatment lives, in the life cycle plan, and to amend the plan, and its funding requirement, as necessary on a regular (probably annual) basis.
- cost information, updated annually, based as far as possible on the authority's own costs, for each treatment in the life cycle plan.

8.7.2.3 The annual expenditure requirement for each section of road would be calculated as the cost of all the treatments in the life cycle plan divided by the number of years in the expected life cycle. These figures would then be aggregated to produce the total annual expenditure requirement for the carriageway network.

8.7.2.4 To support the move to an approach of this kind:

- A deterioration model to predict the future performance of the individual road will need to be developed, tested and implemented in a way that is available to all authorities to allow future performance to be predicted with a reasonable degree of accuracy and consistency.
- An optimisation process needs to be linked to the deterioration model to allow authorities to select the most cost-effective treatments (this is especially critical where the budget is insufficient to fully fund the ideal programme).

8.7.2.5 These requirements have been identified in a recent review of UKPMS core functionality so it is envisaged that UKPMS systems should be able to undertake these tasks in the future. However the development and

implementation of these functions will not be quick or simple and they may not be available until 2013 or beyond. *[The question of whether some earlier progress might be possible will be an issue for discussion with UKPMS developers during the consultation period.]*

8.7.3 Local implications of the approach

8.7.3.1 In order to adopt this approach and make use of the proposed new UKPMS functionality, authorities will need to ensure they have a substantial amount of data on the asset since any model of this type is only as reliable as the data on which it is based. In working towards this, authorities should first develop a data strategy to identify what they will need to collect and which gaps in their current data are most critical.

8.7.3.2 The data needed falls into three general categories, described below in outline. The tables list the general categories, the ease with which the data can be collected and the general likelihood of an authority having such data at the moment.

Figure 8: Static Data (mostly updated only when the asset changes)

	Ease	Likelihood
Length	Easy	Yes
Classification and/or hierarchy	Easy	Yes
Width & area	Moderate	Maybe
Age of Surface	Hard	Some
Age of Structure	V. Hard	A few
Surface Type	Moderate	Maybe
Type & Thickness of Structure	Hard	A few
Traffic flows	Moderate*	Some
HGV flows and/or land use	Moderate	A few
Changes in use patterns	Hard	Some
Difficult ground conditions	Moderate	Some
Bus routes	Moderate	Some

*Easy for an individual road, difficult for the whole network but some kind of approximation should be possible

Figure 9: Condition Related Data

	Ease	Likelihood
SCANNER surveys (ABC roads)	Easy	Yes
Up to date CVI surveys (U roads)	Easy	Some
Safety Inspection Data	Moderate*	Yes
SCRIM/ GripTester data (<i>As and Bs only</i>)?	Moderate*	Some
Public reports	Moderate*	Yes
Other expenditure (eg Cat 2)	Moderate*	Some
Deflectograph (<i>As and Bs only</i>)?	Moderate*	Some (old?)
Streetworks openings	Easy	Some
Structural info from s/w inspection	Moderate	Some

*Ease depends on the system used to capture and store this data

Figure 10: Treatment Details

Range of treatments
Costs
Durability/life
Treatment patterns
Restrictions based on:
• Urban/rural
• Classification
• Traffic load
• Area etc

8.7.4 Deterioration and optimisation model

8.7.4.1 While the details need to be developed, the performance model, whether in UKPMS or elsewhere, would need to use the above data to:

- Examine each road section
- Establish current condition
- Evaluate likely future deterioration
- Evaluate various treatment options (treatment + year, includes 'do nothing')
- Select optimal treatment for that road (could be do nothing)
- Rate the relative efficiency of that treatment (cost/benefit)
- Identify typical future treatment pattern based on initial ideal treatment
- This creates a mini life cycle plan for that road.

Then at a network level:

- Evaluate the Annual Depreciation Charge for the network based on the aggregated analysis of the individual road sections
- Select the most efficient treatments up to the available budget level for each year to give an optimised programme for 5-10 years
- This gives a forward works programme optimised for value for money that can be used to coordinate with other works.

Beyond the 5-10 year programme, use the idealised notional forward projection to create a longer term 'need'

- A 40-50 year LCP and financial projections for the asset

8.7.4.2 In addition to the data requirements, it should also be understood that, to get the full benefits of a strategy of this type, it needs to be put into practice on the ground – that is to say that works programmes and operational procedures need to follow and support the strategy. This may require cultural changes within the organisation. and consideration by national administrations of whether changes are required to performance measurement, including national performance indicators, to reflect the availability of better information and support good asset management practice.

8.8 Carriageway life cycle planning – putting the guidance into practice

8.8.1 Introduction

8.8.1.1 The purpose of life cycle planning is to examine and evaluate different options for the maintenance and operation of an asset in order to determine the most effective strategy for the asset. Consequently different plans can be drawn up for different strategies on the same asset, allowing a comparison of the costs and benefits of each to be made and helping decision makers optimise the results. This example deals with roads with a bituminous surface since these tend to make up the vast majority of local authority networks.

8.8.2 Defining the Asset

8.8.2.1 As described in section 8.3, the surface layers of the carriageway asset will normally have a finite life while the lower layers of the road will generally have an indefinite life. That is to say that, while the structural layers of a road will require localised treatment from time to time, in most cases an authority will not normally plan their complete replacement within a typical life cycle.

8.8.2.2 This example concentrates on building a life cycle plan for the surface layer(s) of carriageways, which can be defined for this purpose as the top 100mm of the road or the total thickness of the bound surface, whichever is less. The same principles would however apply to roads which required a combination of surface treatments and, less frequently, major reconstruction, although the plan would be a bit more complex.

8.8.3 Identifying suitable groupings

8.8.3.1 The carriageway should be divided into suitable subgroups based on factors that influence the life cycle. The key thing is to ensure that the life cycle is reasonable for the assets on which it is being used. For example, it would not be reasonable to apply the same life cycle information to a country lane and a motorway.

8.8.3.2 In the case of carriageway surfaces, key factors to consider include:

- Usage (in terms of number and weight of vehicles)
- Construction (since this will affect life and inform maintenance options)
- Maintenance techniques (plans should not be based around techniques that the authority would not consider appropriate on that type of road)

8.8.3.3 Most authorities will not have sufficient data to differentiate between similar roads and it is important that the amount of effort and detail used in the life cycle planning exercise is proportionate and appropriate to the available data. It is therefore suggested for this intermediate level of plan, that carriageway surfaces be broadly grouped into a small number of groups that have generally similar properties and performance. Factors to consider might include:

- condition data - is often collected differently for Unclassified and classified roads
- A roads – frequently carry more and heavier traffic and may be more robustly constructed

- treatments – some treatments are more suitable for rural roads and others for urban; this should be based on local custom and practice so that the plan is deliverable.

Box 1 – Identifying suitable groupings

Barsetshire Council has a mixed urban and rural network with towns and villages of various sizes linked by rural roads of various sizes and a number of busy strategic roads, all of which are managed by the council.

Barsetshire collects SCANNER data on its A, B and C roads and CVI on its unclassified roads at various frequencies. It also reports condition performance based on these measures. They therefore decide it makes sense to divide the network based on this classification rather than their own maintenance hierarchy (which would be another obvious choice). They decide that their B and C roads are similar enough within the limits of the data available to be one group while the A roads are another and the unclassified network a third.

Barsetshire regularly surface dress rural roads but council policy precludes surface dressing in urban areas. Instead Barsetshire uses micro asphalts on minor urban roads although not usually on the classified network. This means that they need to distinguish between urban and rural for each of the three groups based on classification - a total of six groups so far.

Barsetshire has a small number of high status roads (mainly in enhanced town centres) and a limited number of concrete estate roads. They set these special cases aside for now since they are only a small part of the network.

Barsetshire does not have good enough information on the construction or history of individual roads to divide these groups down further but they have sufficient knowledge and experience to establish typical treatments for these groups.

For the purposes of this life cycle planning exercise they therefore settle on the following six groups:

A roads, Urban	200km	A roads, Rural	300km
B & C roads, Urban	150km	B & C roads, Rural	500km
Unclassified roads, Urban	2500km	Unclassified roads, Rural	2000km

8.8.4 Identifying treatment options

- 8.8.4.1 This stage of the process aims to identify the treatments available to local engineers in managing the network.
- 8.8.4.2 A life cycle plan should consider all significant treatments needed over the life cycle. The key ones will be those that maintain the road surface, allow it to reach its service potential or replace it when it has reached the end of its useful life. This does not have to be a treatment that adds 'strength' to the road, but it has to extend its life rather than just keeping it in a safe condition. Treatments such as surface dressing and resurfacing have a place in the life cycle plan.
- 8.8.4.3 Authorities may also wish to build in allowances for reactive treatments such as pothole filling and routine maintenance both for expenditure planning purposes and so that decisions on which option is optimal can be based on consideration of all costs. However, capital and revenue costs need to be separately identified.
- 8.8.4.6 The treatments selected should be based on the treatments available to the authority and, similarly, the costs applied should be based on the actual cost to the authority of delivering the treatment in question.
- 8.8.4.7 When identifying the range of available treatments it is also necessary to identify:
- Any restrictions on use
 - The typical benefits expected
 - The typical life of the treatment

Box 2 – Identifying Treatment Options

The Bassetshire engineers consider the various treatments they usually employ to maintain the network and group them into three main headings:

- Surface treatments (ST)
 - Intended to seal and protect the existing surface and extend its life; may include limited patching works to the existing surface
- Resurfacing (RS)
 - Intended to replace the existing running surface either with an inlay or an overlay, may include limited patching works to the lower layers
- Rehabilitations (RH)
 - Intended to return strength to a road that has structural problems through heavy traffic, ground conditions etc. May be full or partial reconstruction or substantial localised structural patching

They then look at the breakdown of their network (given in Box 1 above) and consider what treatments they would use, where, and what life they would expect:

- Surface treatments:
 - Surface dressing (any rural road); typical life 10 years
 - Slurry seal and micro asphalt (unclassified urban roads); typical life 12 years
 - Classified urban roads – no suitable surface treatment

The design treatments would be appropriate to the road in question but a 'typical' treatment is acceptable for life cycle planning purposes as long as it is representative. Bassetshire also use various specialist treatments such as fibre-reinforce surface dressing but decide that these could be covered within the generic treatments.

- Resurfacing:
 - Surface course overlay (some rural roads); typical life 20 years
 - Surface course inlay (any road); typical life 20 years

Bassetshire use a range of products and, again, the design would be appropriate to the site in question. For this purpose a typical average treatment can be used.

- Rehabilitations:
 - Full or partial depth reconstruction of the road (usually limited to heavily trafficked roads like A roads); typical life 20 years for the new surface, 100 years for the repaired structure
 - Localised structural repair or renewal on an ad hoc basis as sections fail (rest of the road network); typical life 20 years for the new surface, 100 years for the repaired structure

Again Bassetshire would consider a range of appropriate treatments where suitable to the road in question (such as in-situ recycling, 'crack and seat' for failing concrete road slabs etc.) but for this purpose these can be rolled up into generic 'typical' treatments.

An authority's own life cycle plan might go into more detail and include more options where the information is available to support this.

8.8.5 Costing the Options

8.8.5.1 When creating a typical cost for the job relevant factors that should be considered include:

- The works cost (e.g. the resurfacing/surface dressing etc)
- Preparation works needed to allow the main works (e.g. pre-patching for surface treatments or limited areas of patching/deeper works on a resurfacing scheme. By making allowance for this type of works, based on what the authority normally needs to allow for, we cover the small element of deterioration in the 'indefinite life' layers of the road).
- Temporary traffic management and communications including signals, signs, the cost of temporary traffic orders etc.
- Costs associated with restricted hours working etc.
- Accommodation works (e.g. adjusting the height of dropped kerbs to allow an overlay)
- Design and supervision costs associated with the scheme or programme of works
- Other works necessary as part of the scheme (e.g. replacing road markings after resurfacing)

Box 3 – Costing the Options

Barsetshire needs to arrive at a typical rate for each treatment. This should be an average cost for that type of treatment on that group of roads. This is not intended to generate schemes or engineering estimates – only to quantify the overall need and scale of future maintenance – so using an average cost is acceptable.

Barsetshire look at their surface dressing programmes first. They tend to use high-end dressings using modified binders and multiple layers of chippings on their busier roads and cheaper variants on the other parts of the network. Factoring in some use of fibre-reinforced dressings on heavily cracked sites their typical costs are as follows, based on the current rates in their term maintenance contract and convert these into the cost per linear km using the typical widths for their network (they could alternatively rate all costs per m²)

A roads:	£2.45 per m ²	(£19,600 per km [8m average width])
B&C roads	£1.90 per m ²	(£11,400 per km [6m average width])
Unclassified roads	£1.55 per m ²	(£6,975 per km [4.5m average width])

Next they add the pre-patching and ancillary works based on the typical amount of work that, experience suggests, they need to do on each km they surface dress. They include within this pre-patching, replacement of road markings, limited accommodation works etc.:

A roads:	£21,000 per km
B&C roads	£10,500 per km
Unclassified roads	£7,750 per km

Box 4 – Costing the Options continued

They now need to look at on-costs. Because of their contract, basic traffic management is included in the above costs but the need to add on the cost of road closures and diversions, (used on some sites only), restricted hours (again some sites only) and design/supervision costs. Looking back at these additional costs as a proportion of their basic works costs in recent years, they arrive at the following numbers:

A roads:	+21% (substantial need for restricted hours and extra TM)
B&C roads:	+18%
Unclassified roads:	+11%

They can now arrive at a 'per km' rate for this treatment on each of their three rural road groups (they do not evaluate this for urban roads as Barsetshire do not use this treatment in urban areas)

A roads:	$£19,600 + £21,000 + 21%$	= £49,126 per km
B&C roads:	$£11,400 + £10,500 + 18%$	= £25,842 per km
Unclassified roads:	$£ 6,975 + £ 7,750 + 11%$	= £16,345 per km

Barsetshire then repeat this process for all of the treatment types they have identified and for all groups to which they apply. This gives them a matrix of treatments and costs, all of which are the costs to treat a kilometre of the network, based on the estimated average costs they have derived and the average width of the appropriate part of their network.

This example has not worked through their thought process in detail for each one but some points are worth considering:

Surface treatment (urban) – Barsetshire have arrived at an average cost for using slurry seals and micro asphalts on unclassified roads but decided that too few classified roads are suitable for this treatment for it to be included in their general life cycle plan.

Resurfacing – Barsetshire have taken typical assumptions for the usual treatments and materials appropriate to each group of assets. For instance, they have assumed that on urban unclassified roads, their resurfacing will typically be a mix of inlays and channel plane overlays and that the typical thickness of new material will be at the thinner end of the scale. On A roads they have assumed the average treatment thickness will be greater, hence a disproportionate increase in costs and on rural roads an overlay without extensive planing will be possible some of the time, decreasing costs on these roads.

Rehabilitation – For their busiest A roads, Barsetshire have assumed that this rare treatment will be a full reconstruction to a reasonable depth; on other classes of road they decide that it will be a localised deep patch to restore a localised failure, backed up by a normal resurfacing. Consequently the rate per km does not greatly exceed the resurfacing rate on these roads. That does not necessarily represent the actual treatment – some of these local roads may need a more extensive treatment – but others will not need even that. This is their estimate of what, on average, will be required in the life cycle of the road, based on their experience and knowledge of their network.

8.8.6 Examining lifecycles

- 8.8.6.1 The life cycle plan should consider at least one full life cycle though it is probably not normally realistic to look beyond about 60 years. For many bitmac carriageway surfaces a shorter cycle will be appropriate.
- 8.8.6.2 Having assembled the treatment options and costs, these can now be put together into life cycle packages, taking account of any restrictions on how these treatments are used, in order to find the most effective life cycle package for a given type of road.
- 8.8.6.3 Some treatments can be repeated indefinitely, some are only suitable as intermediate treatments between other, usually more expensive, options. The choices should be suited to an authority's own network, based on experience of what works in local circumstances. That is not to say that authorities should not consider or experiment with other options, only that life cycle planning should be realistic.

8.9 Impairment

- 8.9.1 These notes supplement the main guidance on impairment in sections 7.4 and 7.5.
- 8.9.2 If there is an unforeseen decrease in either performance or previously measured condition compared to the previously assessed level then impairment may be applied.
- 8.9.3 With the use of UKPMS, the data is collected at the section length level and then grossed up to give the total net performance for the network. It would be technically very difficult to distinguish impairment from depreciation. Therefore all changes to surface will be picked up as depreciation.
- 8.8.4 However, there could still be impairment to underlying layers. Examples of this would be if the allowance made in calculating depreciation for small scale replacements arising from things like utilities' works proved to be insufficient, or if a section of road was severely damaged by catastrophic flooding.

9 Footways and cycletracks – detailed guidance

9.1 Introduction

9.1.1 This section provides more detailed guidance on the depreciation and impairment of footways and cycle tracks. As with carriageways, it is proposed that UKPMS should be used as a tool to support both management and valuation of footway assets. A new method of collecting condition data for footways (Footway Network Survey – FNS) is currently being introduced to UKPMS. This will be suitable for use over the whole footway network and in due course, once there is sufficient data, this could be used to provide appropriate financial information for footway assets.

9.2 Assets covered

9.2.1 This section covers surfaced footways and footpaths that are part of the highway network. This would also include paved highway verges where authorities differentiate these from footways. In this context 'paved' includes any hardened/sealed surface including bituminous surfaces; mass concrete and slabs, flags and blocks of various sizes and materials.

9.2.2 On-carriageway cycle lanes should be dealt with as part of the carriageway asset.

9.2.3 Shared surfaces and pedestrianised areas are not specifically dealt with here since the details are likely to vary from case to case and authorities should adopt a suitable approach to their individual assets based on their local situation. By way of guidance, it is likely to be most appropriate to include shared surfaces as carriageways and pedestrianised areas as footways for valuation purposes, based on the likely use and typical construction although this should be flexible to suit the individual circumstances.

9.2.4 Similarly the use of specific enhanced or unusual materials (including unsurfaced highway paths) is not covered in detail but authorities should adapt the general guidance set out here to suit local practice.

9.2.5 This guidance considers footways in three broad categories, grouped by predominant surface type:

- Bituminous – footways with bituminous surface layers typically 70-100mm thick laid on an unbound base layer;
- concrete modular – footways with a modular surface of concrete paving slabs or blocks; typically laid on a sand or mortar bed on top of an unbound base layer;
- Other finishes – includes mass-concrete footways and those with surfaces such as enhanced and natural stone finishes or mastic asphalt on concrete which are different enough in terms of cost and/or life cycle to need separate consideration. These footways are diverse and are not dealt with in detail here but it is anticipated that authorities will adapt the methods given here to any local unusual finishes.

9.3 Asset composition and componentisation

9.3.1 For modular footways, normally only the slabs and the bed (typically sharp sand) on which they sit will need capital treatments and therefore attract depreciation – typically this will be a total thickness of around 100mm

depending on the slabs and bed in question.. In addition some allowance for making good small areas below those levels should be included, based on the authority's experience.

- 9.3.2 For bituminous footways, the surface (bound) layers (typically 70-100mm) will be depreciable, plus again some allowance for making good small areas in underlying layers.
- 9.3.3 For both types, beyond what is stated above, the underlying layers will not normally require treatment and will therefore not normally be depreciated. The allowance to be included with the 'surface' costs is intended to cover the cost of making good previous reinstatements where necessary or dealing with damage from tree roots or over-running vehicles. The amount of allowance made should reflect the *average* need based on the authority's experience and practice.
- 9.3.4 However if exceptionally, treatment is required to lower layers, those will attract depreciation too. This might apply if a particular group of footways were known to have problems and to need deeper treatment on a regular basis due to unusual local conditions.

9.4 Data Assumptions & Approaches to Valuation

- 9.4.1 Two key elements of data are required for valuation purposes – inventory and condition. Different authorities will have different levels of data available to them and therefore a flexible approach is required to make the guidance usable by all while giving scope for improvements as data and techniques advance.
- 9.4.2 **Inventory** – Not all authorities have detailed inventories for their footways. They are likely to have a reasonable inventory for the more important categories (1a, 1 and 2) but may not have an inventory for category 3 and 4 footways. For cycletracks the position is likely to be even worse, and some authorities may have little or no inventory.
- 9.4.3 **Condition** – Most authorities should have reasonably current condition data for category 1a, 1 and 2 footways. Many will not have condition information for other footways or for any cycletracks.
- 9.4.4 Authorities will need to bring their footway and cycletrack inventory and condition data up to a serviceable level on all hierarchies. Where good data on footway lengths and widths is not available, this needs to be collected as a first priority because of its fundamental importance for both maintenance planning and valuation. Surface type should also be collected, either as part of inventory or inspection. Authorities should adopt the Roads Board Footway and Cycletrack Subgroup's Footway Network Survey (FNS) or other suitable approach as a practical solution to the issue of obtaining and maintaining condition data on all hierarchies.
- 9.4.5 Two levels of approach have been identified for inventory and condition: an entry level approach to be used as a stopgap by authorities with limited data; and a more advanced level that may be attainable by some authorities now and should be achieved by all in time. It is not considered appropriate to apply deterioration modelling to footways and cycletracks in the same way as is being suggested for carriageways, hence there is no equivalent to the longer term 'aspirational' approach described in section 8.

9.5 Entry level approach to data

- 9.5.1 For authorities who do not have sufficient inventory, either overall or for particular categories of footway, default values will be provided, based on data from authorities who do have good inventory, of typical lengths and widths of footway associated with a particular type of road. For instance, if analysis showed that 1km of typical urban unclassified road had 2km of footways associated with it at 1.8m wide then an authority would allow 3,600 m² of footways per km of urban unclassified road. (This will also be used to calculate footway GRC where actual inventory is not available.)
- 9.5.2 Where available (e.g. cat 1a, 1 and 2) and sufficiently recent, authorities should use their own condition information. Where condition information is not available, authorities should initially use an estimated condition rating based on information drawn from safety inspections (e.g. FNS or defects per 100m). This might need to be at a network level if the inventory information is poor.

9.6 Advanced approach to data

- 9.6.1 This uses actual inventory, including lengths, widths and surface material. It uses FNS type condition information. For areas identified by FNS as requiring treatment, authorities may need to carry out more detailed condition surveys to design and rank treatment schemes or to help calibrate the safety inspection data.
- 9.6.2 Authorities may need to combine elements of the two approaches. If, for example, an authority has reasonable inventory data but poor condition data, it should use its own inventory but use the level 1 approach for dealing with condition.

9.7 Life cycle plans

- 9.7.1 Since it is not suggested that deterioration modelling be used on these assets, a series of life cycle plans would be developed by each authority, which would form the basis for calculating depreciated replacement cost and annual depreciation. Each life cycle plan would deal with an asset sub-group of similar construction (e.g. bituminous footways and cycletracks). Life cycle plans should reflect the guidance on componentisation given in section 9.3 above. The footway asset may need to be further subdivided so that a reasonably representative unit rate can be used for each division. For instance an authority might select the following subdivisions:

Modular:

- Standard concrete paving slabs
- Block paving
- Standard concrete paving slabs (busy footways)
- Block paving (busy footways)

Bituminous:

- Standard bitmac surface
- Bitmac surface (busy footways)

- 9.7.2 Because of the different nature of the assets, bituminous and slab footways will require different approaches as follows.

9.8 Bituminous Footways and Cycletracks

9.8.1 This is primarily intended to deal with a conventional footway or cycletrack construction of (say) 70mm of bituminous surface on (say) 150mm on unbound sub-base. Other bituminous finishes (such as mastic asphalt on concrete) may need separate treatment and should probably be treaded separately with their own life cycle plan(s).

9.8.2 The surface (bound bituminous layers) will have a finite life and so the life cycle plan needs to allow for wholesale maintenance and renewal or replacement on a periodic basis.

9.8.3 The underlying layers will not always need wholesale replacement and may continue indefinitely if the surface above them is maintained and external factors do not otherwise interfere. However, it is likely that localised structural repairs will be required on a proportion of 'surfacing' jobs each year and some sites may require complete replacement of the underlying layers. Factors that may contribute to this include:

- Tree roots
- Vehicle over-running
- Utility openings
- Renewal of footways constructed to a lower specification
- Poor underlying ground conditions

The authority will need to take a view on how much work of this nature is required each year based on historic records and the condition of the network and allow for this in the life cycle plan.

9.8.4 **Initial DRC** is calculated as footway GRC minus accumulated depreciation. Accumulated depreciation is the total area (sq m) of footway needing repair or replacement multiplied by the local unit cost rate for the treatment.

9.8.5 **Annual Depreciation** should be based on a life cycle plan that identifies the most cost effective way for the authority to maintain its bituminous footway assets over a suitable life cycle (typically at least 40 years). The plan might be based on simple replacement of the surface or might include a more complex life cycle including one or more preventative treatments such as slurry sealing.

9.8.6 Annual depreciation can then be calculated as the unit (per sq m) rate for all the treatments in the life cycle plan multiplied by the area (sq m) of bituminous footway divided by the number of years in the life cycle.

9.8.7 The assumptions in the plan need to be reviewed regularly. If the assumptions in the plan are realistic, then the annual depreciation figure also represents what an authority needs to spend each year to maintain the asset in its present condition. Authorities therefore need to monitor the change in measured condition from year to year to make sure that expenditure is delivering the expected effect on performance.

9.8.8 Section 8.8 provides some further guidance and worked examples on life cycle planning for bituminous carriageway surfaces. Since the principles will be similar, those asset managers dealing with bituminous footways might find it helpful to refer to this too.

9.9 Slab and Modular Footways

- 9.9.1 This approach is primarily intended to deal with a conventional footway with a precast concrete modular surface of conventional slabs, small-element slabs or block paving. Typically this will rest on a bed of sharp sand which will, in turn, be supported by an unbound sub-base layer.
- 9.9.2 Specialist or enhanced finishes such as slabs bedded on concrete for increased bearing capacity or natural Yorkstone paving may need separate treatment and should probably be considered as a separate asset group.
- 9.9.3 These surface materials do not generally wear out through normal usage – the passage of pedestrians back and forth. Instead the need for capital maintenance is usually the result of external factors such as tree roots, vehicle over-running and utility openings.
- 9.9.4 **Initial DRC** is calculated as footway GRC minus accumulated depreciation. Accumulated depreciation is the total area of footway needing repair or replacement multiplied by the local unit cost rate for the repair or replacement treatment. The area needing repair or replacement should be estimated on the basis of historic records and the condition of the network.
- 9.9.5 **Annual depreciation** – measure the change in the area of footway needing treatment at the previous reporting date (end of previous financial year) with the area of footway needing treatment at the end of the current reporting date (latest financial year end) and multiply the difference by the current cost rate. If the amount of footway needing treatment has increased, the cost of the difference will be charged as depreciation.
- 9.9.6 If the amount of footway needing treatment has decreased over the year, no depreciation is charged.

9.10 Impairment of footways

- 9.10.1 These notes supplement the main guidance on impairment in sections 7.4 and 7.5.
- 9.10.2 For bitmac footways, assuming the calculations are carried out in UKPMS, using standard condition data, the model will not distinguish impairment of surface layers from depreciation, but will produce a combined result. Any impairment of underlying layers will need to be calculated separately based on the relevant treatment costs.
- 9.10.3 For slab footways where annual depreciation is based on estimates of past effects, if the provision made for a particular year turned out to be pessimistic, any material shortfall should be accounted for as impairment. The same would apply to any material shortfall in the estimated allowance for treatment to underlying layers of bituminous footways or cycletracks. Impairment could also arise in the event of a significant one off event such as a section of footway being washed away by severe flooding.

10. Structures – detailed guidance

10. Introduction

10.1.1 This section provides specific guidance on the approach to be adopted for calculating depreciation and impairment, for transport structures (as defined in section 6.7.4). An overview of the approach is provided, setting out the key principles and assumptions to be followed. The technical and engineering detail of the approach will be contained in the Highway Structures Asset Management Planning Toolkit (March 2010), which comprises three parts:

- Part A: Methodology
- Part B: Function Specification
- Part C: Supporting Information

10.1.2 Commercial software/system providers must comply with this code and the above guidance to ensure consistency in valuation and financial reporting for transport structures. The system/software must be verified by the Decision Support Tool sub-group of the UK Bridges Board [*Note: it is envisaged this sub-group will use a set of standard data to check commercial/bespoke software*].

10.2 Overview of structures life cycle planning

10.2.1 A life cycle planning approach is used to determine current and future maintenance needs and evaluate the DRC. The approach utilises standard inventory and inspection data, alongside data on deterioration rates, service lives and treatment types/effects.

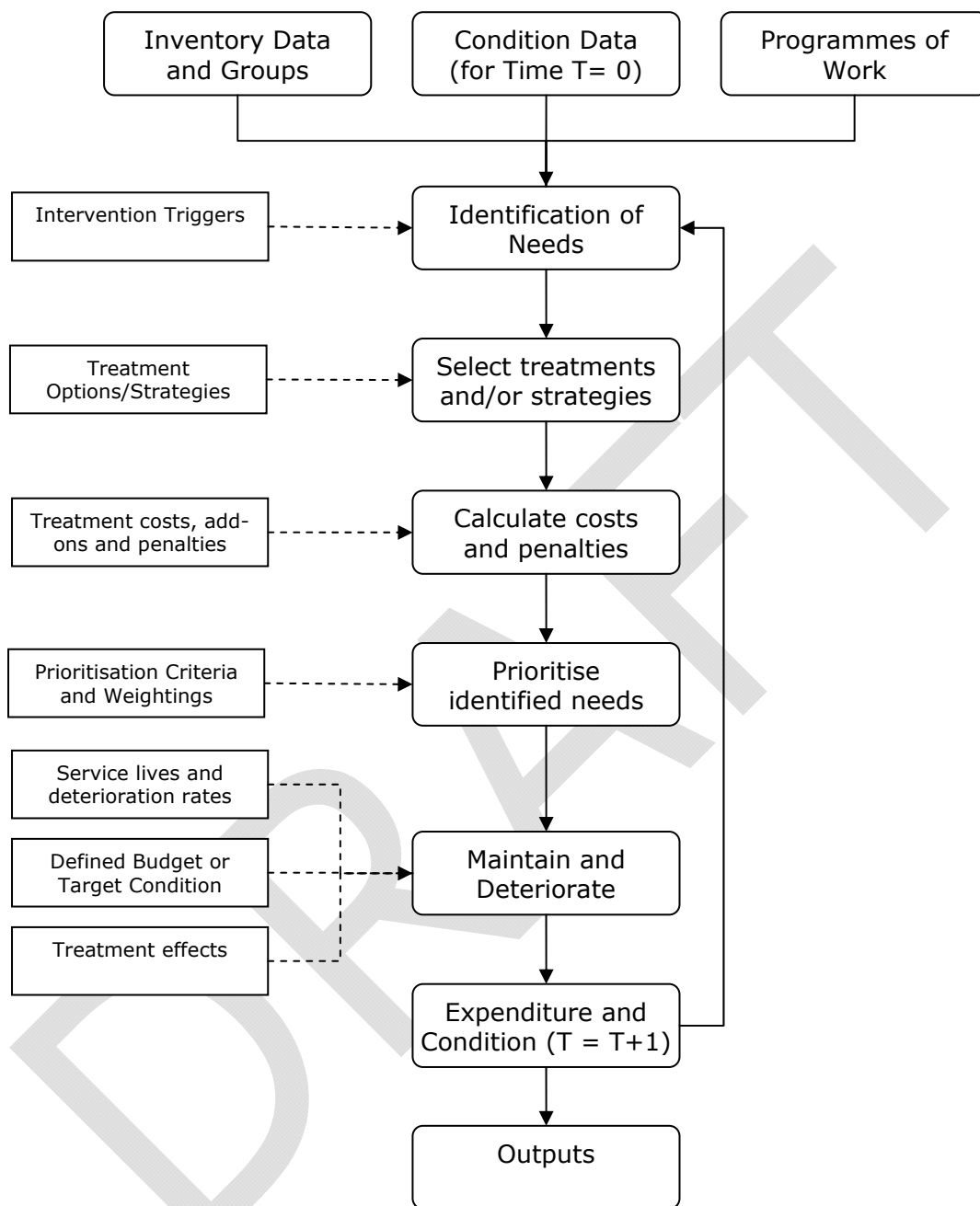
10.2.2 Figure 11 provides a high level overview of the life cycle planning approach to be used for highway structures; the main steps are:

- Inventory Data and Groups – e.g. structure type, dimensions, materials elements and the criteria used to group similar structures;
- Condition Data – element level condition and defect data, e.g. a standardised severity and extent condition rating approach is used for highway structures.
- Programmes of Work – defined programmes of work that typically to address specific needs or issues, e.g. strengthening, parapet upgrade, scour susceptible bridges.
- Identification of Needs – identify maintenance needs based on defined intervention levels, triggers and programmes of work.
- Select Treatments and/or Strategies – select the appropriate treatment, and/or long-term strategy, to address the need.
- Calculate Costs and Penalties – evaluate the costs (e.g. labour, plant, material, access etc.) and penalties (e.g. traffic disruption) of doing or not doing work.
- Prioritise Identified Needs – prioritise competing maintenance needs using an appropriate set of weighted criteria;
- Maintain and Deteriorate – improve/restore the condition of those structures or elements that have been treated and deteriorate others.

- *Expenditure and Condition* – evaluate the total annual expenditure and the condition of the structure stock after maintenance.
- *Outputs* – the key outputs from the life cycle planning process, across the full analysis period (i.e. time horizon) and for each scenario analysed (e.g. Do Minimum, defined budget and target condition), include:
 - Expenditure, condition and backlog profiles;
 - The expected life of each finite life component;
 - The treatment cycle/life of each indefinite life component;
 - The timing, cost and effect of each intervention (be it a replacement of a finite life component or capital maintenance of an indefinite life component).

10.2.4 The DRC and annual depreciation for the stock of structures is evaluated from the outputs. The life cycle planning process is described in detail in Part A of supporting documentation.

Figure 11: Overview of Structures Lifecycle Planning Process



10.3 Component breakdown

10.3.1 The structure types are described in Section 6.7.4. It is recognised that some structures are suitable for subdividing to component level, e.g. bridges, while others can be adequately dealt with at a structure level, e.g. retaining walls, culverts, sign/signal gantries. Figure 12 below shows the minimum and refined breakdown for highway structures, the approach is primarily based on the CSS Condition Indicator Elements (or equivalent) as described in the Inspection Manual for Highway Structures (TSO, May 2007).

Figure 12: Structure Breakdown for Life Cycle Planning

Structure Types	Minimum Breakdown	Refined Breakdown
Bridge: Vehicular	CSS Bridge Inspection Elements	Sub-division of major inspection elements, e.g. abutments divided into East and West
Bridge: Pedestrian/cycle		
Cantilever road sign	Structure	CSS Sign/Signal Gantry Inspection Elements
Chamber/cellar/vault	Structure	CSS Bridge Inspection Elements
Culvert	Structure	CSS Bridge Inspection Elements
High Mast Lighting	Structure	CSS Sign/Signal Gantry Inspection Elements
Retaining Wall	Structure	CSS Retaining Wall Inspection Elements
Sign/signal gantry	Structure	CSS Sign/Signal Gantry Inspection Elements
Structural earthworks – reinforced/strengthened soil/fill structure	Structure	-
Subway: Pipe	Structure	CSS Bridge Inspection Elements
Tunnel	CSS Bridge Inspection Elements	Sub-division of major inspection elements, e.g. abutments divided into East and West
Underpass (or subway): Pedestrian		
Underpass: Vehicular		
Special structure		

10.3.2 A detailed description of the breakdown that can be used for each structure type will be provided in Part A of the supporting documentation.

10.4 Finite and indefinite life components

10.4.1 Structure components, can in general, be classified as follows:

- Finite Life – bearings, bearing plinth/shelf, superstructure drainage (external), substructure drainage (external), waterproofing, movement/expansion joints, finishes, handrail/parapets/safety fences, surfacing, machinery, signs and lighting.
- Indefinite Life – primary deck element, transverse beams, secondary deck element, half joints/hinge joints, tie beam/rod, parapet beam or cantilever, deck bracing, foundations, abutments, spandrel wall/head wall, pier/column, cross-head/capping beam, superstructure drainage (integral), substructure drainage (integral), access/walkways/gantries, handrail/parapets/safety fences, invert/river bed, aprons, fenders /cutwaters /collision protection, river training works, revetment/batter paving, wing walls, retaining walls, embankments.

10.4.2 The above relationships are not absolute; some components appear in both categories while others may change from finite to indefinite life due to structural form, material and maintenance needs/strategy. Further details on

component classifications are provided in Part A of the supporting documentation.

10.5 Inventory Data

10.5.1 The inventory data required for the life cycle planning approach are:

- Structure type as described in section 6.7.4;
- Structure dimensions as described in section 6.7.4;
- Structure grouping – taking account of key maintenance drivers such as material type and structure form, for example, the Bridge Type Code (or equivalent) as described in the Inspection Manual for Highway Structures (TSO, May 2007), can be used to define structure groups;
- Structure usage (e.g. route supported) and obstacle crossed (e.g. navigable watercourse);
- Inspection elements as described in section 10.3.

10.5.2 The above represents the minimum data set required to support life cycle planning and depreciation, this does not preclude authorities from improving and refining the data used for life cycle planning as described in Part A of the supporting documentation.

10.6 Condition and Performance Data

10.6.1 The condition and performance data required for the life cycle planning approach are:

- Condition of each element described in section 10.3; for highway structures this is the severity and extent codes described in the Inspection Manual for Highway Structures (TSO, May 2007);
- Defect codes, where applicable; for highway structures as described in the Inspection Manual for Highway Structures (TSO, May 2007);

10.6.2 Condition data is provided by General and Principal Inspections, which, for highway structures, are undertaken at two and six year intervals in accordance with Management of Highway Structures: A Code of Practice (September 2005).

10.7 Lifecycle Planning Assumptions and Data

10.7.1 The assumptions and data that support life cycle planning (as set out in Figure 11 above) include:

- Intervention triggers – the conditions (or other performance criteria) that trigger the need for work.
- Treatment options/strategies – the specific treatment options that are suitable for an identified/triggered item of work and, where available, specific life cycle strategies that have been developed for individual structures or groups of similar structures.
- Treatment costs and add-ons – the unit rates/fixed costs for specific treatments, the algorithms/assumptions used to adjust the unit rates/fixed

costs to take account of quantities, and the cost add-ons/uplifts, e.g. access, traffic management etc.

- Penalties – the penalties (such as traffic delay, load restrictions, failures) that are likely to be incurred if action is not taken (this is used to support prioritisation of needs).
- Prioritisation criteria and weightings – the criteria and respective weightings that are used to prioritise needs.
- Service lives and deterioration rates – the average service lives and deterioration rates for structure components, including upper and lower bounds that reflect the expected range of service lives/deterioration rates.
- Treatment effect – the impact that a treatment has on the condition/performance of a structure/component.
- Defined budget/target condition – the life cycle analysis can be run by either defining the budget available or the target condition. Under the former approach, the life cycle analysis evaluates the condition that is achieved for the available budget, under the latter the life cycle analysis defines the budget required to achieve the desired condition.

10.7.2 The life cycle planning assumptions and data are discussed in detail in Part A of the supporting documentation; and default assumptions/data are provided in Part C of the supporting documentation. The default data provides a practical starting position. However authorities are recommended to define area/structure specific data where appropriate.

10.8 Calculating depreciation

10.8.1 Depreciation for structures is calculated as follows:

- **Finite Life Structures/Components** – depreciation is based on the cost of replacing the component plus any interim capital expenditure needed to allow it to achieve its life,
- **Indefinite Life Structures/Components** – depreciation is based on the cost of any capital treatments needed to maintain the component to the required standard over the life of the treatment, systematically spread across the defined life cycle. If a component does not normally require treatment to maintain its life indefinitely, no depreciation applies. However, should it begin to show signs of measurable deterioration that will require capital treatment to restore service potential then it needs to be re-categorised and treated from that point as a finite life asset.

10.8.2 **Annual depreciation** is calculated for each component/asset/group as:

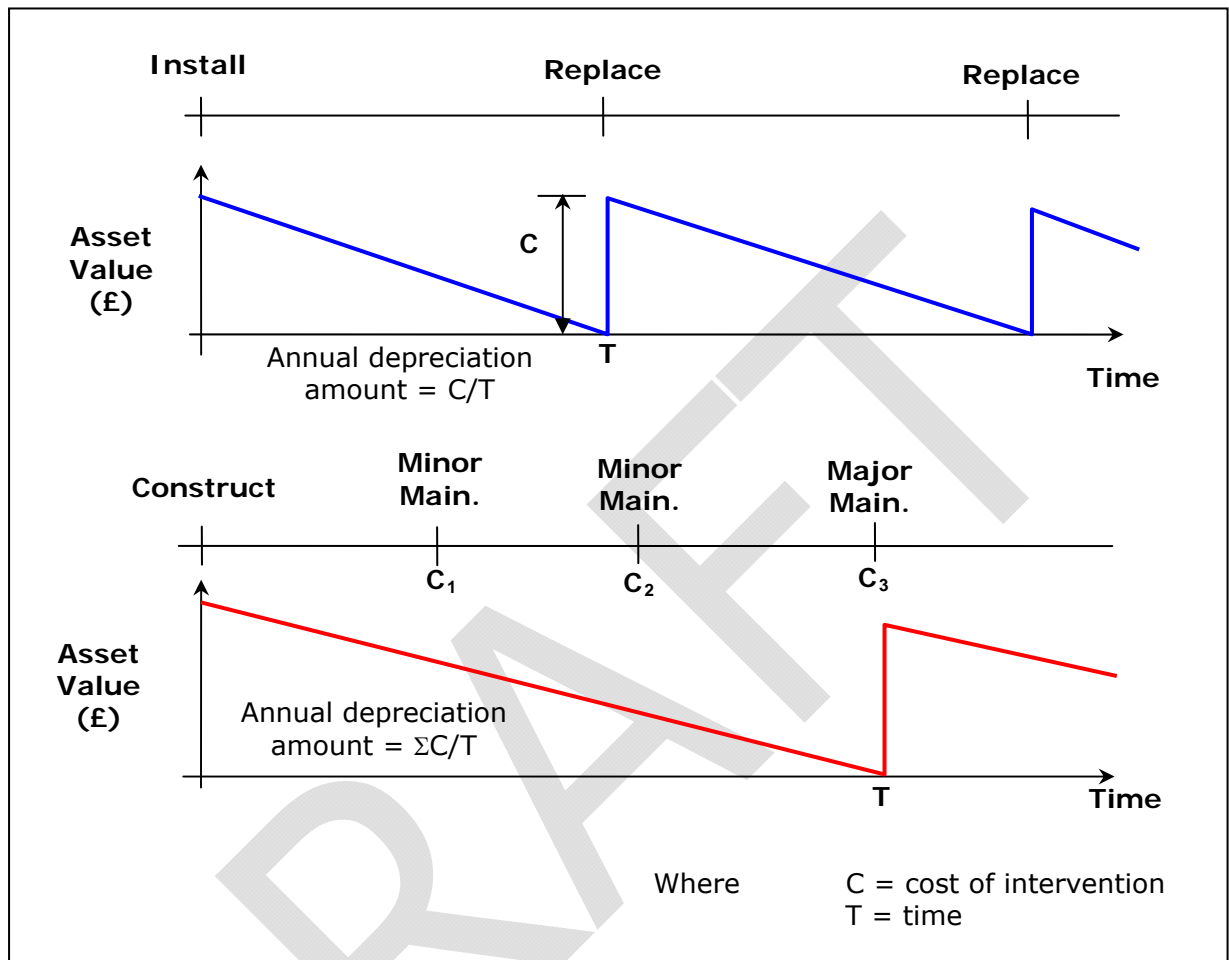
$$\frac{\text{the cost of all capital treatments and/or replacements in the life cycle}}{\text{number of years in the life cycle}}$$

10.8.3 Where sufficient age data is available **Initial Depreciated Replacement Cost (DRC)** is calculated as

$$\text{GRC minus (annual depreciation x number of years of life cycle consumed so far)}$$

10.8.4 Figure 13 illustrates how depreciation is calculated and systematically spread across the total useful life (or intervention cycle).

Figure 13: Depreciation over the life cycle



10.9 Approach to calculating DRC

10.9.1 In the majority of cases, the current condition/performance of a structure/component is somewhere between 'as-new' (i.e. construct or install) and 'end-of-life' (i.e. replace or maintain), with limited, if any, information on the timing and cost of past activities. In the absence of age data, the initial DRC calculation is based on predictions of future treatment needs over the life cycle, and their timing and cost, while the current condition is used to estimate the current age of the structure/component. This is shown by the following component level example.

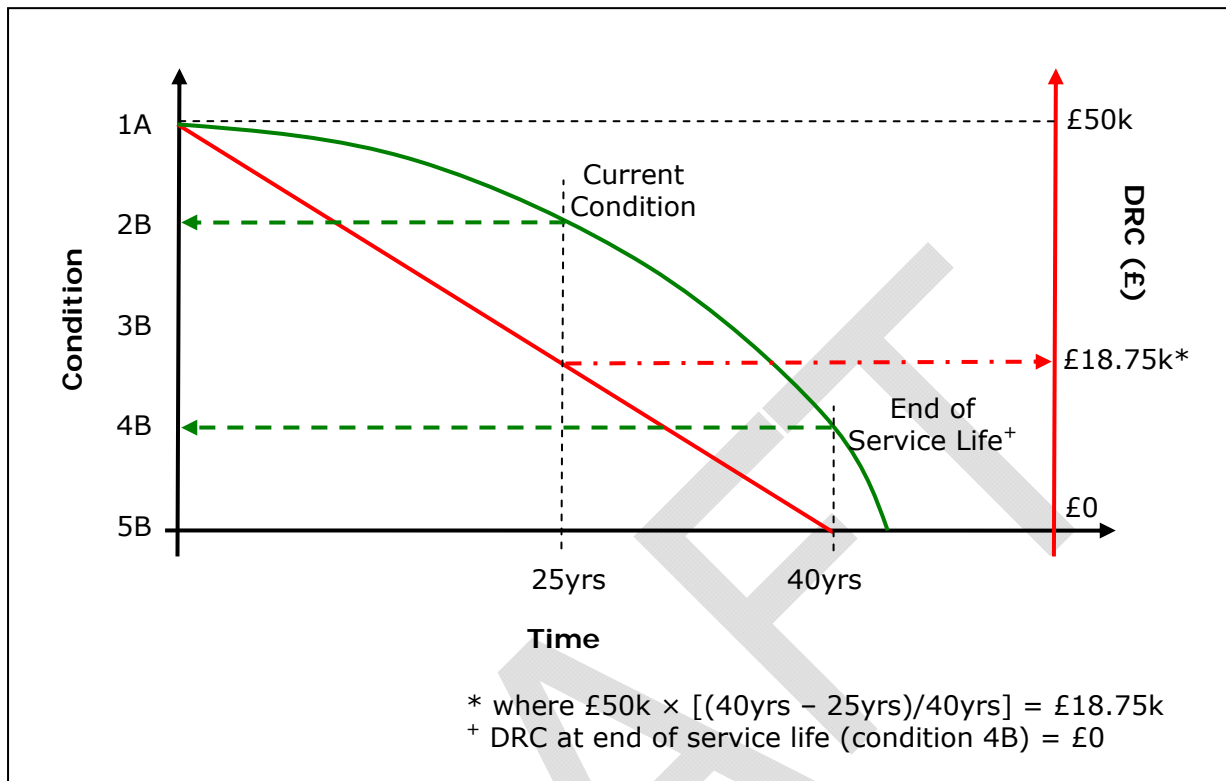
10.9.2 **Example:** consider a single bridge component with the following details:

- Component type = bearing (Roller bearing)
- Predicted useful service life = 40 years
- Current condition = 2B
- Replacement Cost = £50,000 (including traffic management, access etc.)

10.9.3 The current condition information is used to identify an assumed age for the component, as shown below in Figure 14. The assumed age is then used as the

basis for the straight line accumulated depreciation calculation, i.e. 25yrs of an expected 40yr life have been used and therefore the current DRC is £18.75k.

Figure 14 : Schematic of Condition/DRC Relationship



10.9.4 The life cycle approach provides this information for all defined structures/components, thereby enabling the DRC to be calculated for the stock of structures.

10.10 Impairment

10.10.1 Impairment of structures should be calculated in accordance with the guidance in Sections 7.4 -7.6.

11. Other highway assets – detailed guidance

11.1 Scope

11.1.1 This section provides further guidance on the application of the Code to street lighting, traffic management systems and street furniture. It also covers the various elements that have been grouped with carriageways for the purpose of producing composite rates, but are not part of the surface or underlying layers and therefore are not covered in Section 8.

11.2 Lighting, traffic management systems and street furniture

11.2.1 Introduction

11.2.1.1 These assets are considered together because they share the characteristics of being less complex (at least in terms of providing financial information) than carriageways, footways and structures. Componentisation should be more straightforward and all assets/components have finite lives. Also, at least for lighting and traffic management, authorities generally have good inventory and age data. As a result, authorities should generally be able to produce appropriate financial information simply by following the guidance in Sections 4-7 of the Code.

11.2.1.2 For lighting assets (street lighting, illuminated traffic signs, bollards etc) the Lighting Code includes guidance on asset management, including advice on inventory, componentisation and condition assessment.

11.2.2 Annual depreciation and depreciated replacement cost

11.2.2.1 **Annual depreciation** for lighting, traffic management systems and street furniture should be calculated on a straight line basis, in accordance with the methodology in Section 7. The local authority's life cycle plans will indicate the average life of each asset and become more refined over time. Life assumptions must be reviewed annually and adjusted as necessary.

11.2.2.2 The process used for calculating **initial DRC** will depend on whether the authority has data on the age of the assets/components. If it does, DRC should be calculated for each asset/component as $GRC - (\text{annual depreciation} \times \text{number of years of total useful life consumed so far})$.

11.2.2.3 If an authority does not have age data, then an estimate should be made, based on a judgement of the remaining life of the asset. A useful rule of thumb in checking out the realism of estimates is that if assets/components in a group are being replaced as they reach the end of their useful life and there is a fairly even spread of replacement activity from year to year, then the depreciated replacement cost across the group should be roughly 50% of GRC. If the average age of the group is older, and/or capital expenditure is not sufficient to allow for timely replacement, then the DRC could be much lower. Conversely, if a high proportion of the asset group has been replaced relatively recently (as has been the case for many authorities with street lighting) then the initial DRC would be much higher than 50%.

11.2.2.4 If an authority does not have inventory for street furniture and is initially relying for GRC on the default percentage described in Section 6.7.8.5, then as an interim measure that figure may be used to calculate depreciation, in which case the authority will need to estimate an average total useful life for the whole asset type and take a view on the typical average current asset age or residual life.

11.2.2.4 The one exception to the guidance above is highway trees, which are classified as part of street furniture. Highway trees (as defined in Section 6.7.8.6) will normally have an expected useful life greater than 40 years. These should not be depreciated, though they may need to be impaired, eg if a tree has to be removed as a result of accident damage. If a tree has an expected useful life less than 40 years then its value is not deemed to be material and expenditure should be written off when incurred.

11.2.3 Impairment

11.2.3.1 Impairment should be assessed in accordance with Sections 7.4 - 7.6.

11.3 Assets included in composite rates

11.3.1 The guidance on depreciation of carriageways and footways deals with the surface and underlying layers, but that will not pick up all the components that are grouped with these assets in the GRC composite rates. Some replacements/treatments will be picked up and depreciated as part of carriageway works, for example works to reservations, kerbs (which might also be picked up with works to footways), traffic calming, replacement of road markings and road studs. Smaller scale works to individual elements will not normally be material for valuation and do not need to be treated separately, though authorities will wish to make appropriate allowances for them in expenditure planning. Other components should be treated as follows.

11.3.2 **Drainage:** While authorities will wish to obtain appropriate inventory and performance information about drainage assets to support asset management and address issues such as the impact of climate change, it is not recommended that they should seek to develop detailed information on existing drainage assets for valuation purposes. The costs would be very high and would not represent good value for money. Also, much of existing highway drainage is not the same as would be provided in a Modern Equivalent Asset. For GRC purposes the difficulty has been resolved by including drainage, on an MEA basis, within the composite carriageway rate. For depreciation purposes, drainage assets should be treated as indefinite life assets and annual depreciation should be based on the average annual capital expenditure required to maintain them indefinitely. If, in any year, the expenditure required was materially greater than allowed for in depreciation, the excess should be treated as impairment. This approach also provides an appropriate capital expenditure figure for forward budgeting. Authorities should also separately identify the expenditure required for non-capital works.

11.3.3 **Earthworks:** excavated or raised ground (e.g. embankments and cuttings), low height retaining walls and other relevant earthwork assets that are outside the scope of the structures listed in Section 6.7. These should also be treated as indefinite life assets and annual depreciation should be based on the average annual capital expenditure (if any) required to maintain them indefinitely. If, in any year, the expenditure required was materially greater than allowed for in depreciation, the excess should be treated as impairment.

11.3.4 **Boundary fencing** is normally provided as accommodation works and passed on to the adjacent land owner. Unless the authority owns material amounts of such fencing, it should be treated on the same basis as assets in Section 11.3.1. If the holding is material, then either it should be depreciated on a straight line basis in accordance with Section 11.2 or annual depreciation should be based on the annual value of capital works. Safety fencing and pedestrian barriers are classed as street furniture.

11.3.5 **Land, hedges, verges and other vegetation** should not be depreciated.

CIPFA Project Implementation Steering Group

PISG is responsible for overseeing and advising on the implementation of the recommendations in the CIPFA Review of Transport Infrastructure Assets. It has exercised high level oversight of the development of the Code, leaving detailed development to HAMFIG, and provides a forum for taking decisions on associated policy issues. It has oversight of plans for communications and training to support awareness raising and implementation of the Code. It will monitor progress and identify future needs.

The members are:

Ian Carruthers (Chair)	CIPFA
Mostaque Ahmed	Department for Transport
Robert Biggs	Derbyshire County Council
Hazel Black	Scotland Government
Mike Bordiss	HELG
Sarah Bradley	Transport for London
Howard Brier	South Yorkshire Integrated Transport Authority
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Bibliography

Many of the listed documents particularly codes and material relating to UKPMS and condition surveys, may be subject to revision and updating from time to time. Users are therefore advised to check that they are using the latest version.

- 1 Guidance Document for Highway Infrastructure Asset Valuation, CSS/TAG, 2005.
- 2 Framework for Highway Asset Management, CSS, April 2004.
- 3 Quick Start Guidance Series, Roads Board Asset Management Working Group,
Highways Asset Management Quick Start Guidance Note – getting started.
Highways Asset Management Quick Start Guidance Note – risk assessment.
Highways Asset Management Quick Start Guidance Note - levels of service.
Highways Asset Management Quick Start Guidance Note – lifecycle plan.
- 4 Maintaining a Vital Asset, Department for Transport. November 2005,
- 5 Well Maintained Highways, A Code of Practice for Highway Maintenance, UK Roads Board, TSO, 2005
- 6 Management of Highway Structures, A Code of Practice, UK Bridges Board, September 2005
- 7 Highways Structures Asset Management Planning Toolkit, March 2010
- 8 Inspection Manual for Highway Structures, TSO, May 2007
- 9 Well-Lit Highways, Code of Practice for Highway Lighting Management, UK Lighting Board. TSO, 2004
- 10 PAS 55 (2008 Asset Management – Parts 1 & 2), (2004 revised 2008) BSI.
- 11 Footway Network Survey, Roads Board Footway & Cycle Track Sub Group.
- 12 Traffic Management – Code of Practice, March 2004, revised 2008.
- 13 UKPMS Technical Note 46/47/48. Annual Health Check requirement 2009, Scanner specification.
- 14 UKPMS User Guide (Volume relating to visual surveys)
- 15 Comprehensive Area Assessment (CAA): Highway Assets, Audit Commission KLOE.
- 16 The CIPFA FM Model – statements of good practice in public financial management.
- 17 International Financial Reporting Standards (IFRS)
- 18 Prudential Code for Capital Financing in Local Authorities, CIPFA
- 19 Local Authority Accounting Code (IFRS based).
- 20 International Accounting Standard (IAS 16)
- 21 Practitioners guide to Capital Finance in Local Government, CIPFA
- 22 Royal Institute Chartered Surveyors (RICS) Valuation Standards.

Glossary

Admissible Costs – costs that are directly attributable to bringing the asset into a working condition for its intended use.

Annual Depreciation – the aggregate cost of all the capital replacements/treatments needed to maintain/restore its service potential over the life cycle, spread over the estimated number of years in the cycle.

Asset – in the context of this guidance an asset is an integral feature of the highway infrastructure, e.g. roads, structures, lighting and traffic management systems.

Asset Classification – assets grouped in a consistent manner so that data can be aggregated for regional or national purposes.

Asset Consumption – measured in terms of depreciation and impairment of assets.

Asset Management - a strategic approach that identifies the optimal allocation of resources for the management, operation, preservation and enhancement of the highway infrastructure in order to meet the needs of current and future customers.

Asset Management Plan (AMP) - a plan for managing the asset base over a period of time in order to deliver the agreed Levels of Service and Performance Targets in the most cost effective way. This may be referred to as a Highway Asset Management Plan (HAMP) or Transport Asset Management Plan (TAMP) in other guidance documents and codes of practice.

Asset Management System – the hardware and software that supports asset management practices and processes and stores the asset data and information.

Asset Valuation – the procedure used to calculate the asset value.

Asset Value – the calculated current monetary value of an asset or group of assets. It should be correctly referred to as the Net Asset Value, however it is normally shortened to Asset Value. Where the term Asset Value is used in the Code it should be interpreted as the Net Asset Value. Asset Value in this document is synonymous with Depreciated Replacement Cost and Net Book Value.

Authority – used in this version of the Code to mean a Local Highway Authority, this covers all forms of Local Highway Authority having responsibility for highway maintenance as defined in Section 1 of the Highways Act 1980 amended.

Balance Sheet - a financial statement showing the assets and liabilities of an authority.

Benchmark Valuation – a full valuation that includes a review of the valuation basis and calculation of unit rates, Gross Replacement Cost and Depreciated Replacement Cost, typically undertaken once every five years.

Carriageway – this term has a meaning in law section 329 HA80. A way consisting or comprised in a highway, being a way (other than a cycle track) over which the public have a right of way for the passage of vehicles. Originally defined as a road on which a carriage could be driven, now means public vehicle highway – more commonly a road.

Componentisation – where an asset can be broken down into identifiable components with different useful lives those components should be accounted for separately. This should be applied at a sensible level of materiality.

Component Depreciation – Finite life is based on the cost of replacing component and any other capital treatment needed to allow it to achieve its anticipated life/performance. Some indefinite life components may include an element that does require capital maintenance/repair in order that the component can continue to operate indefinitely.

Composite Rates – based on a rate per square metre taking account of all the admissible costs including appropriate allowances as categorised in the classification 3 category.

Cycle Route - a way constituting or comprised in a highway, being a way over which the public have a right of way on pedal cycles (other than pedal cycles which are motor vehicles within the meaning of the Road Traffic Act 1972) with or without a right of way on foot [Section 329(1) Highways Act 1980]. The words in brackets were inserted by section 1 of the Cycle Tracks Act 1984.

Depreciation – the systematic allocation of the depreciable amount of an asset over its useful life arising from use, ageing, deterioration or obsolescence.

Depreciated Replacement Cost (DRC) – is a method of valuation which provides the current cost of replacing an asset with its modern equivalent asset less deductions for all physical deterioration and all relevant forms of obsolescence and optimisation.

Deterioration – the physical wear and tear on the asset damage due to time, weather etc that can be observed and measured through condition surveys.

Finite Life – length of life at the end of the assets will need to be replaced.

Footway – a way comprised in a highway, which also comprises a carriageway, being a way over which the public has a right of way on foot only [Section 329(1) Highways Act 1980]. Footways are the pedestrian paths alongside a carriageway.

Footpath - a highway over which the public have a right of way on foot only, not being a footway [Section 329(1) Highways Act 1980].

Financial Reporting Manual (FReM). The document issued by H M Treasury which sets out the accounting policies and practices that government bodies must follow when preparing their final statements. The FReM is currently based on UK GAAP but has some important interpretations and adaptations. The new IFRS-based version came into effect 1st April 2009.

Gross Replacement Cost / Gross Asset Value – the total admissible cost of replacing a highway asset as part of the existing highway network.

Heritage Asset – a listed asset or an asset that, due to its construction form or character, is considered to be important to the heritage and/or character of an area.

Highway – collective term for publicly maintained facilities laid out for all types of user, and for the purpose of this guidance includes, but is not restricted to, roads, streets, footways, footpaths and cycle routes. (In Scotland, the term “road” is used).

Highway Infrastructure Asset – an authority’s portfolio of highway assets including roads, segregated footpaths and cycle routes, structures, lighting, traffic management systems, etc. Together they function as a system or network which as a whole is intended to be maintained at a specified Level of Service (assessed through performance measures) by the continuing replacement and refurbishment of its assets and elements.

IFRS – International Financial Reporting Standards. An acronym commonly used for international accounting standards and other requirements of the International Accounting Standards Board.

Impairment – a reduction in Net Asset Value due to a sudden or unforeseen decrease in condition and/or performance of an asset compared to the previously assessed level which has not been recognised through depreciation.

Indefinite Life - those assets given the necessary maintenance will last indefinitely.

Initial Measurement – determining a monetary value of a newly constructed, re-constructed or improved asset.

Levels of Service – a statement of the performance of the asset in terms that the customers can understand. Levels of Service typically cover condition, availability, accessibility, capacity, amenity, safety, environmental impact and social equity. They cover the condition of the asset and non-condition related demand aspirations, i.e. a representation of how the asset is performing in terms of both delivering the service to customers and maintaining its physical integrity at an appropriate level.

Life Cycle Plan – a plan to cover the expected life of the component from new to replacement or for indefinite life components the life of the treatment cycle from “as new” condition back to “as new” condition. The plan should include the timing, nature and cost of all treatments needed to maintain the service potential of the asset, component or group over its useful life.

Modern Equivalent Asset – an asset which provides the same potential performance as the existing asset, but takes account of up-to-date technology.

Net Book Value - the amount at which fixed assets are included in the balance sheet, i.e. the Net Asset Value.

Network – the highway network inclusive of all its elements, e.g. roads, segregated footpaths and cycle routes, structures and lighting.

Special Structures - structures that due to a combination of their size, construction, and character are not suitable to be valued using standardised Unit Rates and Gross Replacement Cost models.

Statement of Accounts - a set of financial statements which present the financial performance and position of an authority during the accounting period covering its assets, liabilities, income and expenditure, the cash flow, and any provisions for the future.

Unit Rates – the cost per unit measure (number/length/area/volume) to replace an asset or part of an asset.

Useful Life – is the period for which an asset is expected to be available for use by an entity.

Valuation basis – assets should be valued at fair value on a depreciated cost (DRC) basis.

Whole of Government Accounts – a central Government initiative to produce a comprehensive set of accounts for the whole of the public sector covering central government departments, local government, agencies, NHS trusts and other public bodies in a style similar to the private sector.

Whole Life Cost – systematic consideration of all costs and revenues associated with the acquisition and ownership of an asset.

ABBREVIATIONS

AMP	Asset Management Plan
CSS	County Surveyors Society
CIPFA	Chartered Institute of Public Finance and Accountancy
CVI	Coarse Visual Survey
DfT	Department for Transport
DRC	Depreciated Replacement Cost
DVI	Driven Visual Survey
FNS	Footway Network Survey
FRAB	Financial Reporting Advisory Board
FRem	Finance Reporting Manual
GRC	Gross Replacement Cost
HAMFIG	Highways Asset Management Financial Information Group
HMT	Her Majesty's Treasury
IAS	International Accounting Standard
IFRS	International Financial Reporting Standard
ITS	Information Technology Systems
LCP	Life Cycle Plan
LASAAC	Local Authority Scotland Accounting Advisory Committee
MEA	Modern Equivalent Asset
PFI	Private Finance Initiative
PISG	Project Implementation Steering Group
PPP	Public Private Initiative
PROW	Public Rights of Way
RICS	Royal Institute of Chartered Surveyors
RTPI	Real Time Passenger Information
SCANNER	Surface Condition Assessment of the National Network of Roads
SCRIM	Sideways-force Coefficient Routine Investigation Machine
SCOTS	Society of Chief Officers of Transportation in Scotland
SL	Service Life
TAG	The Local Government Technical Advisors Group
TUL	Total Useful Life
UKPMS	United Kingdom Pavement Management System
UL	Useful Life
UR	Unit Rate
UTC	Urban Traffic Control
VAS	Vehicle Activated Signs
VAT	Value Added Tax
VMS	Variable Message Signs
WGA	Whole of Government Accounts