

Footway Lifecycle (Revised for TAMP 2)

Introduction

1. The background to lifecycle plans, and the format of each, is described in Section 5. This appendix provides the lifecycle plan for footways. At this stage of development of the TAMP, footways are taken to exclude public rights of way, except metalled ones in urban areas, and also to exclude cycletracks and joint footway/cycletracks.
2. Footways are defined in categories 1 to 4, as follows:

Category	Description
1. (primary walking route)	Main shopping areas which attract visitors from outside the vicinity.
2. (secondary walking route)	Shopping areas of larger villages, plus links between primary footways, car parks, rail & bus stations, business and industrial centres and larger schools (> 500 pupils) from main shopping area.
3. (link footways)	Links from local access footways to local amenities such as surgeries, village halls, shops, public houses, leisure centres and sports facilities, smaller schools, visitor centres, hospitals, clinics and care homes etc. Also all flagged footways not included in categories 1 or 2.
4.	All other footways (metalled)

Levels of service

3. The desirable levels of service for this asset category are set out in the table below. Judgements on the four attributes of safety, availability, serviceability and condition are made based on the criteria described in Section 2, though information on customer views is, for this version of the TAMP, based largely on informal feedback, since our NHT annual survey provides answers only to more general questions.
4. This level of service is one which fully meets all aspirations whilst minimising whole-life cost. The lifecycle plan, in later sections, shows how different levels of available funding will influence the extent to which this desirable level of service can be achieved.

Attribute	Desired Standard	Performance measure
Availability	All footways available for use at all times bar periods of scheduled or emergency road works	<ul style="list-style-type: none"> • Highway reports • Performance Indicators
Network Integrity	Safety - Footway surface of appropriate texture and profile to minimise risk of tripping or	<ul style="list-style-type: none"> • Safety inspections • Third party claims

	slipping. Serviceability - Good standard surface without unevenness or potholes affecting use by pedestrians	<ul style="list-style-type: none"> • CVI surveys • NHT survey
Condition	At a level consistent with achieving minimum whole life cost.	<ul style="list-style-type: none"> • Local indicators • User surveys

5. Failure to respond adequately to any of these levels of service will produce risk to the authority. The table below, which details the main risks, underlines the importance of responding properly to each.

<i>Risk type</i>	<i>Description example</i>
Physical	Accidents caused by asset defects
Business	Legal proceedings for failure in duty of care
Financial	Reduction in net book value of the asset because of poor condition; increased compensation payments following legal action;
Corporate image	Poor condition footways reflect on the overall image of the County Council.
Network	More disruption to pedestrians and others because of emergency unplanned maintenance following poor maintenance practice

Asset base and characteristics

6. The extent of footways in the four categories, and of different types of construction, is set out in the table below. Records of the asset base are maintained in the pavement management system, the UKPMS.

	A	B	C	D	E
1		Category 1	Category 2	Category 3	Category 4
2	BITM	15464.85	147686.45	1021896.08	4934149.715
3	BLCKS	29496.65	9602.85	2670.95	29904.7
4	CNFL	28567.55	9588.1	15492.55	52973.8
5	CONC	84	30.8	240.6	5290.2
6	Total	73613.05	166908.2	1040300.18	5022318.415
7					
8	Figures are in m ²				

Asset condition and assessment

7. To assess the extent to which the desirable levels of service are met requires measurements covering the four dimensions of safety, availability, serviceability and condition. There are as yet no measures for availability and serviceability, and these will be considered further in future editions of the TAMP.
8. Our standards for the frequency of footway safety inspections take into account national guidelines, issued in the current national code of practice for maintenance management "Well Maintained Highways" (July 2005) and are as follows:

Category	Description	Frequency of Inspection
1	Primary walking route	monthly
2	Secondary walking route	3 months
3	link footways	6 months
4	All other metalled footways	12 months

9. Coarse visual inspection (CVI) condition surveys are carried out as part of the inspection of adjacent carriageways, at frequencies detailed in the carriageway lifecycle plan
10. A local indicator for CVI surveys has been developed. This shows the proportion of footways below a specially developed condition threshold.

Indicator	2007/8	2008/9	2009/10	2010/11	2011/12
Cat 1 & 2 local PI					
Cat 3 & 4 local PI	21.1%	9.4%	10.0%	15.3%	18.7%

Asset valuation

11. The 2010 valuation for footways was £392 million. The current valuation using the GRC spreadsheet off the CIPFA website, which includes an inflation factor, gives a value of £426½ million.

Future changes in demand

12. Substantial new development is planned in the County over the next twenty years. This expansion will bring substantial lengths of new footway in new housing and employment areas, and will also intensify the use of existing footways, particularly those in categories 1 and 2. The increase in the extent of the asset will, in the long term, produce a requirement for additional maintenance expenditure. The increase in intensity of usage is, however, likely to have only a marginal impact on the rate at which footways deteriorate.

Treatment options and costs

Limited types of footway construction, and ways in which they deteriorate, lead to a relatively short list of maintenance treatments. The frequency and use of these treatments are dictated by the category of the footway in question. In most instances category 1 and 2 footways receive a higher level of maintenance to maintain the standards set out in the levels of service. The table below summarises the list of maintenance treatments for footways.

Treatment	Expected treatment life	Average treatment cost
Reactive maintenance		
Bituminous (Patching etc)	5-10 years	£15 - 20/m ²
Blocked	10 years *	£30.00/m ²
Paved	10 years *	£25.00/m ²
Preventative maintenance		
Bituminous (Slurry sealing)	8 -20 years	£1.75/m ²
Blocked	N/A	-
Paved	N/A	-
Renewal		
Bituminous (Resurfacing)	40 - 50 years	£40 – 50/m ²
Blocked	50+ years	£45/m ²
Paved	50+ years	£50/m ²

* Maintenance requirement in many locations is negligible, but where the underlying construction is damaged by heavy vehicle overrun, services work etc., relaying can be required.

13. Bituminous footways make up the major proportion of the footway network and in general stand up well to traffic in all locations; however, regular preventative maintenance work is required to prevent long-term deterioration. Treatment options are:
- Construct and do minimum then renew when condition assessment shows life expired.
 - Construct, maintain reactively and renew when reactive maintenance becomes uneconomical.

- c) Construct, series of preventative treatments at defined intervals then renew
14. Block paving has been used in many areas over recent years. Compared with flags, this is better at coping with vehicle overrun and its visual appearance is often preferred. Preventative maintenance is not available for this type of surface, with reactive maintenance being followed, in the longer term, by relaying or renewal. Utility works tend to have a disproportionate affect on this type of surface, but they can also be difficult to identify for repair. Cleansing operations can remove sand from the joints between blocks. This problem increases the likelihood of trip-hazards being created by delivery lorries using the surface.
15. Flagged footways do not cope well with vehicle overrun, disturbance by tree-roots and utility works, which can all cause tripping hazards. Flags are expensive to install, but they need relatively little reactive maintenance when not disturbed. Treatment options are:
- a) Construct, reactive maintenance only, no planned renew interval.
 - b) Complete flag replacement with flexible construction.
16. Historical information relating to bituminous footways is more readily available for determining treatment options and intervention criteria. However, less information is available for blocked and flagged footways. This data is being collected through the HMS works ticket process.

Management strategy for minimising whole-life costs

17. Whole life costs include the direct costs of works, design, supervision, surveys, and the indirect costs including inconvenience to users, environmental impacts and third party claims. The main factors which will affect the whole life cost of an individual footway are:
- Type and quality of original construction.
 - Degree and type of damage and degradation caused by environmental factors, traffic, and levels of utility work.
 - Speed, quality and type of response to damage and degradation.
 - Timing of intervention treatments.
18. At present, the links between these have not been fully quantified. This is an important area for research and development and progress nationally, together with evidence from HMS works tickets, will be used to inform future editions of this lifecycle plan.
19. Historically the Council's strategy for maintaining bituminous footways has been:
- to specify a high standard of initial construction

- to undertake timely reactive maintenance in order to keep footways in a safe condition and prevent short term deterioration,
- to have a programme of preventative maintenance to arrest deterioration of the surface and lower layers and to extend the life of the footway at minimum cost
- to resurface footways (using recycling techniques where possible) when reactive and preventative work is uneconomic
- to reconstruct footways which are uneconomic to treat by other means.

20. This approach depends on the concept of added life. If a footway were constructed at a cost of £C per sq m, but then received no work other than that required to keep it safe, it would be expected to last for a given time (Y years) before needing reconstruction. The cost per year would be £C/Y. Intervention treatment (costing £I/sq m) would mean that reconstruction would not be needed until a later date (L years after the original life of Y years), thus if the cost per year of construction plus intervention treatment $((C+I)/(L+Y))$ is less than the cost per year without intervention (C/Y) , the intervention treatment is cost-effective. On this basis, bituminous footways should be slurry sealed when they are around 20 years old and then re-treated at 8 year intervals providing the underlying material is sound. At an age of around 40 - 50 years, resurfacing, or where necessary reconstruction, should be undertaken. This effectively restarts the lifecycle.
21. This strategy is based on good practice but there has been no rigorous financial evaluation of the approach or testing of alternatives, for example the timing of the various interventions. This strategy needs to be verified, or amended, in the light of evidence from HMS safety inspection records and works tickets.
22. There is no similar strategy for flagged footways, with existing practice being based on renewal of flags when deterioration is perceived to be too widespread to deal with on a reactive basis. Where vehicle overrun or tree roots cause extensive damage, replacement with a bituminous surface is often the preferred option, although not always popular. Evidence from HMS safety inspection records, works tickets and insurance claims will help with making the choice.
23. Block paving, by virtue of its small size but thick construction, does not generally deteriorate unless subjected to significant heavy vehicle overrun or turning. In such cases, relaying or replacement with alternatives is appropriate. Evidence from HMS safety inspection records, works tickets and insurance claims will help with making the choice.
24. Further work will be necessary to develop a strategy for the next version of the TAMP. This will address the selection of surfacing types for different situations. Evidence for this will come from HMS safety inspection records, works tickets and insurance claims.

Options and targets within the management strategy

25. The analysis which follows analyses levels of capital spending against predicted

outcomes for footway condition. Similar analysis in future editions of the TAMP will need to analyse in more detail the impact of revenue spending on condition. It should be noted that the causal link between capital spend and resulting condition is complicated and not necessarily fully explained by the headline figures; this is another area for further investigation in future editions of the TAMP.

LTP proposals

26. The second Local Transport Plan reviewed the correlation between the achievement of condition targets and proposed overall spending, within the then-promised government allocations. This capital spending on resurfacing and reconstruction was to be supported by continued revenue spending on reactive maintenance at a level predicted to be approximately £1m a year in real terms through the five year period. The table below shows the predicted capital spending against condition targets.

	07/08	08/09	09/10	10/11	11/12	5 Year Total
Cat 1 & 2 footways	£105k	105k	£115k	£120k	£125k	£565k
Target condition	7.6%	7.4%	7.2%	7.0%	6.8%	N/A
Recorded condition	19%	16%	14%	15%	%	
Cat 3 & 4 footways	£1.76m	£1.85m	£1.84m	£2.03m	£m	£9.29m
Target condition	17.7%	16.8%	15.9%	15.0%	%	N/A
Recorded condition	21.1%	9.4%	10%	15.3%	18.7%	
Rolling 4 year avge	15.7%	14%	13.6%	14%	13.3%	

27. For category 1 and 2 footways, the 7% target represented renewal on average every 15 years or so. This is close to optimum for minimising whole-life cost, based on the maintenance practice described above. Continued revenue spending at present levels was believed likely to be sufficient to maintain safety and also to meet community expectations on serviceability, particularly reflected in the appearance of footways.
28. For category 3 & 4 footways, the condition measures indicate the percentage of footways with significant defects. The optimum long-term goal for this indicator was expected to be approximately 10% to 12%, producing the same minimum whole-life cost as for category 1 and 2 but reflecting the slightly lower serviceability standard acceptable for the appearance of these lesser-category footways. The sum provisionally allocated in the LTP was forecast to be sufficient to produce some improvement over the five year period, but not sufficient to meet this target.

29. The LTP totals, therefore, though not sufficient to achieve a state consistent with minimum whole-life cost for all footways in the five year period, did appear on the basis of the evidence then available to be sufficient to move to that state within approximately the next ten years. On the basis of the limited evidence so far available on the other dimensions of levels of service, there can also be reasonable confidence that these would have been met. Some increase in spending on category 3 and 4 footways would be desirable, to reach the steady state position sooner, but is unlikely to be available.

Alternative options

30. The reduced allocations for maintenance announced by the Department for Transport in late 2006, coupled with uncertainties over the likely outcome of the autumn 2007 government comprehensive spending review, resulted in targets being reviewed. The following table shows the revised spending for the period and the target condition:

	07/08	08/09	09/10
Cat 1 & 2 footways (£000's)	£105	£115	£120
Target condition	7.9%	7.8%	7.6%
Cat 3 & 4 footways (£000's)	£1,255	£1,045	£1,535
Target condition	19.4%	22.9%	24.4%

31. The predicted condition for category 3 and 4 footways was considered unacceptable. The overall funding was adjusted to put £250k a year more into category 3 and 4 footways at the expense of principal roads, which were ahead of target condition. The table below shows the revised funding together with target condition:

	07/08	08/09	09/10
Cat 1 & 2 footways (£000's)	£105	£115	£120
Target condition	7.9%	7.8%	7.6%
Cat 3 & 4 footways (£000's)	£1,255	£1,295	£1,785
Target condition	19.4%	21.5%	21.0%

32. For completeness, the third table below sets out the required spending levels on category 3 and 4 footways which would be necessary to bring these up to a condition consistent with minimum whole-life cost, of around 11%, in a reasonable period, say by 2015/16. Although funding at this level is highly unlikely, this does illustrate the gap in investment necessary to achieve optimum condition, allowing minimum whole-life cost thereafter.

	08/09	09/10	10/11	11/12
Cat 3 & 4 footways	£1.85m	£1.9m	£1.95m	£2.0m
Target condition	18.4%	17.0%	16.4%	15.1%
Recorded condition	9.4%	10%	15.3%	18.7%
Rolling 4 year average condition	14%	13.6%	14%	13.3%

Funding Requirements

33. The table below is an extract from an XL spreadsheet, which shows the annual renewal requirements for each type of footway. An assumed service life of 40 years and maintenance rates of £17/m² for category 1s and 2s and £15/m² for category 3s and 4s have been used.

	A	B	C	D	E	F
29	Annual maintenance requirement for a service life of 40 years					
30	Renewal Area					
31	Bitmac	387	3,692	25,547	123,354	
32	Block	737	240	67	748	
33	Paving	714	240	387	1,324	
34	Concrete	2	1	6	132	
35	Renewal Cost @ £17/m ² for 1s and 2s and £15/m ² for 3s and 4s					Sub-total
36	Bitmac	£6,579	£62,764	£383,205	£1,850,310	£2,302,858
37	Block	£12,529	£4,080	£1,005	£11,220	£28,834
38	Paving	£12,138	£4,080	£5,805	£19,860	£41,883
39	Concrete	£34	£17	£90	£1,980	£2,121
40		£100,000		£2,270,000	Total	£2,380,000

34. The table below is an extract from an XL spreadsheet, which shows the annual slurry seal requirements for bitmac footways. A rate of £1.75/m² has been used, which means that the service lives shown have to be achieved to restrict the spend to the figure shown. In other words, for the funding provided, the treatment is being expected to last for over 20 years on the category 3s and 4s. This is highly unlikely.

	A	B	C	D	E	F
42	Slurry Seal @ x years		years	years	years	
43	Bitmac	9	9	22	22	
44	Area	1,718	16,410	46,450	224,280	
45	Cost @ £1.75/m ²	£3,007	£28,717	£81,287	£392,489	
46		£31,700		£473,800		£505,500

Lifecycle action plan

33. Most of the actions to deliver this lifecycle plan are contained within the wider

summary of development contained in Section 9. A separate action plan is not included here.

Risks

34. The risks involved in implementing the lifecycle action plan have been assessed against the council’s standard grid of likelihood versus impact and are detailed in the table below, with an outline of the mitigation to be planned. The ‘red’ risks from each lifecycle plan are listed in section 7 of the main TAMP document.

Impact of effects	Severe	A				
	Significant	B			4,5,6	
	Moderate	C			1,2	3
	Minor	D				
			4	3	2	1
			Very Un-Likely	Not Very Likely	Quite Likely	Very Likely
			Likelihood of causes			

Risk	Level	Mitigation(for red risks)	Responsible
1. Insufficient staff resources for analytical work.	2C		
2. Insufficient staff resources for customer attitude work	2C		
3. Insufficient progress nationally and in the region to support changes in practice	1C	Work through Midlands Service Improvement Group to ensure key issues are tackled	GM(Technical Services)
4. Reduced Capital funding	2B	Review allocation between asset categories to minimise overall deterioration	GM(Technical Services)
5. Reduced Revenue funding	2B	Ditto	ditto
6. Reduced frequency of Inspections	2B	Ensure process improvement work on inspections reflects this risk	Project manager (process improvement)

Glossary -

DRAFT