

ANGUS COUNCIL

ROADS COMMITTEE – 14 JUNE 2001

ROADS INFRASTRUCTURE CONDITION

REPORT BY THE DIRECTOR OF ROADS

ABSTRACT

This Report informs the Committee of the condition of the Council's roads infrastructure in an all Scotland context and outlines the funding required from the Scottish Executive to redress progressive structural deterioration.

1 RECOMMENDATIONS

It is recommended that the Committee agree:-

- (i) to note that the current levels of funding afforded to Angus Council from the Scottish Executive (both Revenue and Capital funding) are wholly inadequate to maintain the roads infrastructure network to a satisfactory standard;
- (ii) to note that year-on-year due to this inadequate Scottish Executive funding the roads network infrastructure continues to deteriorate at an accelerated pace due to lack of ability to carry out preventative maintenance and structural maintenance at desired frequency levels;
- (iii) to note the Angus situation, which is typical of most other Scottish Local Authorities, whereby year-on-year under-funding of structural maintenance in the short term will undoubtedly lead to much more costly treatments in the future;
- (iv) to note that Angus Council has applied substantial endeavours to direct funds towards addressing the current condition of roads whilst also progressing major projects such as the A92 (£2.080M in 2001/02), and in overall terms for 2001/02 some £0.6M or so budget provision above Scottish Executive overall spend indicators was assigned by the Council;
- (v) to note the substantial estimated cost (£61M) required to bring the public road carriageways and footways in Angus up to a standard where an Economic Maintenance Regime (EMR) could be initiated and maintained thereafter if sufficient year-on-year funding (£5M/year) were provided (compared to current provision of £1.551M in 2001/02 subject to adjustment from a further proposed contribution to the Roads and Transport Renewal and Repair Fund following the completion of the Council's 2000/01 Final Accounts);

- (vi) to note the total annual minimum costs of an EMR (£6.4M/year) required to ensure the long-term performance of the full range of major infrastructure items on the road network (carriageways, footways, bridges, street lighting and traffic signals) and prevent deterioration beyond the point of economical repair (compared to current provision of £2.392M in 2001/02 subject to adjustment from a further proposed contribution to the Roads and Transport Renewal and Repair Fund following the completion of the Council's 2000/01 Final Accounts);
- (vii) to the submission of further reports to advise future Committees in respect of the condition of the Council's roads network infrastructure and the structural maintenance implications arising therefrom;
- (viii) to the Convener of the Roads Committee and the Director of Roads continuing to participate fully in the ongoing COSLA input to the Scottish Executive's proposed 15 year transport framework, an integral element of which will be to highlight the magnitude and 'build-up' effect of under-provision for roads structural maintenance funding across all Scottish Local Authorities with a view to securing additional monies for road infrastructure maintenance funding from Central Government;
- (ix) to the Leader of the Administration writing directly to the First Minister to convey the dissatisfaction of the Council to the wholly inadequate funding provided for roads infrastructure maintenance and seeking measures on how the First Minister intends to address this funding dilemma.

2 INTRODUCTION

- 2.1 The Director, like all his other counterparts across Scotland, has been concerned for sometime about the deteriorating condition of parts of the road network, with some roads suffering from edge rutting, wheel tracking rutting, flooding, uneven road surfaces and lack of skid resistance. An on-going commitment of resources is therefore required to maintain adequate skid resistance, good ride quality, edge condition, and effective drainage.
- 2.2 The potential dangers caused by poor skid resistance, potholes, worn road markings and inadequate drainage are self-evident. More specifically poor shape may contribute to standing water, which can lead to aquaplaning or skidding on ice in winter. Uneven or rough roads can lead to loss of grip, which can be particularly dangerous on bends and summits, characteristic of many rural roads. These defects are normally dealt with through structural maintenance programmes (re-construction, re-cycling, overlays, re-surfacing and surface dressing).
- 2.3 It is estimated that the asset value of the 1768 km of adopted carriageways in Angus is in the region of £460m. If bridges, footways, lighting, signs, drainage systems etc., are included then the total asset value would be in the order of £650m. Like all material assets the road network is subject to deterioration if not maintained to a required standard on an ongoing basis. Moreover this maintenance needs to be done

before further deterioration is allowed to set in which consequently would result in much greater cost at a later time.

- 2.4 It therefore follows that adequate resources must be allocated year-on-year (a) to provide the required maintenance at the appropriate time to prolong the life of the infrastructure and (b) to replace items of road network infrastructure which have reached the end of their working life and are beyond the point of economical repair.

3 DETAILS

3.1 Technical Background Information

- 3.1.1 The classification breakdown of the 1768km of Council Roads in Angus is shown in Table 1 below.

TABLE 1 **ANGUS COUNCIL ROADS LENGTHS (KM)**
As at 1st April 2001

| Road Type | Built Up | | Non Built Up | | Total |
|---------------------|------------------|----------------------|------------------|----------------------|--------|
| | Dual Carriageway | Non Dual Carriageway | Dual Carriageway | Non Dual Carriageway | |
| Principal | 1.7 | 36.2 | 0 | 154.2 | 192.1 |
| Non Principal A & B | 0 | 24.8 | 0 | 229.6 | 254.4 |
| Non Principal C | 0 | 32.7 | 0 | 450.6 | 483.3 |
| Unclassified | 0 | 290.4 | 0 | 547.8 | 838.2 |
| | | | | | 1768.0 |

- 3.1.2 94% of Revenue expenditure (third party payments including CFCR) on roads is currently devoted to maintenance of the existing roads network infrastructure (with the remaining 6% spent on road safety measures, traffic management etc (5%) and Coastal and Flood Prevention (1%)). The road maintenance element can be divided into four separate key functions:-

- structural maintenance 14%
 - cyclic/routine maintenance 40%
 - winter (gritting and snowclearing) 32%
 - street lighting 8%
- 94%

- 3.1.3 Cyclic/routine maintenance is the care and upkeep of verges, drainage systems, footways, road markings, safety barriers, traffic signs etc. It also includes

patching and temporary repairs to carriageways. This work is essential to keep the road network in a safe, serviceable and tidy condition.

3.1.4 Structural maintenance is the preservation of the strength, integrity, skidding resistance and general serviceability of the carriageway construction. This can be achieved through:-

- surface dressing
- resurfacing
- overlay
- full reconstruction
- recycling

In order to maintain the performance and maximise the working life of the carriageway it is necessary to renew the running surface as it wears out. This can be achieved most economically and effectively by means of surface dressing (spray and chip) which seals the road surface and restores skidding resistance but does not contribute to the strength of the pavement. However, surface dressing is generally not a suitable treatment for urban areas (because of the requirement to exclude pedestrian traffic during spraying until the binder is stabilised). Thin wearing coats and proprietary micro-asphalt offer an alternative (but more expensive) treatment and these can be applied in urban areas. Depending on the traffic which the road is carrying and the increased stresses due to road curvature and braking and traction effects surface dressings can last between five and ten years. The treatment can then be repeated two or possibly three times before the build up of binder and chippings becomes unstable or the underlying layers become brittle due to age. At this stage it becomes necessary to resurface or overlay the road.

If the appropriate treatment is not carried out timeously ingress of water through the surface of the road can lead to a relatively rapid deterioration of the carriageway, severe loss of pavement strength, disintegration of the surface and road base, resultant slump and distortion under traffic loading and ultimately to the complete break up of the carriageway. At this stage the only option is full reconstruction of the road with associated high costs and disruption of traffic while work is carried out.

3.1.5 Footways require to be maintained with an even and impermeable surface otherwise the ingress of water together with freezing in the winter will result in structural deterioration. An asphalt footway should be serviceable for 15 to 20 years before resurfacing or reconstruction is required.

3.1.6 A significant factor in the deterioration of both carriageways and footways is disturbance by public utility openings the reinstatement of which cause inherent weakness of the structure.

3.1.7 Bridges and culverts are an essential part of the road network and require frequent inspection and adequate funding to allow planned programmes of repair and strengthening if road closures are to be avoided.

- 3.1.8 Retaining walls which support the road verge and carriageway are an increasing maintenance burden. Retaining walls are predominantly dry stone dykes in the rural areas many of which are beyond their useful life and susceptible to the increased volume and weight of today's traffic.

3.2 Whole-Life Cycle Funding Requirements

3.2.1 Scotland-wide Perspective

3.2.1.1 SCOTS Survey

In 1997 SCOTS (The Society of Chief Officers of Transportation for Scotland) carried out a survey via their Funding and Procurement Group (the Director of Roads Chairs this Group) of the funding requirements of all Scottish Councils for road network infrastructure maintenance.

This survey highlighted that there was significant under-funding of carriageway maintenance across all Councils in Scotland. The total annual shortfall on a Scotland-wide basis between the funding required for carriageway maintenance and the allocation provided by the Scottish Executive was estimated at £26.4M.

3.2.1.2 ALARM Survey

Since then (ie for 1997/98 and subsequent financial years) the Refined Bitumen Association (RBA) and the Asphalt Industry Alliance (AIA) have carried out surveys on a UK-wide basis with the findings reported separately for England, Scotland, Wales, London and all UK.

The National Annual Local Authority Roads Maintenance (ALARM) Survey 2001 is attached as an appendix to this report (Appendix 1).

The key findings of these annual surveys are summarised in tabular form at the end of the 2001 report. These tables show a rapid and continuing widening of the gap between the funding available and the funding required for carriageway maintenance. The key statistics for the whole of Scotland for the shortfall in the road structural maintenance budget are summarised below:-

Annual Local Authority Road Maintenance (ALARM) Survey
Annual Funding Shortfall for Carriageway Maintenance
All Scotland

| Survey Year | Financial Year | Total Funding Shortfall | Average per Authority |
|--------------------|-----------------------|--------------------------------|------------------------------|
| 1998 | 1997/1998 | £78M | £2.45M |
| 1999 | 1998/1999 | £102M | £3.20M |
| 2000 | 1999/2000 | £129M | £4.00M |
| 2001 | 2000/2001 | £223M | £7.20M |

3.2.2 Angus Council Perspective

Surveys of carriageways and footways to determine the funding required to restore the network to a condition whereby an annual Economic Maintenance Regime (EMR) could be initiated are detailed in Table 2 below.

TABLE 2

STRUCTURAL REQUIREMENTS CARRIAGEWAYS AND FOOTWAYS

Rural Roads

A & B Class Roads (Rural)

| Residual Life (yrs) | % of Network | Total Length | Treatment Required | % Requiring Treatment | Treatment Length | Rate/km £(000's) | Total (£000's) |
|------------------------------|--------------|--------------|---------------------|-----------------------|------------------|------------------|----------------|
| > 20 | 54 | 235 | Nil | | 0 | | 0 |
| 5 to 20 | 20 | 87 | Overlay | 25 | 22 | 50 | 1100 |
| 0 to 5 | 26 | 113 | Reconst/ Recycle | 100 | 113 | 250 | 28250 |
| Total A & B Roads | | | | | | | 29350 |

C & Unclassified Roads (Rural)

| Residual Life (yrs) | % of Network | Total Length | Treatment Required | % Requiring Treatment | Treatment Length | Rate/km £(000's) | Total (£000's) |
|---|--------------|--------------|---------------------|-----------------------|------------------|------------------|----------------|
| > 20 | 54 | 540 | Nil | | 0 | | 0 |
| 5 to 20 | 20 | 200 | Overlay | 25 | 50 | 35 | 1750 |
| 0 to 5 | 26 | 260 | Reconst/ Recycle | 100 | 260 | 75 | 19500 |
| Total C & Unclassified Roads | | | | | | | 21250 |

Urban Roads

Urban Carriageways and Footways

| | Carriageway Treatment Cost (£000's) | Footway Treatment Cost (£000's) | Total (£000's) |
|----------------------|-------------------------------------|---------------------------------|----------------|
| Arbroath | 1935 | 676 | 2611 |
| Brechin | 528 | 20 | 548 |
| Carnoustie | 1109 | 345 | 1454 |
| Forfar | 753 | 244 | 997 |
| Kirriemuir | 240 | 52 | 292 |
| Monifieth | 460 | 213 | 673 |
| Montrose | 1335 | 473 | 1808 |
| Villages | 1485 | 593 | 2078 |
| Total | 7845 | 2616 | 10461 |
| Overall Total | | | £61m |

184km of the total 446 km of A & B class roads were tested by deflectograph vehicle which determines the residual life of the road pavement. Further deflectograph testing will be carried out in due course on the remainder of the network to obtain information for the United Kingdom Pavement Management System (UKPMS) which the Department is about to procure. In the meantime the results of the first phase of testing have been extrapolated to the remainder of the network.

Urban streets and footways have been surveyed by maintenance engineering staff using a system of course visual inspection which rates and prioritises the lengths inspected.

The conclusion of the surveys indicates a required spend for carriageway and footway structural maintenance of **£61m** to restore the network to a condition which would allow an economic maintenance regime to be effected.

This level of expenditure is obviously outwith the scope of the funding available to Angus Council and would require a significant injection of additional funding from the Scottish Executive to address this 'backlog' problem combined with a further requirement for significant additional year-on-year funding to allow the Angus road network to be maintained at minimum whole-life costs in the long term.

Clearly, it is unrealistic to expect an immediate injection of cash of this magnitude in the current economic climate. However, without the investment required to restore the road network to a condition such that the average residual life is half of the normal working life, the cost of maintaining the road network in a safe and serviceable condition will continue to increase year-on-year. Roads at the end of their working life are no longer susceptible to relatively low cost maintenance treatments such as re-surfacing and surface dressing. Instead, much more expensive treatments such as re-construction, re-cycling and major patching are required.

The Scottish Executive must address this funding predicament in the forthcoming 15 year Transport Strategy for Scotland. However, there is a distinct danger that the Scottish Executive will focus on 'new' and 'integrated' transport initiatives without providing adequately for the existing road network.

- 3.2.3 An Economic Maintenance Regime (EMR) for the carriageway network is shown in Tables 3A and 3B below indicating a requirement of £3.9M to maintain the carriageway network at the minimum whole-life cost in the long term. The equivalent cost for footways is estimated at £1.1M giving a combined total for carriageways and footways of £5M.

TABLE 3A – FREQUENCY OF SURFACE TREATMENT

| Classification | Urban | | Rural | |
|----------------|--|------------------|---|--|
| A & B | Intermediate treatment (wearing course) Resurface | 20 yrs 40 yrs | Intermediate treatment (surface dressing) Intermediate treatment (wearing course) Intermediate treatment (surface dressing) Wearing Course/resurface | 10 yrs 20 yrs 30 yrs 40 yrs |
| C | Intermediate treatment (wearing course) Resurface | 25 yrs 50 yrs | Intermediate treatment (surface dressing) Intermediate treatment (surface dressing) Intermediate treatment (wearing course) Intermediate treatment (surface dressing) Intermediate treatment (surface dressing) Wearing Course/resurface | 10 yrs 20 yrs 30 yrs 40 yrs 50 yrs 60 yrs |
| Unclassified | Intermediate treatment (wearing course) Resurface | 30 yrs 60 yrs | Intermediate treatment (surface dressing) Intermediate treatment (surface dressing) Intermediate treatment (surface dressing) Wearing course | 10 yrs 20 yrs 30 yrs 40 yrs |

TABLE 3B – WHOLE-LIFE CYCLE FUNDING REQUIREMENT FOR ANGUS COUNCIL FOR CARRIAGEWAY MAINTENANCE

| Classification | Length (km) | Width (km) | Cycle Period yrs | Maintenance Cycle | Total EMR Cost (£m) | Cost for EMR Cycle per Year (£m) |
|--------------------|-------------|------------|------------------|--|---------------------|----------------------------------|
| A & B - Urban | 63 | 7.3 | 40 | yr 20 (£10/m ²) yr 40 (£12/m ²) | 10.12 | 0.25 |
| A & B - Rural | 384 | 7.0 | 40 | yr 10 (£2/m ²) yr 20 (£8/m ²) yr 30 (£2m ²) yr 40 (£9/m ²) | 56.44 | 1.41 |
| C Urban | 33 | 6.5 | 50 | yr 25 (£10/m ²) yr 50 (£12/m ²) | 4.72 | 0.10 |
| C Rural | 450 | 5 | 50 | yr 10 (£2/m ²) yr 20 (£2/m ²) yr 30 (£8m ²) yr 40 (£2/m ²) yr 50 (£2/m ²) yr 60 (£9/m ²) | 56.25 | 0.95 |
| Unclassified Urban | 287 | 5 | 60 | yr 30 (£10m ²) yr 60 (£12m ²) | 31.57 | 0.53 |
| Unclassified Rural | 548 | 3.5 | 40 | yr 10 (£2/m ²) yr 20 (£2/m ²) yr 30 (£2m ²) yr 40 (£8/m ²) | 26.85 | 0.67 |
| Total | | | | | 185.95 | 3.90 |

For carriageways alone in Angus £3.9M is required annually to provide an EMR cycle.

The National Annual Local Authority Roads Maintenance (ALARM) Survey 2001 which is appended to this Report (Appendix 1) details underfunding issues which are prevalent across the UK.

It is possible through whole life costing methodology (based on the life expectancy and the end of life replacement cost) to estimate the average annual funding requirement necessary to maintain the existing roads infrastructure (no allowance for new provision) under an EMR. These costs for Angus Council are shown in Table 4. It can be seen that the average annual funding requirement for the major infrastructure items (carriageways, footways, bridges, lighting, traffic signals is £6.416M.

TABLE 4

ANNUAL FUNDING REQUIREMENT FOR INFRASTRUCTURE RENEWAL AND REPLACEMENT UNDER AN ECONOMIC MAINTENANCE REGIME (EMR)

| | |
|--|---------------------|
| | £'000 |
| Carriageways | 3,900 |
| Footways | 1,100 |
| Bridges | 460 |
| Retaining Walls | 202 |
| Street Lighting * | 704 |
| Traffic Signals and Pedestrian Crossings | 50 |
| Total | <u>6,416</u> |

*A separate report (Report No 686/01) giving a detailed analysis of the condition of Street Lighting Infrastructure and associated funding implications is being presented to this Committee.

The funding currently available for the maintenance and replacement of the major infrastructure items is detailed in Table 5.

TABLE 5

FUNDING AVAILABLE IN 2001/02 FOR THE MAINTENANCE AND REPLACEMENT OF MAJOR INFRASTRUCTURE ITEMS

| A. Funding Source | £'000 |
|--|---------------------------|
| <u>Revenue</u> - <u>Structural and Cycling Maintenance</u> | |
| Reconstruction | 0 |
| Overlay | 0 |
| Surface Dressing | 0 |
| Bridge Maintenance | 40 |
| Retaining Walls | 50 |
| Remedial Earthworks | 55 |
| Patching | 501 |
| Footways/Cycle Tracks | <u>237</u> |
| Sub-Total | <u>883</u> |
| <u>Revenue</u> - <u>Traffic Signals</u> | 25 |
| <u>Revenue</u> - <u>Street Lighting</u> | 273 |
| <u>Capital</u> | |
| Bridge Repairs | 49 |
| Bridge Strengthening | <u>49</u> |
| Sub-Total | <u>98</u> |
| <u>CFCR</u> | |
| Skid Resistance | 450 |
| <u>Roads and Transport</u> <u>Renewal and Repair Fund</u> | |
| Bridge Repairs | 80 |
| Street Lighting Renewals | 275 |
| Carriageway Strengthening/Overlay/Resurfacing | 258 |
| Footway Reconstruction | <u>50</u> |
| Sub-Total | <u>663</u> |
| Total | <u><u>2392</u></u> |

| B. Roads Infrastructure Items | | £'000 |
|---|------------------|--------------------|
| <u>Carriageways and Footways</u> | | |
| Remedial Earthworks | (Revenue) | 55 |
| Patching | (Revenue) | 501 |
| Footways/Cycle Tracks | (Revenue) | 237 |
| Skid Resistance | (CFCR) | 450 |
| Carriageway Strengthening/overlay/resurfacing | (R&R) | 258 |
| Footway Reconstruction | (R&R) | <u>50</u> |
| | Sub Total | <u>1551</u> |
| <u>Bridges</u> | | |
| Bridge Maintenance | (Revenue) | 40 |
| Bridge Repairs | (Capital) | 49 |
| Bridge Strengthening | (Capital) | 49 |
| Bridge Repairs | (R&R) | <u>80</u> |
| | Sub Total | <u>218</u> |
| <u>Retaining Walls</u> | (Revenue) | 50 |
| <u>Street Lighting</u> | | |
| Maintenance | (Revenue) | 273 |
| Street Lighting Renewals | (R&R) | <u>275</u> |
| | Sub Total | <u>548</u> |
| Traffic Signals | (Revenue) | 25 |
| | Total | <u>2392</u> |

The imbalance between the funding available in the 2001/02 financial year (£2.392M) and the funding required for renewal and maintenance of the Road Network Infrastructure on an EMR basis (£6.416M) is therefore approximately £4M.

4 FINANCIAL IMPLICATIONS

- 4.1 It is currently estimated that the funding required to bring the standard of carriageway construction and surfacing up to a condition where an annual Economic Maintenance Regime could be effected is £61M. The Scottish Executive must address this serious backlog underfunding issue affecting all of Scotland's Councils.

- 4.2 The annual cost of providing an Economic Maintenance Regime for the major elements of the road network infrastructure is estimated at £6.4M.
- 4.3 The imbalance between the funding available and the funding required for renewal and repair of the road network infrastructure is currently £4M. This requires a significant additional injection of funding, year-on-year to allow the roads network infrastructure to be maintained on a sustainable basis.
- 4.4 Angus Council has applied substantial endeavours to direct funds towards addressing the current condition of the road network infrastructure whilst also progressing major projects such as the A92 (£2.080M in 2001/02), and in overall terms for 2001/02 some £0.6M or so budget provision above Scottish Executive overall spend indicators was assigned by the Council.
- 4.5 The current allocations of funding for Roads programmes will be subject to adjustment from a further proposed contribution to the Roads and Transport Renewal and Repair Fund following completion of the Council's 2000/01 Final Accounts.

5 HUMAN RIGHTS IMPLICATIONS

There are no human rights implications arising from the proposals in this report.

6 CONSULTATION

The Chief Executive, the Director of Law and Administration and the Director of Finance have been consulted in the preparation of this Report.

7 CONCLUSION

There is a shortfall between the current level of expenditure on roads infrastructure maintenance and the funding required for an Economic Maintenance Regime of approximately £4M. Unless this imbalance is addressed year-on-year it will not be possible to apply appropriate economic maintenance treatments timeously. There will then be a consequential accelerated deterioration of the roads infrastructure which will require high cost replacement to restore the public roads in Angus to a serviceable condition.

Without substantial additional funding from the Scottish Executive for the maintenance of Local Authority roads it is difficult to see how this bleak scenario will be improved upon. However, in the meantime all endeavours will continue to be made to keep the roads in Angus safe and serviceable within the available financial resources.

Dr Bob McLellan
DIRECTOR OF ROADS

NOTE

Report No 1211/00 - National Road Network Condition Assessment – Angus Council Roads Committee - 23 November 2000.

Report No 1236/00 - Skidding Resistance – Angus Council Roads Committee - 23 November 2000.

Appendix 1 Annual Local Authority Road Maintenance (ALARM) Survey 2001

Appendix 2 Performance Information for Scottish Councils Data Compendium 1999/2000 – Accounts Commission.

DG/AS

21 May 2001

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