

ANGUS COUNCIL

ROADS COMMITTEE

14 JUNE 2001

STREET LIGHTING INFRASTRUCTURE CONDITION

REPORT BY THE DIRECTOR OF ROADS

ABSTRACT

This Report outlines the condition of the Council's Street Lighting Infrastructure together with the overall national position and details the associated funding requirements to facilitate the renewal of obsolete apparatus within required timescales.

1 RECOMMENDATIONS

It is recommended that the Committee agree:-

- (i) to note that the funding made available by the Scottish Executive for street lighting requirement is wholly inadequate to allow desirable whole life-cycle maintenance;
- ii) to note the UK situation with regard to the deterioration of the street lighting infrastructure.
- iii) to note the Angus situation, which compares well to many other Scottish Local Authorities, but nevertheless largely mirrors the Scottish trend of under-funding of lighting column renewals via insufficient financial allocation from the Scottish Executive has resulted in a high degree of obsolescence and inefficiency existing in many street lighting installations;
- iv) to note that the "Design Life" of a street lighting installation is 25 years;
- v) to note the funding required to allow the renewal of street lighting apparatus at the end of its normal working life.

2 INTRODUCTION

2.1 National Background

The Institution of Lighting Engineers published an information booklet in 1997 titled "Street Lighting - Protecting A Vital Asset" which detailed the benefits accrued from good street lighting schemes and detailed the Institution's concerns regarding the poor state of the existing street lighting infrastructure in Britain.

It reads as follows: -

2.1.1 **“The Benefits**

The nation’s street lighting systems provide a vital night-time public service essential for modern living.

2.1.2 **Good street lighting serves: -**

- To reduce night-time road accidents by, on average, 30%
- To deter criminal acts of street attack and vandalism
- To reduce public anxiety at night
- To enhance the night-time environment - a positive aid to commercial, leisure and tourism activities

2.1.3 **The National Network**

In England, Scotland and Wales there are approximately 6 million street lighting units (excluding illuminated bollards, road signs, traffic lights etc.). This figure represents a national asset worth around £2.5 billion at 1997 prices.

2.1.4 **Useful Life**

2.1.4.1 **Lighting Columns**

A useful life of 25 years is a realistic target for mild steel and concrete columns.

Columns made from these materials represent around 90% of all columns installed in the UK.

2.1.4.2 **Luminaires**

The useful life of modern, high performance luminaires (excluding lamp replacement) is 25 years and during this period, the performance will be maintained at close to the original. A change after this time is advantageous because of advances in technology.

The light output of older type road lighting luminaires begins to fall after installation. Light output from luminaires installed 25-30 years ago has been measured at values as low as 30-40% of their original design performance levels.

Today's luminaires perform better and for longer thanks to improved manufacturing techniques and modern technology. Proper maintenance and cleaning of luminaires will ensure a continuing high light output.

2.1.5 **The Crisis**

The constraint of local authority expenditure via insufficient financial support from the Scottish Executive in recent years has resulted in a severe under investment in street lighting replacement programmes.

Cost pressures on local authority maintenance budgets have exacerbated the situation to the point where considerable proportions of lighting equipment, particularly on residential roads, are now operating well beyond their economic life.

In consequence, the condition of much of this equipment has become increasingly inefficient in its use of energy and is the direct cause of higher maintenance and electricity costs.

Recent surveys have highlighted the dilapidated state of much of the nation's street lighting equipment. It is estimated that, within the next decade, the replacement of up to 2 million columns will be essential as their structural and mechanical safety becomes uncertain.

With regard to luminaires, investigations have revealed that 36% of all traffic route luminaires and nearly 45% of residential road luminaires have been in service for at least 25 years. This fact alone indicates the high degree of obsolescence and inefficiency existing in many of our street lighting installations. This inefficiency means lower levels of lighting, wasted energy and increased operating costs.

2.1.6 **The Remedy**

How can the nation's street lighting equipment be protected? The remedy is simple. Street lighting must be regarded as a major national asset which can improve community safety by cutting night-time street crime and reducing people's fear of it. It should not be regarded as merely an aid to traffic safety.

How much money is involved nationally? With an average useful life of 25 years, £100 million per year is needed on a UK wide basis to replace obsolete and deteriorated installations.

Current expenditure is only around £18 million per year! The outcome of the present equation is a rapidly declining standard of street lighting for the community at large.

2.1.7 **What are the other advantages of modern technology?**

New equipment does not deteriorate so quickly.

New equipment is more energy efficient.

New equipment is more vandal resistant.

New equipment puts light where it is needed and avoids light spill.

In the short term new equipment will ensure an effective public lighting service. In the long term, by implementing rolling capital replacement programmes, the present situation will not repeat itself. Proper maintenance regimes will also reduce the capital cost of public lighting.

Good safe street lighting saves lives and money. We must invest now."

2.2 **The Situation in Angus**

In conjunction with the above the Director of Roads has also been concerned for some time about the overall condition of the street lighting infrastructure within Angus and this matter was investigated whilst carrying out the New Lighting Best Value Service Review during 1999/2000.

This Review's Service Improvement Plan included the following action point:-

"Carry out annual checks to determine what the "life expectancy" of the lighting column stock is in relation to the column replacement programme to determine if year-on-year funding levels are adequate to permit column replacement programmes to be carried out to meet manufacturers' recommended design life".

In order to determine if funding levels are adequate the following factors will be looked at in detail in this Report:-

- i) Approximate age of the existing street lighting stock.
- ii) Expenditure on lighting column renewals.
- iii) Lighting columns replaced expressed as a percentage of the total number of columns
- iv) Increase of the street lighting infrastructure.

3 **DETAILS**

3.1 **Approximate age of the existing street lighting stock**

The street lighting infrastructure in Angus consists of approximately 16000 lighting columns. These include 9500 steel columns, 4000 concrete columns and 2500 miscellaneous columns i.e., aluminium, glass fibre etc. The best information available shows that approximately 7000 street lighting columns are less than 25 years old, 8000 lighting columns are between 25 years and 50 years old and 1000 lighting columns are over 50 years old.

3.2 **Expenditure on Lighting Column Renewals**

Historically, lighting column renewals have been funded from the Council's Capital Budget under the following work categories:-

- Work associated with Hydro Electric alterations i.e., undergrounding of overhead cable;
- Work associated with footway/carriageway reconstruction and resurfacing work
- Provision of lighting in unlit areas;
- General improvements - updating and replacement work due to equipment degradation and obsolescence

Recently, street lighting renewals have been funded from the Roads and Transport Renewal and Repair Fund and minor alterations have been funded from the Street Lighting Revenue Budget.

Table 1 below shows the expenditure on lighting column renewals from 1990/91 to 2000/01.

Table 1 – Annual Expenditure on Lighting Column Renewals

Financial Year	Street Lighting Capital	Street Lighting CFCR	Street Lighting R + R	Footway Associated	Footway R + R	Total
1990/91	£170,058	N/A	N/A	£130,173	N/A	£300,231
1991/92	£176,257	N/A	N/A	£201,432	N/A	£377,689
1992/93	£92,072	N/A	N/A	£245,312	N/A	£337,384
1993/94	£186,694	N/A	N/A	£94,128	N/A	£280,822
1994/95	£428,360	£71,327	N/A	£214,902	N/A	£714,589
1995/96	£262,590	£85,042	N/A	£267,848	N/A	£615,480
1996/97	£65,814	£148,835	N/A	£104,800	N/A	£319,449
1997/98	£352,258	N/A	N/A	£144,095	N/A	£496,353
1998/99	£103,253	£165,023	£280,701	£134,937	£69,868	£753,782
1999/00	N/A	N/A	£176,938	£86,698	£38,419	£302,055
2000/01	£100,000	N/A	£408,326	£27,431	N/A	£535,757
	£1,937,356	£470,227	£865,965	£1,651,756	£108,287	£5,033,591
				Annual Average		£457,599

It can be seen from the above that on average Angus Council and its predecessor, TRC, have spent approximately £458,000 per year on lighting column renewals.

3.3 Lighting Columns Replaced expressed as a percentage of the total number of columns

It was agreed at the Society of Chief Officer's of Transportation In Scotland (SCOTS) Lighting Group meeting on 24th June 1998 that due to the fact that street lighting was to be the subject of Service Reviews as part of each Authority's commitment to Best Value, an integral part of these Reviews should be the comparison of each Authority's service with others. A questionnaire was issued to allow this comparison to be made.

The questionnaire was sent to all 32 Scottish Authorities and a total of 22 questionnaires were returned providing a snap shot of each Council's activities for financial year 1997/98.

One of the questions related to the number of lighting columns replaced by each Council on an annual basis as a percentage of their of lighting column stock and the results are detailed in Table 2.

Table 2 – Column Replacement Achieved by Scottish Councils in 1997/98

Council I.D. No.	No. of Lighting units	No. of Cols. Replaced Funded from Revenue	No. of Cols. Replaced Funded from Capital	Total No. Of Cols. Replaced per Year	% of Cols. Replaced per Year
1	41500	200	500	700	1.69
2	34800	0	350	350	1.01
3	23000	120	300	420	1.83
4	21000	75	250	325	1.55
5	14600	0	90	90	0.62
6	18000	200	180	380	2.11
7	5540	0	85	85	1.53
8	17000	300	200	500	2.94
9	18000	280	140	420	2.33
10	21000	250	400	650	3.10
11	15000	100	150	250	1.67
12	18000	115	400	515	2.86
13	60000	800	0	800	1.33
14	18000	150	0	150	0.83
15	28000	50	220	270	0.96
16	57000	120	500	620	1.09
17	52000	200	0	200	0.38
18	64700	250	450	700	1.08
19	14700	35	104	139	0.95
20	3686	0	40	40	1.09
21	13000	50	100	150	1.15
22	13100	100	100	200	1.53
TOTALS	571626			7954	
				Average %	1.39

It can be seen from the previous Table that Angus Council (I.D. Number 12) came third out of the 22 Authorities who completed the questionnaire. It should be appreciated however that this frequency of column renewal is still insufficient to allow for renewal within the Design Life of the column stock.

It should also be noted that "number of lighting units" includes both lighting columns and illuminated sign columns hence the increase from 16000 to 18000 units in Angus. As every Council returned information on the basis of "number of lighting units" the calculation to determine the percentage of columns replaced every year is contaminated however the results still show that none of the Councils in Scotland who completed the questionnaire are achieving renewal of lighting columns within the Design Life of their column stock.

It is accepted that the above details pertain to a one-off snap shot of each Council's activities for 1997/98 however future reports to Committee will be able to report on each Council's column renewal programme on an annual basis as Audit Scotland have included the following performance indicator in the Statutory Performance Indicators for 2000/01.

"Indicator 5b lighting columns replaced expressed as a percentage of the total number of columns".

This indicator includes planned replacement programmes funded through either Capital or Revenue but does not include new columns in unlit areas.

3.4 **Increase of street lighting infrastructure**

It should be appreciated that existing street lighting schemes are renewed on a priority basis taking into account deteriorating structural integrity and the night-time performance of the schemes.

Generally, any street lighting scheme installed prior to the early 1980's does not comply with the current BS 5489 for lighting installations and this is reflected in the fact that when installing new street lighting schemes more columns are installed than are removed from site.

To emphasise this fact, whilst carrying out the Electrical Testing of lighting columns in Monifieth (Roads Committee December 1998, Report Number 1247/98) it was calculated that 70% of street lighting in Monifieth was sub-standard due to the excessive design spacing of the existing columns and it was anticipated that the existing number of street lighting columns on these sub-standard schemes would have to be increased from 802 to 1218 in order to meet the current BS 5489 for Street Lighting, an increase of 52%. While Monifieth is not typical of the standard of street lighting throughout the rest of Angus it is estimated that an increase of 20-30% in the number of street lighting columns would be required to bring the lighting schemes up to current standards in the other burghs. This would have the impact of increasing the street lighting columns in Angus from the current 16,000 base to approximately 19,000 to 21,000.

To highlight the benefits of providing street lighting to BS 5489 it should be noted that whilst carrying out Customer Satisfaction Surveys as part of the New Lighting Best Value Service Review during 1999/2000, 629 questionnaires were issued to residents adjoining new works.

An exceptionally high number, 322, questionnaires were returned and it was determined that:-

- i) 65% stated that the new street lighting scheme was excellent
- ii) 27% stated that the new street lighting scheme was adequate
- iii) 66% stated that they felt safer since the street lighting was upgraded
- iv) 70% stated that they felt that the new street lighting had enhanced their residential area

It should also be noted that at the present time there is correspondence on file from residents, Community Councils, Elected Members etc., requesting improved street lighting amounting to some £500,000.

The information pertaining to columns removed/columns installed in Angus is detailed in Table 3 below.

Table 3 – Increase in number of lighting columns as a result of street lighting renewal programmes

Year	Columns Removed	Columns Installed	Increased Number Of Columns	Percentage Increase
1990/91	166	327	161	+96%
1991/92	120	367	247	+206%
1992/93	192	389	197	+103%
1993/94	153	332	179	+117%
1994/95	288	549	261	+91%
1995/96	256	438	182	+71%
1996/97	107	201	94	+87%
1997/98	238	470	232	+97%
1998/99	437	717	280	+64%
1999/00	261	405	144	+55%
2000/01	236	404	168	+71%
Total	2454	4599	2145	+87%
Average	223	418	195	+87%

The above figures for columns installed exclude new lighting installed in private developments (at the developer's cost) adopted for on-going maintenance by the

Council, but include new lighting provided by the Council (for example in unlit areas or as extensions to existing schemes).

Obviously, this increase in the number of lighting columns will create an additional burden on the Council and must be allowed for in any long-term strategy for column renewal.

Finally, it should be noted that the Director of Roads is at present carrying out non-destructive testing of 150 steel lighting columns in Arbroath which are approximately 25 years old to determine if they are still "fit for purpose". This testing will be extended to cover other areas of Angus and once the results of the tests are collated the findings will be reported to future Roads Committees.

4. FINANCIAL IMPLICATIONS

- 4.1 The funding made available by the Scottish Executive for street lighting purposes is wholly inadequate to allow desirable whole life cycle maintenance.
- 4.2 On average Angus Council and its predecessor have installed 418 lighting columns per year at a cost of £458,000 per annum, an average of £1100 for every column installed.
- 4.3 Comparing the average number of obsolete columns removed per year, 223, with the existing total number of lighting columns in Angus (approximately 16,000) it would take approximately 72 years ($16,000 \div 223$) to replace the existing street lighting stock in Angus at the current rate of renewal.
- 4.4 Based on the manufacturer's Design Life of 25 years, Angus Council should be replacing approximately 640 columns per year ($16,000 \div 25$).
- 4.5 The Angus situation appears to compare well to many other Scottish local authorities but nevertheless largely mirrors the national underfunding position.
- 4.6 To allow this Design Life renewal cycle Angus Council would have to allocate some £704,000 ($640 \times £1,100$) to lighting renewals each year. The current budget for street lighting renewals in 2001/02 is £275,000. (However this allocation will be 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).
- 4.7 Unfortunately, the above calculation is based on all the existing street lighting infrastructure being within its Design Life at present, however, as stated previously approximately 9,000 lighting columns are already more than 25 years old.
- 4.8 The above calculations are also based on the existing number of lighting columns. However, as exemplified in Monifieth, when providing adequate lighting to the current BS 5489 the number of new columns required could be some 20 - 30% more than the number of existing columns.

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 Finance and the Director of Law and Administration have been consulted in the preparation of this report.

7 CONCLUSION

Street Lighting systems provide a vital night time public service which is essential for modern living. The current levels of funding available to the Council are inadequate to allow street lighting infrastructure to be replaced at the end of its design life.

Dr Bob McLellan
DIRECTOR OF ROADS

NOTE:

No background papers, as defined by Section 50D of the Local Government (Scotland) Act 1973 (other than any containing confidential or exempt information) were relied on to any material extent in preparing the above Report.

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24 May 2001