

**REPORT TO:** Policy and Performance Review Committee

**MEETING DATE:** 21 February 2018

**BY:** Depute Chief Executive (Partnerships and Community Services)

**SUBJECT:** Roads Asset Management - Annual Status and Options

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## **1. PURPOSE**

- 1.1 This report presents a summary of the council's road assets as of 1 April 2017. It:
- Describes the status of the asset, its current condition, and performance;
  - Defines the value of the assets;
  - Details the service that the asset and current budgets are able to provide;
  - Presents the options available for the future.
- 1.2 In accordance with the Chartered Institute of Public Finance and Accountancy (CIPFA) Code of Practice on Transport Infrastructure Assets, road assets are split in to 6 distinct Asset Groups: Carriageways; Footways and Cycleway; Street Lighting Status; Structures; Traffic Management Status and Street Furniture.
- 1.3 This report advises on carriageways, footways, street lighting and Traffic Management Systems which are referenced in Appendix A - Status and Options Report 2018. No data is available for Structures and Street Furniture presently.

## **2. RECOMMENDATIONS**

- 2.1 To note the content of the report and operational proposals.

### **3. BACKGROUND**

- 3.1 East Lothian Council in conjunction with the Society of Chief Officers for Transportation Scotland (SCOTS) have commissioned Atkins to assist in the development of an Asset Management Framework to deliver a structured approach to Roads Asset Management Planning, in line with Central Governments financial reporting requirements being compliant with International Financial Reporting Standards (IFRS) and meets the needs of Whole of Government Accounts (WGA).
- 3.2 This report complements the Road Asset Management Plan (RAMP). It provides information to assist with budget setting for the roads infrastructure asset groups.
- 3.3 The status of the asset group is provided in terms of current condition, investment options, outputs that are deliverable and the standards being achieved.
- 3.4 The report considers the following options:
- No investment
  - A continuance of current funding levels
  - The predicted cost of maintaining current standards
  - A 5-year increase in investment (Carriageways Only)
  - A 10-year increase in investment (Carriageways Only)
- 3.5 The report adopts the ethos of Long Term Forecasts as Road assets deteriorate slowly. The impact of a level of investment cannot be shown by looking at the next couple of years. The report includes 20 yr. forecasts to enable decisions to be taken with an understanding of their long term implications.
- 3.6 To reflect continuing budgetary pressures the report contains an assessment of the impact for each option presented. In some instances, however the level of detail of assessment is currently hindered by an absence of data. Commentary on data accuracy is provided in Appendix A.

### **3.7 Carriageways**

- 3.7.1 The carriageway long term condition trend suggests a 'steady state' picture however, the network condition has marginally deteriorated over the years. (Fig 1.2)
- 3.7.2 The cost of Planned Maintenance – corrective treatments in particular carriageway reconstruction costs are prohibitive. A preventative treatment approach should mitigate the need to invest significantly, if interventions are timed appropriately. Short term under-investment could result in major long-term expenditure necessary to rectify major defects which could have been addressed earlier.
- 3.7.3 This is borne out by the fact that current investment in the asset is decreasing, however, through prudent management of resources and an adoption of a preventative maintenance strategy, a slower deterioration of the asset is achieved.
- 3.7.4 The annualised depreciation of the asset is calculated to be £10,102,436 (Table 1.1). Current investment is £3,200,000 a shortfall of 315%. As highlighted in 3.7.3 a lower financial commitment is maintaining the condition. Effectively, the Councils investment is achieving a higher return than anticipated.
- 3.7.5 East Lothian steady state figure calculated through the SCOTS Scottish Road Maintenance Condition Survey (SRMCS) SCANNER outputs and is £2,857,000. This is the value predicted to maintain the condition of the carriageway at its current level. This value is less than current investment so infers a less optimised outturn. This value is calculated every 4 years using Road Condition Indicator (RCI) data. However due to the frequency of the survey there is a high risk of inaccuracies considering the classification of East Lothian's roads.
- 3.7.6 An analytical assessment of Carriageway Options provides a review of potential treatment strategies. It is proposed to Adopt Option 2 – Current Level of Investment.
- 3.7.7 This Option proposes that the council provides the same investment as the previous year and maintain the preventative maintenance strategy in order to best utilise the monies available.
- 3.7.8 Although this will mean an increase in the use of surface dressing and slurry treatments, negative feedback from residents is likely to be low and short lived due to the advances in materials currently used and the limited seasonal duration of the works.

### **3.8 Footways**

- 3.8.1 Footway survey data is over 5 years old and needs to be updated. A more regular assessment of the footway network condition is required to understand and monitor deterioration over the longer term. A review of our current procedures is ongoing to address this backlog of data collection.
- 3.8.2 Only 3% of footways are regarded to be Condition 4 – Major deterioration (Figure 2.2).
- 3.8.3 Investment in 2015/16 is above the steady state figure but this includes cycle / footpath improvements that have been invested on existing infrastructure. The annualised depreciation of the footway asset is calculated to be £2,302,743. (Table 2.1)
- 3.8.4 An analytical assessment of Footway Options (Section 2.1) provides a review of potential treatment strategies. It is proposed to Adopt Option 2 – Current Level of Investment.
- 3.8.5 This Option proposes that the council maintains the current level of investment and maintains the current strategy. This approach does not have the same level of long term benefits but meets current budgetary constraints. This approach will be reviewed annually and adjusted if there is acceleration in deterioration. This strategy best utilise the monies available.

### **3.9 Street Lighting**

- 3.9.1 There is currently a high growth in the street lighting asset base due to the upturn in housing land development. Approximately 2000 assets are currently in the adoption pipeline, with more to follow every year.
- 3.9.2 A significant amount of street lighting columns (36%) have exceeded their expected service life (ESL).
- 3.9.3 The majority of street lighting luminaires have either exceeded their ESL (56%) or have been made obsolescent by advancements in technologies and the industry / manufacturers move to promote low cost LED components.
- 3.9.4 Investment in the street lighting stock has increased but is well below the annualised depreciation value (ADC), leaving an annual maintenance backlog of column and luminaire renewal.
- 3.9.5 Energy costs are expected to increase despite mitigation by procurement arrangements and the installation of LED luminaires. Whole sale energy prices are determined by the marketplace, which is

influenced by the mix of power generating options, renewables, energy security, network growth, investment and regulations make the energy landscape difficult to predict. Consequently, a pessimistic bias should be catered for.

- 3.9.6 An assessment of Street Lighting Columns and Luminaire renewal options provides an overview of potential treatments and strategies. It is proposed to adopt Option 4 for Column renewal and Option 2 for Luminaire renewal.

### **3.10 Traffic Management Systems**

- 3.10.1. The Traffic Management System asset base has increased by 10% in the last 5 years.
- 3.10.2. The majority of traffic signal equipment (94%) is within their expected service life. The ones that have exceeded their expected service life have been inspected and its working condition is considered to be satisfactory.
- 3.10.3 The annualised depreciation of the traffic management system asset is calculated to be £108,800 (Table 4.1).
- 3.10.4 An assessment of Traffic Management Systems Options and provides an overview of potential strategies. It is proposed to Adopt Option 1- Current Level of Investment for Traffic Management Systems.

## **4 POLICY IMPLICATIONS**

- 4.1 None

## **5 EQUALITIES IMPACT ASSESSMENT**

- 5.1 This report is not applicable to the well-being of equalities groups and an Equalities Impact Assessment is not required.

## **6 RESOURCE IMPLICATIONS**

- 6.1 Financial – None
- 6.2 Personnel – None
- 6.3 Other – None

## 7 BACKGROUND PAPERS

7.1 None

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<b>DATE</b>	January 2018



# **ROADS INFRASTRUCTURE**

**Appendix A**

**Status and Options Report 2018**

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## 1.0 CARRIAGEWAY STATUS

### Road Length

A Class Roads	95.2 km
B Class Roads	169.4 km
C Class Roads	222.9 km
Unclassified Roads	428.7 km

### Road Condition

The condition of the Roads is measured by the Scottish Road Maintenance Condition Survey (SRMCS) that assesses parameters such as, ride quality, rut depth, intensity of cracking, texture depth and edge condition. This provides an indication of the residual life of the road structure.

The Road Condition Index (RCI) is a measure of the percentage of our roads that require attention.

Green - an RCI score <40 - where the carriageway is generally in a good state of repair;

Amber - an RCI score ≥40 and <100 - where some deterioration is apparent which should be investigated to determine the optimum time for planned maintenance treatment;

Red - an RCI score ≥ 100 - where the carriageway is in poor overall condition which is likely to require planned maintenance soon (ie within a year or so).

The RCI graph to the top left shows the trend over the last years, overall condition in Blue and poor RCI in Red.

Historically investments in Roads across the UK has been low, which has impacted on the overall condition of the Road Network.

### Road Valuation

The Gross Replacement Cost and Depreciation Values for the carriageway can be seen on the table on the right. The annualised depreciation of £10.102m represents the average amount by which the asset will depreciate in one year if there is no investment in renewal of the asset.



Figure 1.1

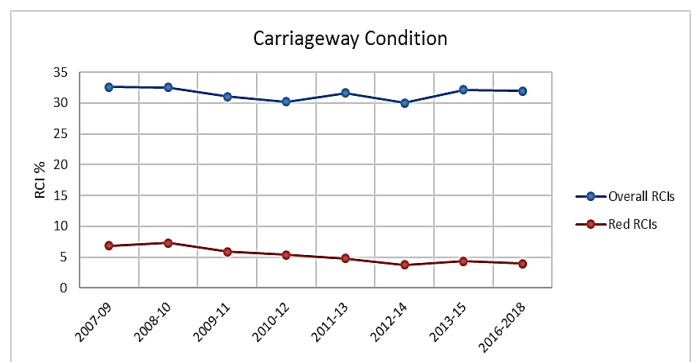


Figure 1.2

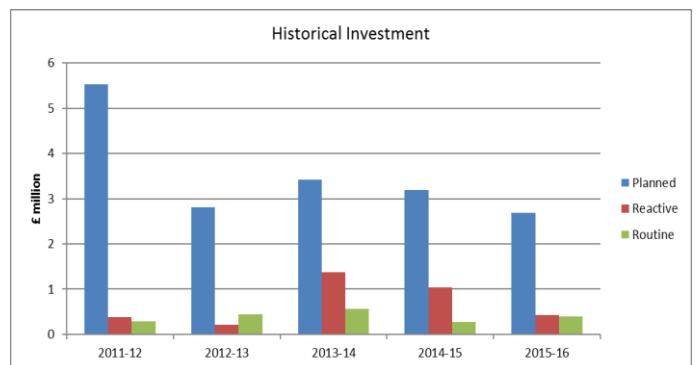


Figure 1.3

Table 1.1

Road Classification	Gross Replacement Cost	Depreciated Replacement Cost	Annualised Depreciation Cost
Principal (A) Roads (Urban)	£47,582,711	£43,667,737	£385,978
Principal (A) Roads (Rural)	£85,028,613	£75,009,945	£1,000,167
Classified (B) Roads (Urban)	£43,337,801	£40,012,034	£351,933
Classified (B) Roads (Rural)	£126,400,657	£107,739,750	£1,752,692
Classified (C) Roads (Urban)	£16,570,510	£14,953,041	£163,529
Classified (C) Roads (Rural)	£124,702,810	£104,343,120	£1,893,572
Unclassified Roads (Urban)	£204,654,245	£176,106,891	£3,348,270
Unclassified Roads (Rural)	£88,458,751	£75,362,012	£1,206,294
<b>Total</b>	<b>£736,736,098</b>	<b>£637,194,530</b>	<b>£10,102,436</b>

## 1.1 CARRIAGEWAY INVESTMENT OPTIONS

### OPTION 1 – NO INVESTMENT

Zero investment would lead to severe deterioration, with 78% of our roads requiring attention after 20-years. The volume of reactive temporary repairs would rise rapidly, year on year, as would public liability claims. Customer satisfaction levels can be expected to decrease significantly.

### OPTION 2 – CURRENT LEVEL OF INVESTMENT

An annual capital investment of £3.2m would lead to sustained deterioration, with 51% of our roads requiring attention after 20-years. The volume of reactive temporary repairs would steadily rise, year on year, as would public liability claims. Customer satisfaction levels can be expected to steadily decrease.

### OPTION 3 – STEADY STATE

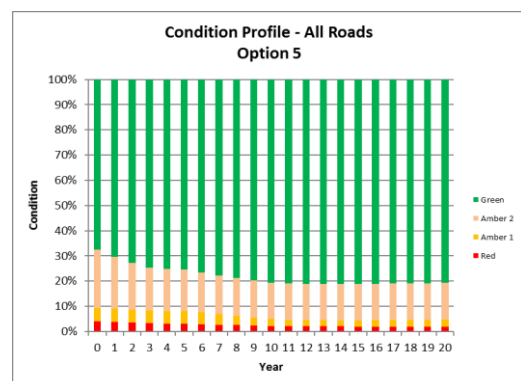
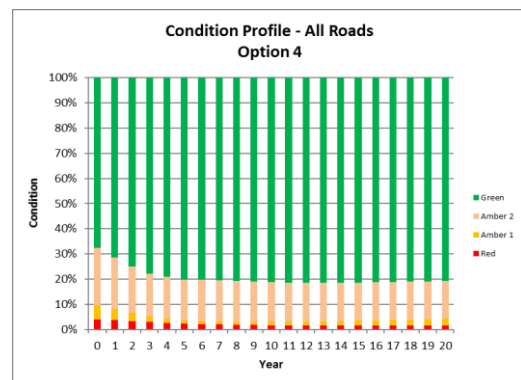
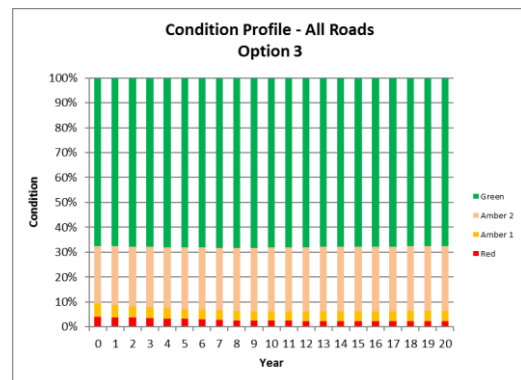
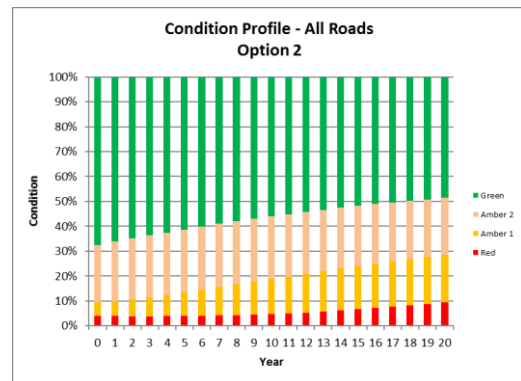
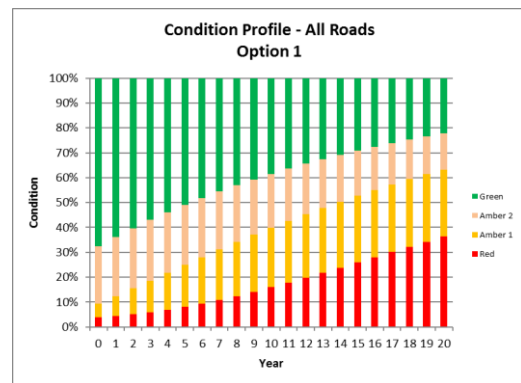
An annual £4.3m capital investment would maintain existing Road Condition of 32%. The volume of reactive temporary repairs, public liability claims and levels of customer satisfaction can also be expected to be maintained. The road will still be vulnerable to significant deterioration in the event of a severe winter.

### OPTION 4 – £33.6 INVESTMENT OVER 5 Yrs

An annual capital investment of £6.7m would lead to significant improvement, with only 19.2% of our roads requiring attention after 5 years. The volume of reactive temporary repairs would significantly reduce, as would public liability claims. Customer satisfaction levels would improve significantly.

### OPTION 5 – £49.1 INVESTMENT OVER 10 Yrs

An annual capital investment of £4.9m would lead to significant improvement, with only 19.3% of our roads requiring attention after 10 years. The volume of reactive temporary repairs would significantly reduce, as would public liability claims. Customer satisfaction levels would improve significantly.



## **1.2 CARRIAGEWAY KEY ASSET ISSUES**

### **Structural Vulnerability**

The survey indicates that 23.6 km of the rural public roads in East Lothian are of a poor condition and require immediate investigation and possible treatment. Additionally, severe winter weather conditions (impairment) would significantly accelerate damage to the carriageway network

### **Level of Investment**

The level of investment on public roads in East Lothian has not been sufficient to limit the decline in the overall condition of the network. Appropriate investment can achieve a well-managed road network (Figure 1.1).

## 2.0 FOOTWAY STATUS

### Footway Length

Bituminous	438.9 km
Slabs / Flags	15.7 km
Natural Stone	6.8 km
Concrete	20.0 km
Blocks	0 km

Total Footway Length = 481.3 km

### Footway Condition

The condition of the footway asset is obtained using the East Lothian Footway Condition Assessment Process. This is an aging asset which will have longer term investment requirement (Figure 2.1).

The condition referred to is the 2013/14 assessment. There has been no change between financial years.

The level of condition is considered good with only 3% of footways with major deterioration (Condition 4).

### Condition Band Descriptions

- Condition 1 – As New
- Condition 2 – Aesthetically Impaired
- Condition 3 – Minor Deterioration
- Condition 4 – Major Deterioration

### Footway Valuation

The Gross Replacement Cost and Depreciation Values for the footway can be seen on the table on the right. The annualised depreciation of £2.3m represents the average amount by which the asset will depreciate in one year if there is no investment in renewal of the asset.



Figure 2.1

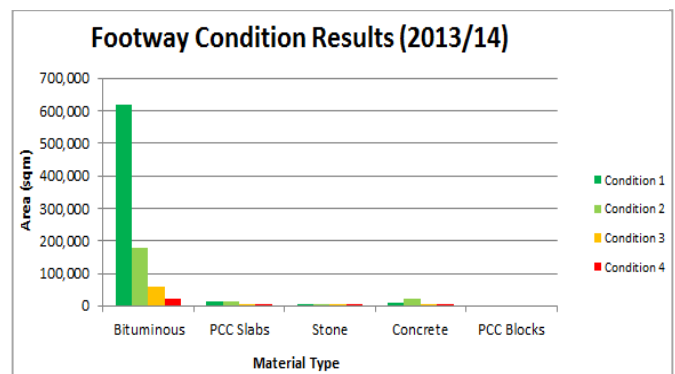


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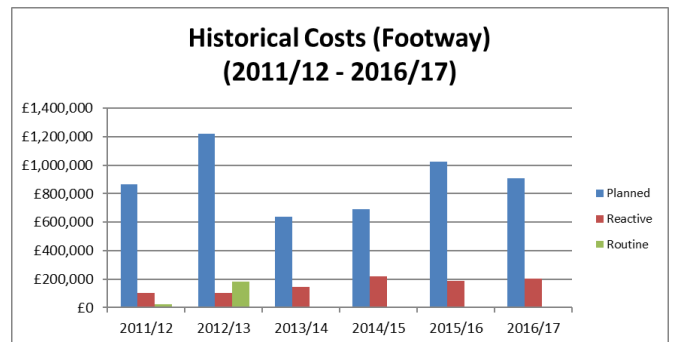


Figure 2.3

Table 2.1

Footway Valuation			
Road Classification	Gross Replacement Cost	Depreciated Replacement Cost	Annualised Depreciation Cost
Bituminous	£119,017,747	£79,707,710	£2,207,226
Slabs	£2,564,944	£1,757,407	£30,253
Stone	£4,831,852	£3,279,765	£46,339
Concrete	£3,364,368	£2,232,468	£18,925
Blocks	£0	£0	£0
<b>Total</b>	<b>£129,778,911</b>	<b>£86,977,350</b>	<b>£2,302,743</b>

## 2.1 FOOTWAY INVESTMENT OPTIONS

### OPTION 1 – NO INVESTMENT

Zero investment would lead to severe deterioration, with 23% of our footways requiring attention after 20-years. The volume of reactive temporary repairs would rise rapidly, year on year, as would public liability claims. Customer satisfaction levels can be expected to decrease significantly.

### OPTION 2 – CURRENT LEVEL OF INVESTMENT

An annual capital investment of £600k would lead to sustained deterioration, with 27% of our footways requiring attention after 20-years. The overall level of condition four reduces to 0% which is the main target of this option. The volume of reactive temporary repairs would rise rapidly, year on year, as would public liability claims. Customer satisfaction levels can be expected to decrease significantly.

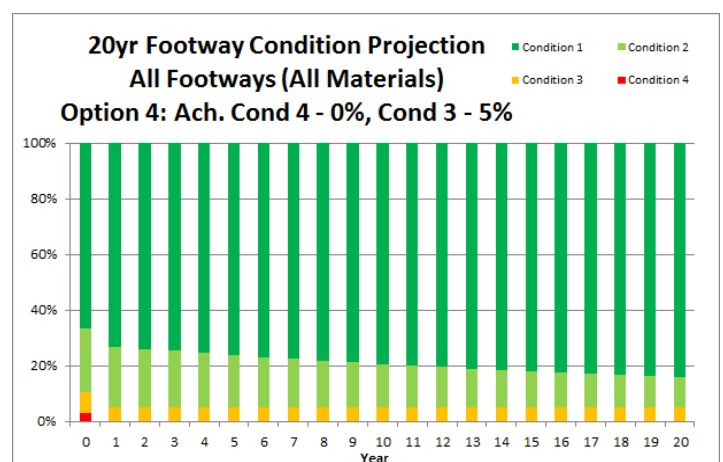
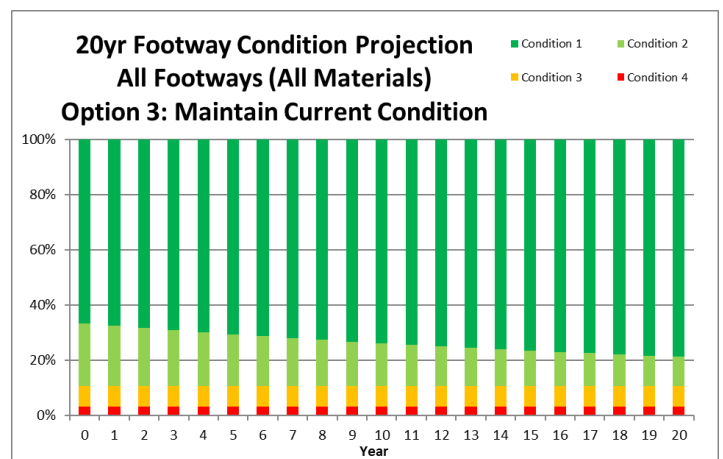
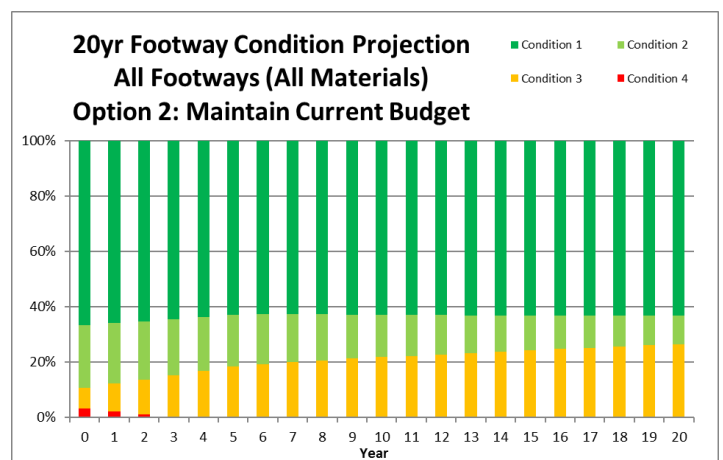
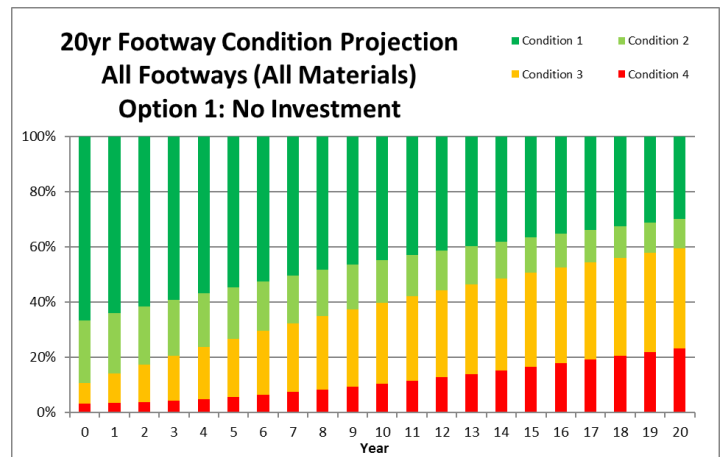
### OPTION 3 – STEADY STATE

An annual £815k capital investment would maintain existing Road Condition of 11%. The level of minor and major deteriorated (condition three and four) footways remaining the same over time. The volume of reactive temporary repairs, public liability claims and levels of customer satisfaction can also be expected to be maintained.

### OPTION 4 – MINIMISING DETERIORATION

An annual capital investment of £1.1m would reduce minor deteriorated (condition three) footways to 5% and remove all major deteriorated (condition four) footways in year one and then maintain steady state for year 20.

The volume of reactive temporary repairs would significantly reduce, as would public liability claims. Customer satisfaction levels would improve significantly.



## **2.2 FOOTWAY KEY ASSET ISSUES**

### **Investment**

The need for improvements in footways and cycleways will be necessary to enable the success of Sustainable Transport Strategies. An important aspect is to ensure the condition of the footways is acceptable and in rural areas there is a need to investigate joining up isolated sections of footway which will encourage more use of the footways.

### **Data Reliability & Priorities**

The reliability of the condition information is questionable as it is several years old and needs to be updated. The cycle of data collection needs to be formalised and rigorously followed. Accordingly, long term condition analysis is difficult and the accurate prediction models is problematic. Resourcing of the inspection regime is challenging due to conflicting service area priorities but will need to be demonstrable to ensure reliability of data.

### 3.0 LIGHTING STATUS

#### Lighting Assets

Lighting Columns	17,956
Cable Length	409 km

#### Condition

A structural testing programme is ongoing to identify columns in poor condition for replacement. An electrical test and inspection programme is also in place, which includes cable and cabinet test details and cable schematic diagrams. Cyclic inspections are carried out over a 6- to 8-year cycle.

Over 36% of our lighting columns have exceeded their service life, compared to the Scottish average of 29.4%.

Approximately 56% of lanterns exceed their expected service life.

A programme to replace or upgrade all 10,000 non-LED lanterns with LEDs over a four-year period is ongoing.

Figure 3.1 highlights a typical deterioration at the base of a lighting column.

#### Customer Satisfaction

Customer satisfaction levels are relatively high when compared to roads and footways, reaching a high of 86% in 2017.

**Gross Replacement Cost - £45.5m**



Figure 3.1

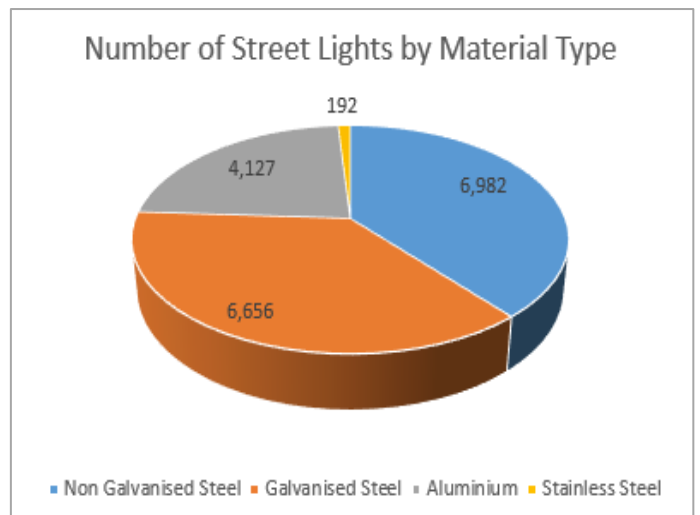


Figure 3.2

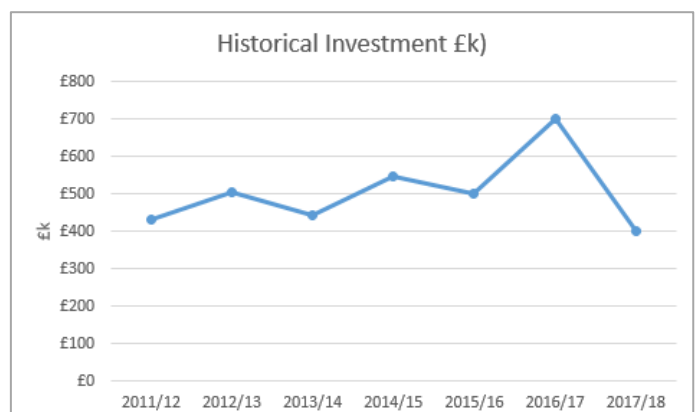


Figure 3.3

### 3.1 COLUMN OPTIONS

#### COLUMN OPTION 1 – CURRENT LEVEL OF INVESTMENT - £150k per annum

Continuing current investment would mean significant risk of structural failure (column collapse) and a substantial increase in reactive repairs, with 61% of columns exceeding the expected service life after 20 years. Customer satisfaction levels can be expected to decrease significantly.

#### COLUMN OPTION 2 – MAINTAINING CURRENT % OF COLUMNS EXCEEDING ESL - £450k per annum

Condition continues to fall until new low of 46% ESL reached in 6-7 years' time. Only gradual return to mid-30% ESL in 30 years. Will significantly reduce the risk of structural column failure in short term.

#### COLUMN OPTION 3 – REPLACEMENT OF BACKLOG

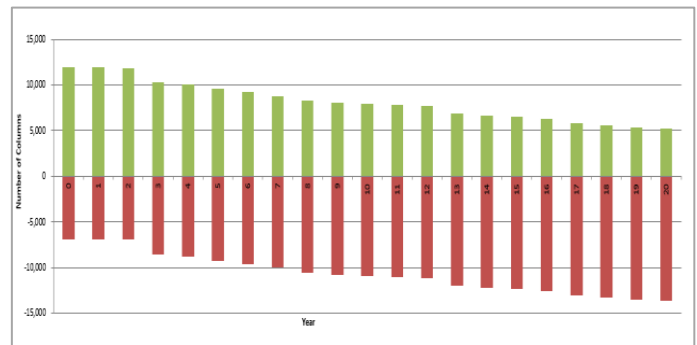
Replacement of backlog then as galvanised steel as required - £4.1m per annum for 2 years then £240k per annum for the next 30 years.

All un-galvanised steel columns replaced ASAP. Galvanised steel as ESL reached. Will significantly reduce the risk of structural column failure and maintain risk at low level.

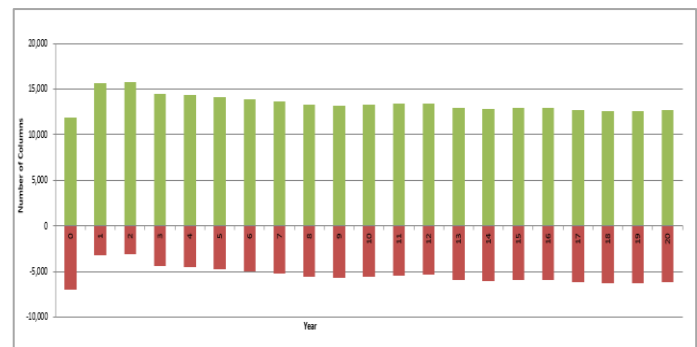
#### COLUMN OPTION 4 – REPLACEMENT OF ALL STEEL COLUMNS

Replacement of all steel columns - £4.1m per annum for 2 years then £900k per annum for the next 8 years.

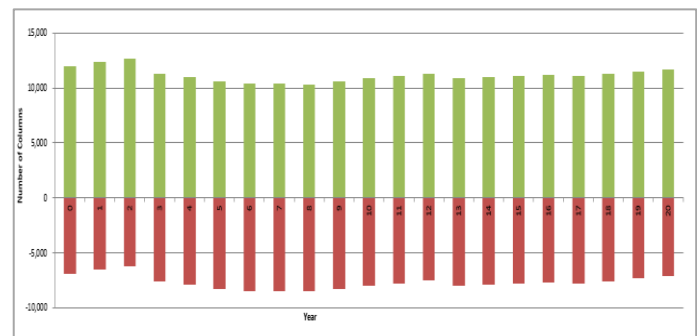
All steel columns replaced in 10 years. Will significantly reduce the risk of structural column failure. Replacement Aluminium columns expected service lives of 50 years so condition of columns should remain good until well after scope of RAMP analysis.



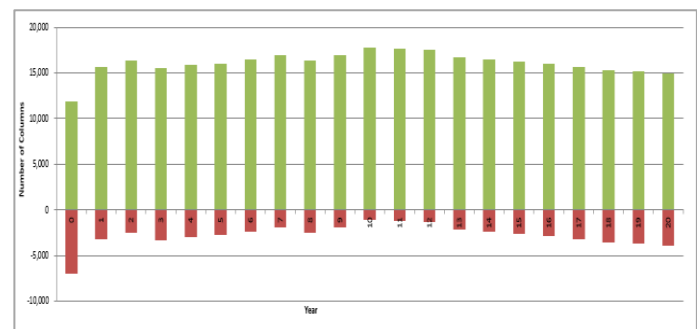
Column Option 1 – Current Level of Investment



Column Option 2 – Maintain Current % of Columns Exceeding ESL



Column Option 3 – Replacement of Backlog



Column Option 4 – Replacement of All Steel Columns

Any investment in column replacement will result in the luminaire age profile improving too, as the lanterns are renewed at the same time. Investment targeted at the oldest columns and the most energy inefficient or problematic luminaires.



### 3.2 LUMINAIRE OPTIONS

#### Luminaire Option 1

Continue Current Balanced Strategy - £358k per annum for 4 years

Continue our strategy of LED upgrade using a retrofits and replacement lanterns; a balance between capital and quality. Existing luminaires in unacceptable condition will be replaced with new LED luminaires. Existing luminaires in acceptable condition will be retrofitted. 100% LED achieved. Potential energy savings are not optimised due to the inefficiencies of LED retrofits. Light quality may be an issue.

#### Luminaire Option 2

Highest Capital Cost, Quality & Energy Efficiency - £558k per annum for 4 years

Improvement over our current programme of LED upgrade by replacing all Non-LED lanterns to achieve the best quality. All non-LED luminaires will be replaced. Potential energy savings are optimised due to the efficiencies of new LED lanterns. Highest light quality.

#### Luminaire Option 3

Lowest Capital Cost, Quality and Energy Efficiency - £171k per annum for 4 years. £193k cost to replace remaining lamps every 5 years.

This option is a contingency should our current programme of LED upgrades be considered too expensive. Existing luminaires in unacceptable condition will be replaced with new LED luminaires.

Existing SOX and SON lamps replaced with LED (Figure 3.4). Existing White lamps will be left and replaced like for like when they fail, every 5 years on average. 100% White Light at end of programme but only 79% LED. Light quality may be an issue. Potential energy savings are not optimised due to the inefficiencies of majority of existing LED retrofits and non-LED White lamps whose cyclical replacement costs are considerable



Figure 3.4

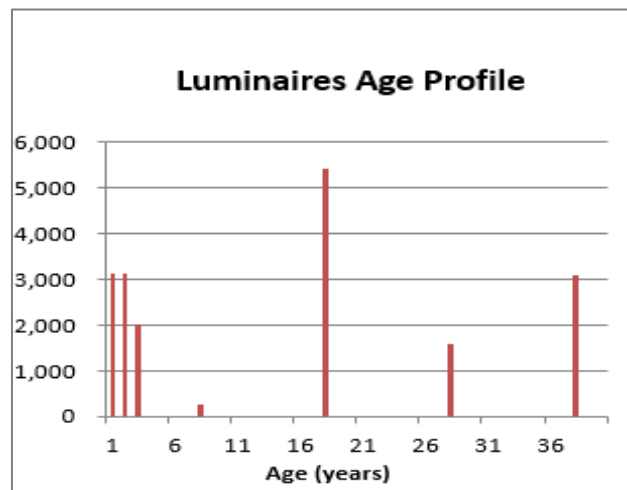


Figure 3.5

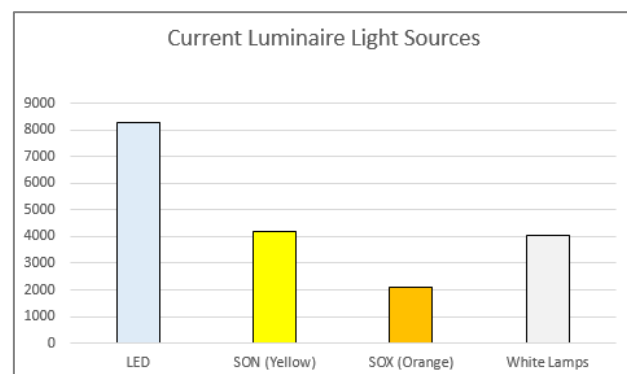


Figure 3.6

If there is an increase in spend on column replacement then luminaires will be renewed at the same time, reducing the cost of the above options. Most significant cost saving will be if column replacement were carried out over a sort period of time as any luminaires fitted to columns that are soon to be replaced can be transferred over. We would endeavour to undertake an approach where strategies of replacing Columns and Luminaires align.

### 3.3 LIGHTING - KEY ASSET ISSUES

#### Energy Prices

The biggest factor influencing street lighting is the price of electricity. Over the last decade the cost of electricity has increased significantly. It is likely that electricity prices will rise significantly in the coming years. If the recent trend is to continue, the additional cost to the street lighting service is significant.

The table opposite shows the pay back periods for luminaire options.

Option	Description	Pay-Back
Luminaire Option A	Continue Current Balanced Strategy	6 Years
Luminaire Option B	Highest Capital Cost, Quality & Energy Efficiency	9 Years
Luminaire Option C	Lowest Capital Cost, Quality and Energy Efficiency	4 Years

#### Energy Efficiency

The principal manufacturer of (orange) SOX lamps has announced they will cease production in 2020. This will reduce the availability and affordability of SOX lamps and control gear massively, making the maintenance of these luminaires prohibitively expensive. A similar situation will arise in due course with other lamp types as LED comes to increasingly dominate the market.

Manufacturers have developed LED “lamps” and LED “gear trays” (which combine an LED light source and tray in one component) for fitting to suitable high quality shells. The reliability, energy efficiency and quality of light produced (distribution and glare) will however be inferior to that achievable with a totally new LED lantern.

The whole life cost of maintaining luminaires fitted with any kind of traditional lamp are high versus those retrofitting with LEDs. Some luminaires will still require total replacement as their shells are of too poor a quality to retrofit.

44% of all luminaires have been replaced or retrofitted with LEDs already.

## 4.0 TRAFFIC MANAGEMENT STATUS

### Traffic Signals

#### Junctions

Minor	1
Medium	24
Major	3

#### Pedestrian Crossings

Single Carriageway	51
Double Carriageway	0

### Traffic Signals Condition

The condition of Traffic Signals assets is determined by periodic electrical and structural inspections carried out on an annual basis.

Modelling based on a 20 year Expected Service Life results in 6% of our locations being flagged for replacement.

The decision on whether to replace assets that have exceeded the ESL is only made after annual inspection results are reviewed. Some assets are therefore not replaced at the end of their ESL, resulting in a misleading “maintenance backlog”.

The majority of traffic signal equipment (94%) is within their expected service life (Figure 4.2).

### Traffic Signals Valuation

The Gross Replacement Cost and Depreciation Values for the footway can be seen on the table on the right.

The annualised depreciation of £347,000 represents the average amount by which the asset will depreciate in one year if there is no investment in renewal of the asset.

Traffic Signal Assets by Type

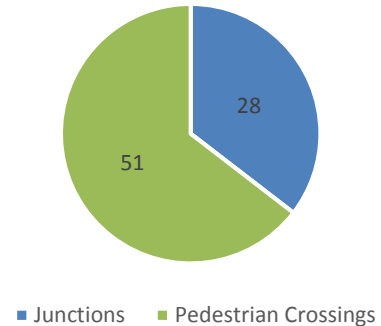


Figure 4.1



Figure 4.2

Table 4.1

Traffic Management System Assets	Gross Replacement Cost	Depreciated Replacement Cost	Annualised Depreciation Cost
<b>Traffic Signal (Junction) Subtypes</b>			
Minor Junction	£126,000	£93,550	£4,425
Medium Junction	£1,100,000	£683,500	£38,500
Major Junction	£60,000	£47,250	£2,125
Complex Junction	£0	£0	£0
<b>Traffic Signal (Pedestrian Crossing) Subtypes</b>			
Single Carriageway	£1,785,000	£1,095,000	£63,750
Double Carriageway	£0	£0	£0

## 4.1 TRAFFIC MANAGEMENT OPTIONS

### OPTION 1 – CONTINUE CURRENT LEVEL OF INVESTMENT

An annual capital investment of £60,000 would lead to sustained deterioration, with 21% of our assets requiring attention after 20-years.

The volume of reactive temporary repairs would rise rapidly, year on year, as would public liability claims. Customer satisfaction levels can be expected to decrease significantly.

### OPTION 2 – STEADY STATE

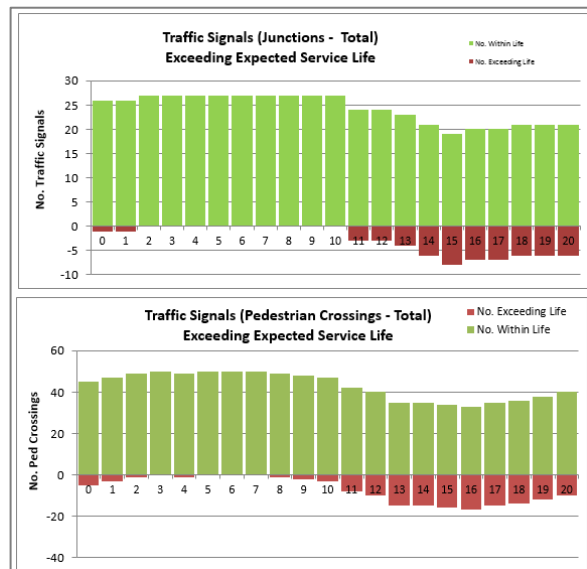
After an initial investment of £100,000 to address the slight maintenance backlog a steady state would be achieved with an annual £50,000 capital investment.

The volume of reactive temporary repairs, public liability claims and levels of customer satisfaction can also be expected to be maintained.

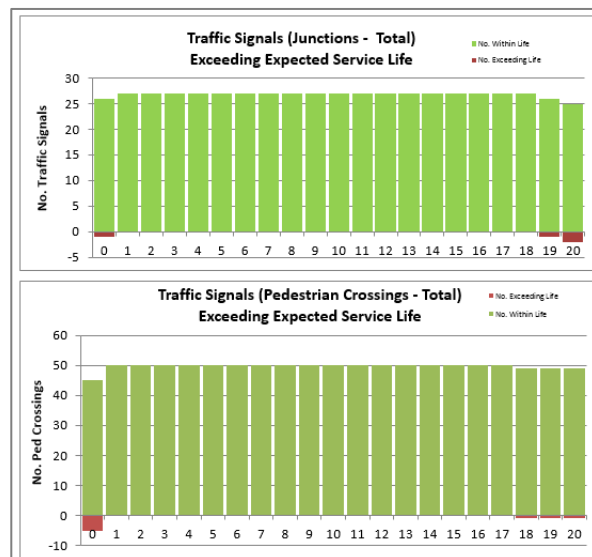
### OPTION 3 – NO REPLACEMENT UNTIL NECESSARY

An average annual capital investment of £51,000 over 20 years (total cost £1.02m).

The volume of reactive temporary repairs would rise rapidly, year on year, as would public liability claims. Customer satisfaction levels can be expected to decrease significantly.



Option 1 – Current Level of Investment



Option 2 – Steady State



Option 3 – No Replacement Until Necessary