East Lothian Council

REPORT TO: Policy and Performance Review Committee

MEETING DATE: 24 November 2015

BY: Depute Chief Executive (Partnership and Services for Communities)

SUBJECT: Roads Asset Management - Annual status and options Report

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1. PURPOSE

1.1 This report presents a summary of the council's road assets as 1 April 2015. 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 Cycleways; Street Lighting Status; Structures; Traffic Management Status and Street furniture.

1.3 This report advised on carriageways, footways, street lighting and Traffic Management Systems which are referenced in Appendices A to D respectively. No data is available for Structures and Street furniture presently.

2. RECOMMENDATIONS

2.1 To note the content of the report and operational recommendations.

3. BACKGROUND

3.1 East Lothian Council in conjunction with SCOTS and CSSW are developing 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 and outputs that are delivered and the standards being achieved.

3.4 The report considers the following options:

- A continuance of current funding levels
- The predicted cost of maintaining current standards
- An increase in investment

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.

3.7 **Carriageways**

3.7.1 The length of adopted carriageways has remained relatively constant over the last 5 years. This is due primarily to a lack of adoptions or removals ‘stopping up’ of the carriageway. (Table1)

3.7.2 The carriageway long term condition trend suggests an improving situation. (Fig 2) A significant improvement has been noticed in the U Road condition category (Figure 6)

3.7.3 Investment in the asset is decreasing, which would suggest prudent management of resources as the condition is improving. (Fig 7)

3.7.4 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.

3.7.5 The annualised depreciation of the asset is calculated to be £6,032,612. (Table 4) Current investment is £4,496,000 (Table 5) a shortfall of 44%. A present a lower financial commitment is maintaining the valuation. Effectively, the Councils investment is achieving a higher return than anticipated.

3.7.6 East Lothian steady state figure is calculated to be £3,430,000. This is the value predicted to maintain the condition of the roads at their current level. This value is less than current investment so infers a less optimised maintenance process. This value is calculated every 4 years using RCI data.

3.7.7 An assessment of Carriageway Options (Table 5-8 and Figure 8-15) provides an analytical assessment of potential treatment strategies. It is recommended to Adopt Option 3.

3.7.8 This Option recommends that the council maintains the current level of investment and adopts a preventative maintenance strategy in order to best utilise the monies available.

3.7.9 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.

3.7.10 The treatments are quick as well as less costly than resurfacing and will cause less disruption to traffic whilst the works are being undertaken.

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. (Table 9)

3.8.2 Only 3% of footways are regarded to be Condition 4 – Major deterioration. (Figure 17)

3.8.3 Historical investment over the last 2 years has been maintained but is lower than the two previous years.

3.8.4 The annualised depreciation of the footway asset is calculated to be £763,675. (Table 12) Financial year 2014/15 investment was £1,879,000 (Table 11) an overcommitment of £1,116,000. However,

£898,000 was for improvements, which add value to the asset but most increase reactive/ routine treatments. (Key Issues)

3.8.5 An assessment of Footway Options (Table 13-17 and Figure 19 – 27) provides an analytical assessment of potential treatment strategies. It is recommended to Adopt Option 1.

3.8.6 This Option recommends that the council maintains the current level of investment and maintains the current strategy. (Table 13) This approach does not have the same level of long term benefits but meets current budgetary constraints. This approach will be reviewed yearly 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 low growth in the street lighting asset base. However, this is predicted to significantly increase in line with Local development plan housing land supply.

3.9.2 A significant amount of street lighting columns 41.82% are exceeding their expected service life. (Figure 30)

3.9.3 A significant amount of street lighting luminaires 40.56% are exceeding their expected service life. (Figure 32)

3.9.4 Investment in the street lighting stock (Figure 33) is increasing but is well below the annualised depreciation value.(Table 18)

3.9.5 Energy costs are decreasing due to a combination of factors, lower energy costs, procurement arrangements and the adaption of low wattage LED luminaires. (Figure 33)

3.9.6 The annualised depreciation of the street lighting asset is calculated to be £1,478,371, (Table 20). Financial year 2014/15 investment and outputs was £1,502,436 (Table 21). However, this included £592,058 of electricity consumption charges, which should be excluded from the comparison. (Table 21)

3.9.7 An assessment of Street lighting column and luminaries Options (Table 23- 26 & Figure 34-43) provides an analytical assessment of potential treatments and strategies. It is recommended to Adopt Option 1 for column replacement and Option 3 for luminaries.

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 is within their expected service life. (Figure 45 & 46) Significant investment (Figure 46 and 47) predict systems not requiring major refurbishment over the next 10 years.

3.10.3 The annualised depreciation of the traffic management system asset is calculated to be £179,500, (Table 30). Financial year 2014/15 investment and outputs was £181,700 (Table 29). However, this included £41,500 of new infrastructure provision.

3.10.4 An assessment of Traffic Management systems Options Table 31- 33 and Figure 47- 60 provides an analytical assessment of potential treatments and strategies. It is recommended to Adopt Option 4 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

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DATE	16 November 2015

Appendix A - Carriageway Asset Status and Option Report

1. Introduction

This report presents a summary of the council's road assets as at March 2015. It:

- Describes the current condition of the asset
- Details the service that the asset and current budgets are able to provide
- Presents the options available for the future

The report complements the Road Asset Management Plan (RAMP). It provides information to assist with budget setting for roads.

Status

The status of each asset group is provided in terms of current condition, the output that are delivered, the standards being achieved and, where possible, an indication of customer satisfaction.

Options

The report considers the following options:

- A continuance of current funding levels
- The predicted cost of maintaining current standards
- Predicted effects of different levels of a preventative strategy

Long Term Forecasts

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.

Impacts Risk

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 the level of data available.

2. Carriageways

2.1 Status Report

Table 1 – Carriageway Asset Statistics

Asset Group: Carriageway

Statistics

The Asset

Road Class	Urban Length (km)	Rural Length (km)	Total Length (km)
A Road	32.8	62.4	95.2
B Road	35.4	134.0	169.4
C Road	15.5	207.4	222.9
Unclassified Road	229.9	198.5	428.7
Total Length (km)	**313.6**	**602.3**	**915.9**

Commentary

- An accurate actual length of East Lothian's carriageway is unknown. Length information is stored on the National Street Gazetteer (NSG) and WDM but they are not linked due to IT issues.
- The level of carriageway inventory is considered to be of a medium to high reliability. Information is stored on the WDM software.
- The carriageway asset has grown <1% in the last 5 years. However, subject to meeting the SDP housing allocation significant growth of up to 15% can be expected over the next 10 years.

2.3 Carriageway Condition

The status of carriageways is calculated annually, by means of a survey to establish the overall condition of the carriageway asset. The Scottish Road Maintenance Condition Survey (SRMCS) is a Scotland–wide contract organised since 2002 by the Society of Chief Officers of Transportation in Scotland (SCOTS) to calculate the condition of all carriageways in Scotland. The survey is machine-based Surface – Surface Condition Assessment of the National Network of Roads - (SCANNER), and is subject to independent audit and quality assurance with the survey vehicles being subjected to rigorous annual validation checks. Data from the surveys are used to report on the condition of the local public road network – Statutory Performance Indicator 22. Over the years, this work has been developed to give a valuable oversight on the condition of the local road network and the trends in carriageway condition.

Where surveys do not encompass a complete road class (ie on non-principal Classified roads), a rolling selection of roads is surveyed. That is, for B and C Class roads, one-half of the network is surveyed in one year and the other half in the following year. Over the course of the four-year SRMCS project, theoretically, A Class roads will be surveyed 4 times and B and C Class roads will be surveyed twice. A 10% sample of unclassified roads is surveyed each year – this is made up from 10% of urban roads and 10% rural roads.

In previous years, SCOTS have made available individual results for every Scottish Authority. Because only 10% of unclassified roads are surveyed each year, results can (and do) fluctuate from year to year. It is not practical to eliminate these sampling

errors without surveying more unclassified roads each year but that would add significantly to the cost of the survey. Grouping results together, as we have done this year, helps average out such sampling errors.

The (SRMCS) uses automated road condition survey machines (SCANNER3) to measure a range of road condition parameters including ride quality, rut depth, intensity of cracking, texture depth and edge condition. A Road Condition Index (RCI) is calculated from SRMCS data for every 10m of the road that has been surveyed.

The survey coverage used to produce the RCI is collected over two years for the classified network and, since the completion of the 2011 surveys, every four years for the unclassified network. Before 2011, the unclassified RCI was calculated from two years of surveys.

As indicated, each parameter is weighted depending on its importance to the condition of the road and the reliability of the measurement. For example, rutting is considered very important and the measurement is very reliable therefore, the weighting is 1 for both factors so the maximum score achievable for rutting is 100. Whereas, cracking is considered important but the measurements of cracking is not as reliable therefore, the weightings are 1 and 0.6 respectively and the maximum score for cracking is 60. The reliability and importance of the measurement stays constant regardless of what class of road is being surveyed except for texture when the importance varies. This is to reflect the importance of adequate texture in supporting good skid resistance on rural high speed roads.

The upper and lower thresholds vary across the class and environment of road for longitudinal profile, or road roughness, and A class rural roads have different texture thresholds from other classes.

The individual parameter scores are combined to produce an RCI for each 10m subsection. Only the highest of the 3m or 10m Profile Variance scores contribute to the overall RCI score. The SRMCS PI is made up from the total proportion of a network that is above or equal to an RCI of 40.

To assist the user a Traffic light colour scheme, Green, Amber and Red have been assigned to different RCI bands as shown below:

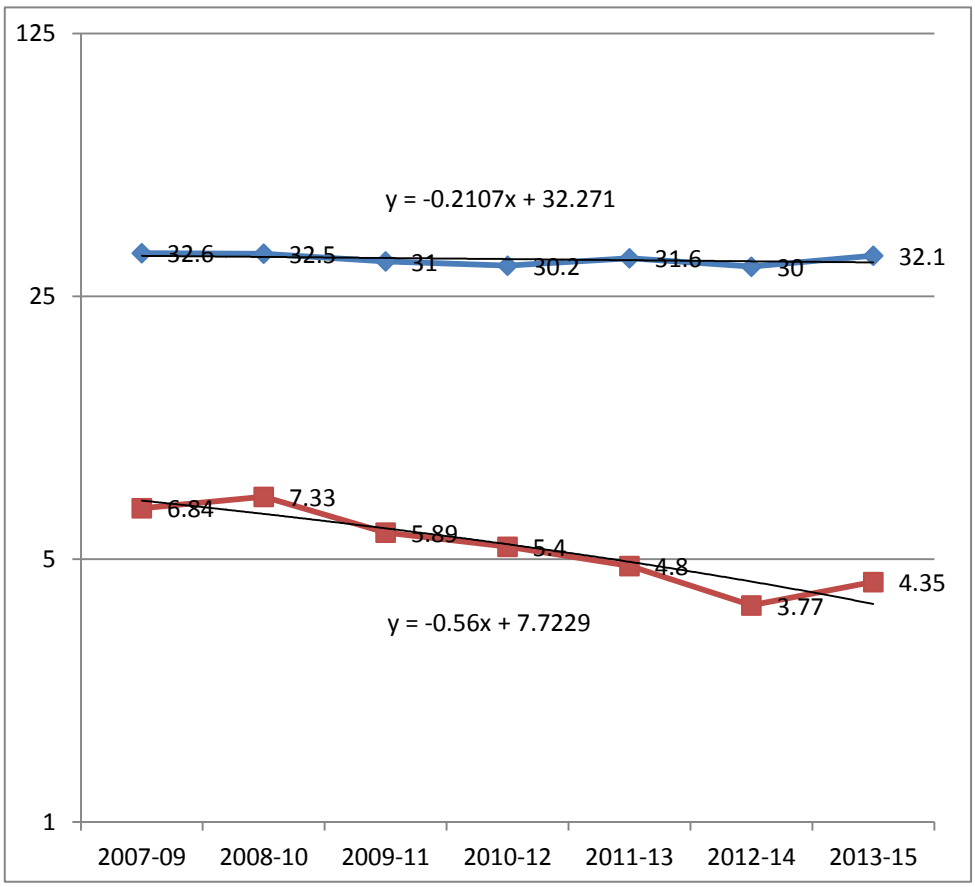
Green - an RCI score <40 - where the carriageway is generally in a good state of repair;

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).

Figure 1 – Overall Carriageway Condition

Overall Carriageway Condition

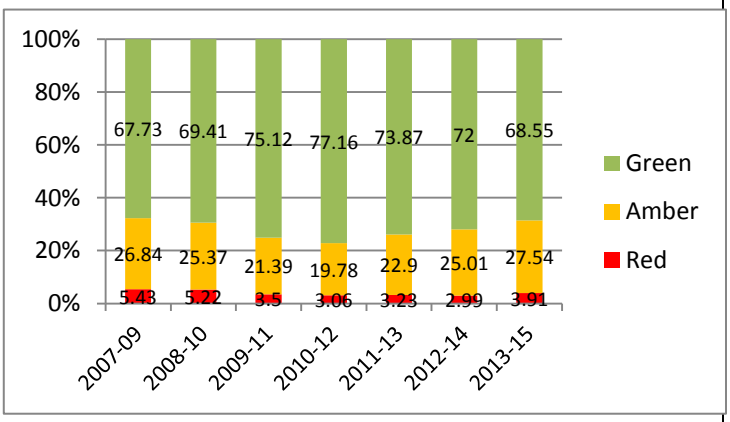


Commentary

- Overall trends are downwards
- The top (blue) line represents the overall carriageway condition trend.
- The bottom (red) line indicates the condition of carriageways that require maintenance soon.
- The overall trend is that the condition is improving but there has been a recent worsening of the asset condition.

Figure 3 – A Class Road Carriageway condition

A Road Condition



- Measured by SCANNER
- 100% one side measured annually
- The overall condition of A Class roads is deteriorating
- There are currently no condition targets for A roads.
- A current action is to identify more practical hierarchical groups that line up with current Strategies documents and create condition targets to reflect the needs of these road type. Examples of hierarchical groups include bus routes, school routes, cycle routes etc.

Figure 4 – B Class Road Carriageway condition

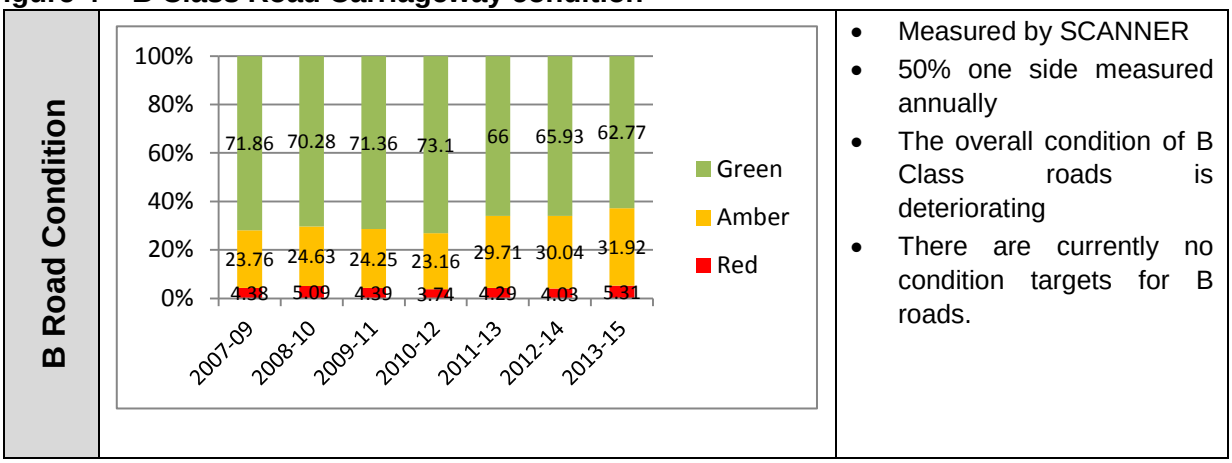


Figure 5 – C Class Road Carriageway condition

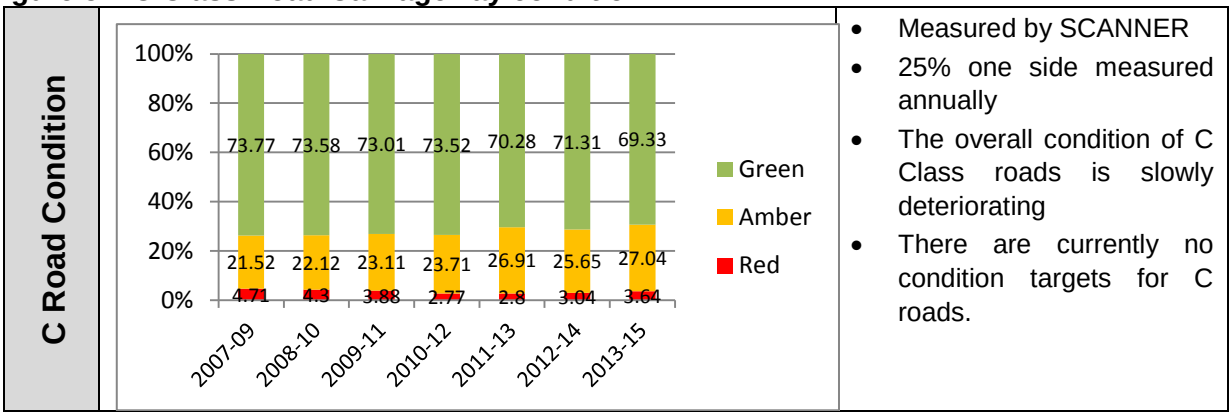
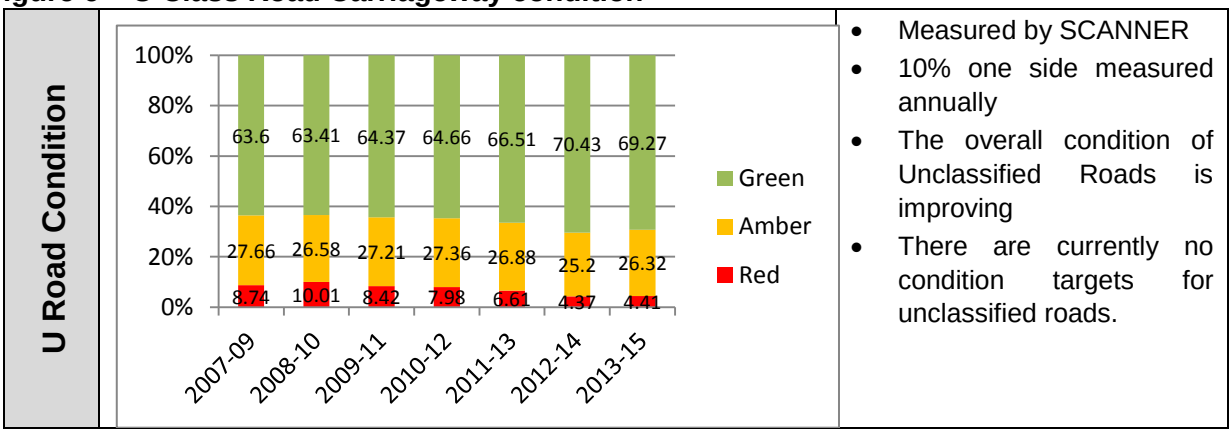


Figure 6 – U Class Road Carriageway condition



Performance Indicators

The PI data provided is a snapshot of SCOTS RAMP and CSS Wales HAMP Project and APSE data collected for 2014/15. A comprehensive report of this data collection is provided each year in May. The data template is designed to enable roads authorities

to collect and report data in accordance with the requirements of the CIPFA Transport Infrastructure Asset Code.

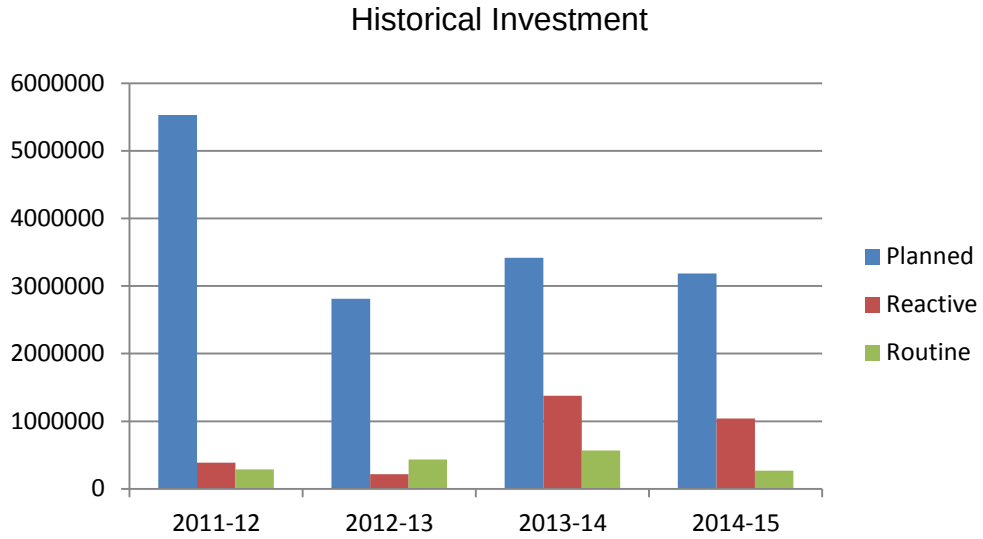
Table 2 – Performance Indicators

Ref	Description	2014/15 Result	Comments
PI03a / (1.1.01)	% of Cat 1 defects made safe within response times	76.53%	Negative change from 2013
PI39 / (1.2.01)	% of safety inspections completed on time	100%	No change
PI40 / (2.1.01)	% of carriageway length to be considered for maintenance treatment	30.0%	Negative change from 2013
PI41 / (2.1.02)	% of carriageway length treated	4.28%	Positive change since 2013
PI42a / (6.1.01)	Total asset management (carriageway) expenditure by carriageway length	£4,802/km	
PI42b / (6.1.03)	Total carriageway maintenance investment by carriageway length (excluding client cost)	£4,502/km	

Historical Investment

Historical investment is a record of spend per planned, reactive and routine categories. Generally, planned works are capital investments, asset renewals and routine / reactive revenue costs.

Figure 7 – Historical Investment



- Planned maintenance work is considered to be that which provides for a sustainable outcome, adding value to the carriageway asset network, and includes:- surface dressing, thin/micro surfacing (thin), moderate and thick overlay (thin) moderate, structural inlay reconstruction road drainage schemes planned patching which was identified as planned work prior to the start of the year (i.e. not programmes arising from safety inspections)

- Reactive maintenance is considered to be all safety related work associated with the carriageway asset and includes:-.all emergency safety related work including pothole repairs, kerb repairs, repairs to defective ironwork and any other temporary or permanent repairs carried out on an unplanned basis on the grounds of safety. Includes defects notified via 3rd party public liability claims, programmed patching which was not identified as planned work prior to the start of the year (e.g. arising from safety inspections)

- Routine maintenance work priorities and programmes are a combination of programmed, ancillary maintenance functions (e.g. gully emptying, weed spraying, verge maintenance, etc) which are not structural or fabric maintenance, and other routine work (determined largely from defect reports and service inspections) that would not constitute planned scheme carriageway maintenance or reactive repairs to the fabric of the carriageway. Routine maintenance works include:- gully cleaning, weed spraying, verge maintenance, cyclic maintenance

Commentary

- Reactive and routine costs are declining, which are predicted due to positive planned maintenance strategies

Table 3 – 2014/15 Carriageway Investment and Outputs

Cost Category	£4,496k	Output
Planned Maintenance - Preventative	£599.9k	− 168,089m^2 of surface dressing (£538,952) − 11079m^2 thin / micro surface undertaken (£60,964)
Planned Maintenance - Corrective	£2,766k	− 23,828m^2 (21.7%) of thin over-lay (£533,746) − 34,917m^2 (44.3%) of thin in-lay (£1,086,521) − 4,864m^2 (8.5%) of moderate in-lay(£208,209) − 3,503m^2 (25.5%) of reconstruction (£626,532)
Routine Cyclic Maintenance	£270.6k	− 12,459 no. Gullies Clean (£216,082) − 591km Highway verge swathe and visibility splays cut in rural areas (£39,240) − Cyclic maintenance (£8,717) − Road-remarking renewed (£6,627)
Routine - Reactive Repairs (emergency)	£148.2k	− 375 no. cat 1 defect repairs (£22,004) − 2 no. Floodwater Events (£40,008) − Debris, oil, animal carcass, make safe (£86,248)
Routine - Reactive Repairs (non-emergency)	£920.6k	− 2732 no. cat 2 defect repairs (£159,853) − 43 no Drainage investigation and repair (£114,017) − Misc – 4 no. Earthworks and kerbing (£6,855) − 12,232m^2 Carriageway patching (£463,425) − 12 Find and fix (subsidence, block)(£103,386) − line marking and road studs(£83,103)
Routine – Inspection & Survey	£77.3k	− Condition surveys (£13,000) SRMCS − RAMP (£5,000) − Improvement Service (£3,000) − Surveys and Traffic modelling (£51,300)
Operating Costs	£1,115k	− Winter service
Loss#	£3.7k	- 19 no 3rd party claims associated with carriageways

Carriageway Valuation

The following table summarises the result of a valuation of East Lothian Council carriageway assets as at April 2015. The valuation is reported in accordance with HM Treasury requirements for whole of government accounts as updated in March 2015[(2).]

The valuation provides the council with a depreciated replacement cost valuation of the asset. The valuation has been undertaken in accordance with the methods set out in the CIPFA Transport Asset Infrastructure Code[(1).] The valuation is based upon the calculation of a depreciated replacement cost (DRC) i.e. *"the current cost of replacing an asset with its modern equivalent asset, less deductions for all physical deterioration and impairment"*.

The following table includes:

- The estimated cost of replacing the existing asset (gross replacement cost, GRC)
- The estimated current value of the asset (depreciated replacement cost, DRC)
- The estimated average sum that needs to be spent year on year to maintain the assets in a steady state (the annual depreciation, AD).

Table 4 – Valuation

Carriageways Valuation (These values include the regional and inflation factors for the current year)				
Road Classification	**Gross Replacement Cost**	**Depreciated Replacement Cost**	**Annualised Depreciation Cost**	**Depreciation**
Principal (A) Roads (Urban)	£51,737,526	£47,757,274	£320,237	£3,980,252
Principal (A) Roads (Rural)	£92,453,119	£84,521,160	£694,839	£7,931,960
Classified (B) Roads (Urban)	£47,121,960	£44,873,267	£199,562	£2,248,692
Classified (B) Roads (Rural)	£137,437,676	£124,872,205	£1,092,898	£12,565,471
Classified (C) Roads (Urban)	£18,017,409	£16,939,399	£99,752	£1,078,010
Classified (C) Roads (Rural)	£135,591,577	£122,698,336	£1,087,517	£12,893,241
Unclassified Roads (Urban)	£222,524,190	£208,015,331	£1,610,482	£14,508,860
Unclassified Roads (Rural)	£96,182,768	£85,143,869	£927,326	£11,038,899
Total	**£801,066,225**	**£734,820,841**	**£6,032,612**	**£66,245,384**

The annualised depreciation (AD) of £6.032m represents the average amount by which the asset will depreciate in one year if there is no investment in renewal of the asset.

Key Issues

- The Scottish Roads Maintenance Condition Survey (SRMCS) – Road Condition Indicator (RCI) indicates that approximately 32.1% of the public roads within East Lothian should be investigated and considered for maintenance treatment (294km).
- The SRMCS also indicates that 4.35% of the public roads in East Lothian are of a poorer condition that requires immediate investigation and possible treatment. This equates to 39.8km of carriageway.
- The survey has identified 20.3km of rural public roads, which are in need of further investigation
- East Lothian Councils steady state figure is calculated at £3,430,000.
- The number of carriageway reported public liability claims is decreasing year on year.
- Work is ongoing to develop a formal set of policies and service standards in relation to the maintenance and management of the carriageways. Thisiss to be included within the ELC Maintenance Manual
- Winter weather has less of an effect on the condition of the road network but still plays its part. The road network is less resilient to winter weather due to the underlying age of the network. This commentary should be treated cautiously as winter weather conditions are significantly milder than (2009/10). Severe winter weather conditions (impairment) would significantly accelerate damage to the carriageway network.
- It is unlikely that the Service will be able to resource all the required interventions.
- Commodity costs generally increase year on year. Over the last 5 years the cost of a tonne of asphalt has increased by 40%. However, significant reduction in the global oil price has not been reflected in bituminous material prices.
-

Current Status

As at 31 March 2015

- → annual budget is being maintained over time
- ↗ commodity costs are increasing
- ↘ staff resources are reducing
- ↘ short term (year to year) analysis of the carriageway condition suggests the carriageway condition is deteriorating (RCI 30.0 to 32.1)
- ↗ long term analysis highlights an improving situation (overall carriageway condition)
- ↘ significant decrease in 3rd party claims (69 to 46)
- ↘ decrease in the cost of settling claims

Current Strategies

- The process of identifying the policy requirements necessary to maintain the current level of service will be presented to Council for ratification as part of the Road Asset Management planning process in March 2016
- A three year capital plan has safe guarded current investment levels.

  Investment in carriageways is being made through carriageway reconstruction, resurfacing and preventative treatments. These measures are designed to maintain the 'steady state' condition of the carriageway network at a constant annualised depreciated value in line with previous years.
- The overall capital investment is reviewed annually to proportion funding between asset groups and carriageway hierarchies.
- The use of the 'jetpatcher' to make safe all Category 1 and 2 defect repairs will be reduced. A 'right first time' approach to the treatment of carriageway defects (i.e. Permanent repairs) will be introduced.

2.2 Carriageway Options

2.2.1. Option C1: Invest £3.5m – East Lothian Proposed 2016/17 Strategy

Budget

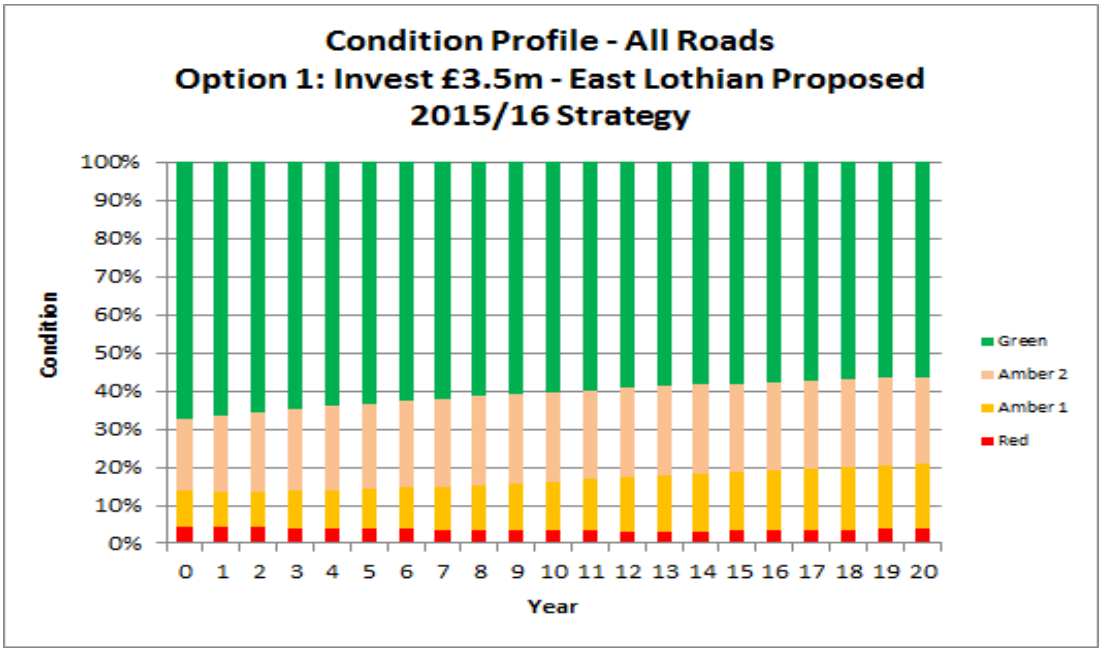
This option investigates the effect of investing £3.5m from the proposed East Lothian Council 2016/17 planned maintenance budget at the same level over a 20 year period. This programme consists of £350,000 of 60mm+ depth strengthening treatments, £2,560,000 for resurfacing treatments and £630,000 for surface treatments. The budget is distributed evenly over the different road categories.

A breakdown of the total carriageway budget for 2016/17 is as follows:

Table 5 – Carriageway Investment Option C1

RAMP Cost Category	**Expenditure (£000's)** (2015/16 actual)	**%**
Routine - Reactive Repairs (emergency)	£250	4.0%
Routine - Reactive Repairs (non-emergency) - Patching	£975	15.8%
Routine Cyclic Maintenance	£379	6.1%
Planned Maintenance - Preventative	£630	10.2%
Planned Maintenance - Corrective	£2,910	47.2%
Inspections and survey (not covered under staff costs)	£13	0.2%
Operating Costs (winter service)	£998	16.2%
Improvements	**£0**	0.0%
TOTAL	**£6,155**	
Loss (3rd Party Claims associated with (c/ways)	£13	0.2%
TOTAL (including claims costs)	**£6,168**	

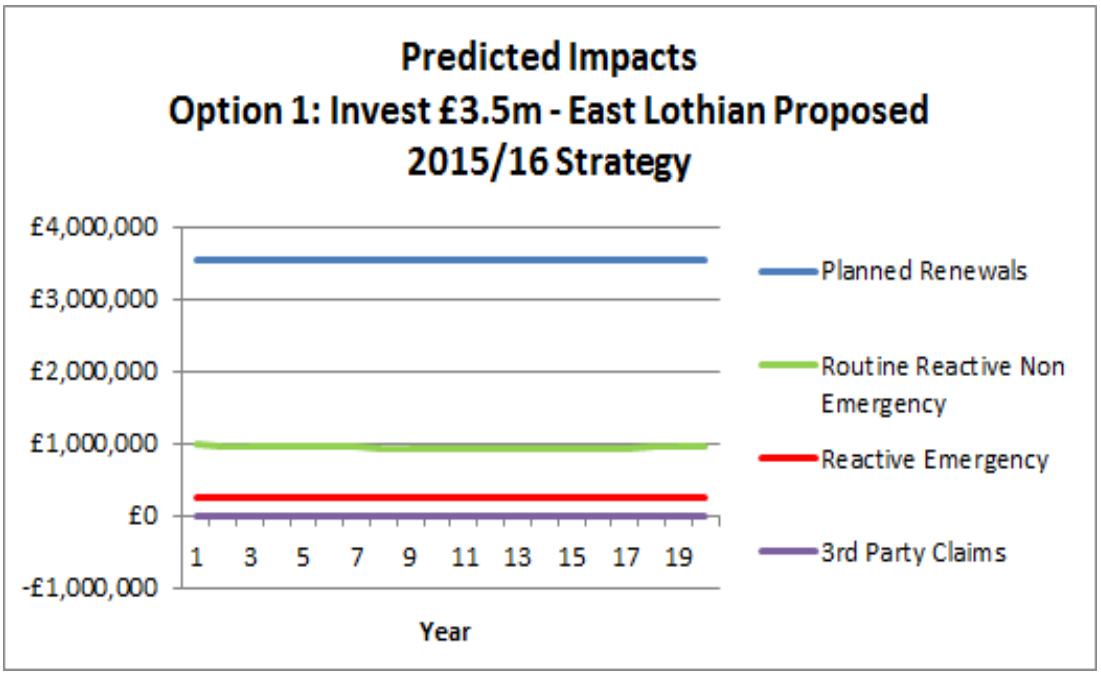
Figure 8 - Predicted Condition C1



This shows a continuing deterioration of the carriageways over time resulting in the percentage of carriageway in need of maintenance (red + amber condition) increasing from the current 33% to 44% in 20 years.

The level of red condition over the 20 year period reduces from 4.4% to 3.9% due to the high percentage of resurfacing treatments and the small quantity of strengthening treatment being targeted at the worst condition carriageways.

Figure 9- Predicted Impacts C1



Option Summary C1

The option of continuing to invest as per the East Lothian 2014/15 Planned Maintenance Strategy is predicted to result in:

a. annual budget remaining the same over time
b. ↘ a reduction (deterioration) of measured condition
c. ↗ quantity of low impact minor defects (potholes and the like) will continue to increase. It must be noted that this strategy will see a small reduction in major defects due to the corresponding decrease in red condition carriageway.
d. ↗ It is likely there will be an increase in 3rd party claims. The reduction in resources will reduce the frequency of inspections and subsequent increase in potential un-defendable claims.
e. ↘ level of customer satisfaction is likely to reduce with regular delays caused by the need for more reactive maintenance and an increase in journey time caused by the low standard condition of the road.
f. ↗ carbon emissions will increase as journey times take longer and there will be a greater requirement for reactive maintenance.
g. Total cost (over 20 years) estimated at **£123m.** Annual cost £6.1m initially, growing slightly over time to accommodate growing reactive repair needs. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

2.2.2. Option C2: Maintain Current Condition

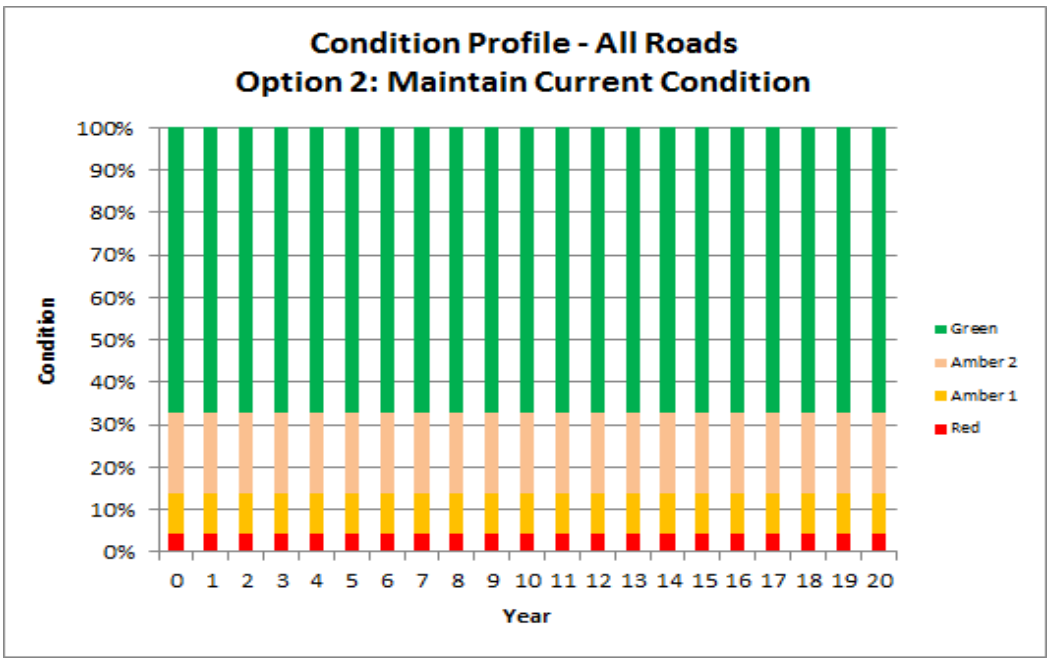
Budget

The second option comprises a continuance of current condition levels using a mix of preventative and corrective treatments, the estimated cost of this being shown below:

Table 6 – Carriageway Investment Option C2

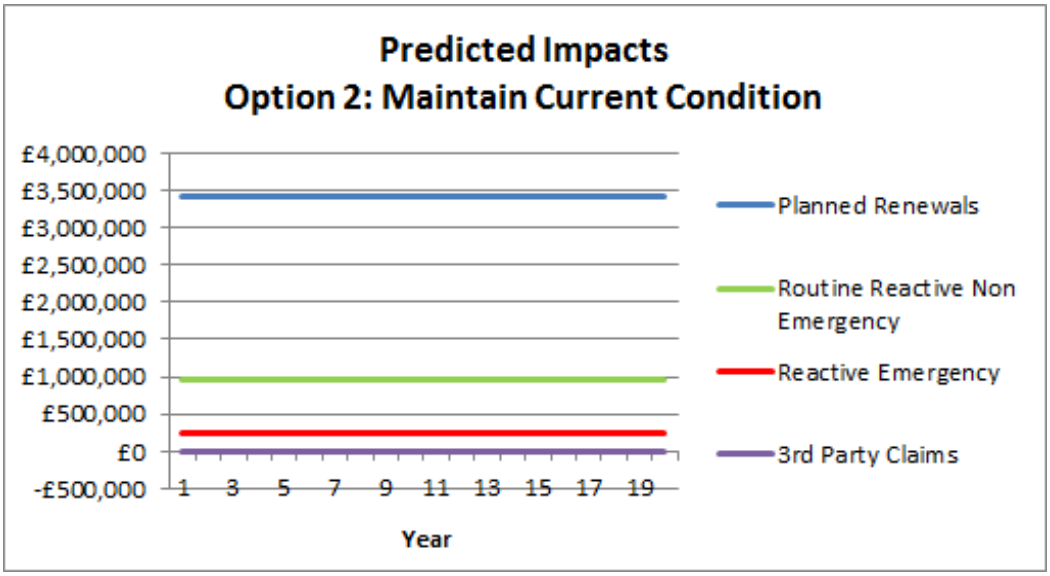
RAMP Cost Category	**Expenditure (£000's)** (2015/16 actual)	**%**
Routine - Reactive Repairs (emergency)	£250	4.1%
Routine - Reactive Repairs (non-emergency) - Patching	£975	16.1%
Routine Cyclic Maintenance	£379	6.3%
Planned Maintenance - Preventative	£2,077	34.3%
Planned Maintenance - Corrective	£1,353	22.3%
Inspections and survey (not covered under staff costs)	£13	0.2%
Operating Costs (winter service)	£998	16.5%
Improvements	£0	0.0%
TOTAL	**£6,045**	
Loss (3rd Party Claims associated with (c/ways)	£13	0.2%
TOTAL (including claims costs)	**£6,058**	

Figure 10 - Predicted Condition C2



This shows the condition of the carriageways remaining the same over the 20 year period.

Figure 11 - Predicted Impacts C2



Option Summary C2

The baseline option of a continuance of current funding levels is predicted to result in:

a. →annual budget remaining the same over time
b. →continuance of measured condition
c. →no increase in quantities of minor defects (pot holes and the like)
d. →continuance of current level of 3rd party claims
e. →level of customer satisfaction will remain constant.
f. →carbon emissions will remain constant.

Total cost (over 20 years) estimated at **£121m.** Annual cost £6.1m. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

2.2.3. Option C3: Invest £3.5m – Preventative Strategy

Budget

The third option comprises investing £3.5m in the proposed East Lothian Council 2016/17 planned maintenance budget adopting a preventative strategy. A preventative strategy targets treating carriageways more regularly with lower life, lower cost treatments.

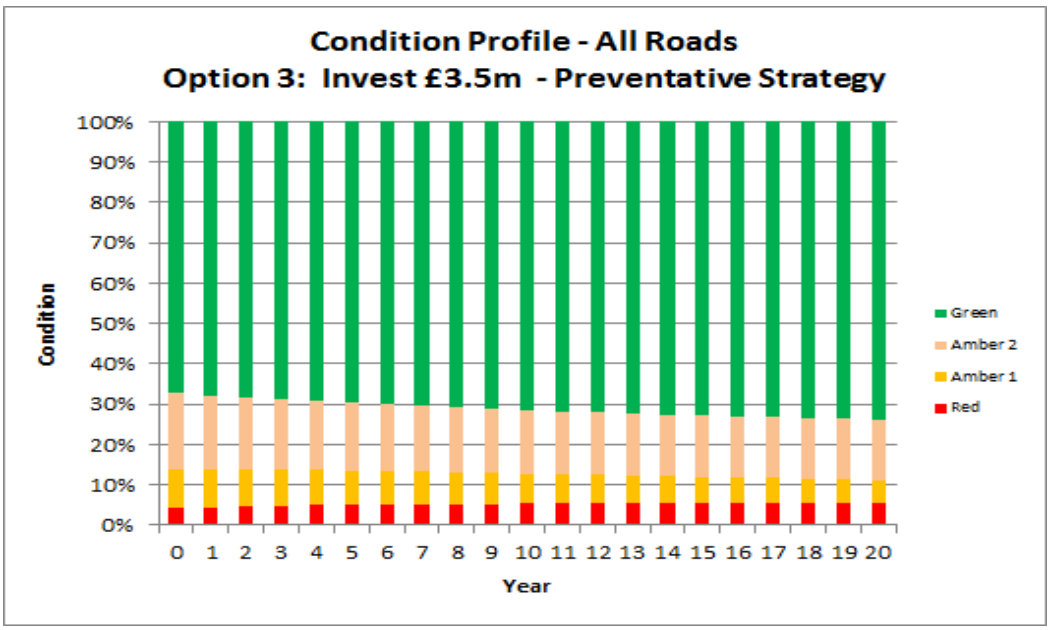
The division of the budget into treatment types will be 66% preventative, 30% resurfacing and 4% strengthening. The strengthening budget will target the worst condition sections of carriageway.

A breakdown of the total carriageway budget for 2016/17 would be as follows:

Table 7 – Carriageway Investment Option C3

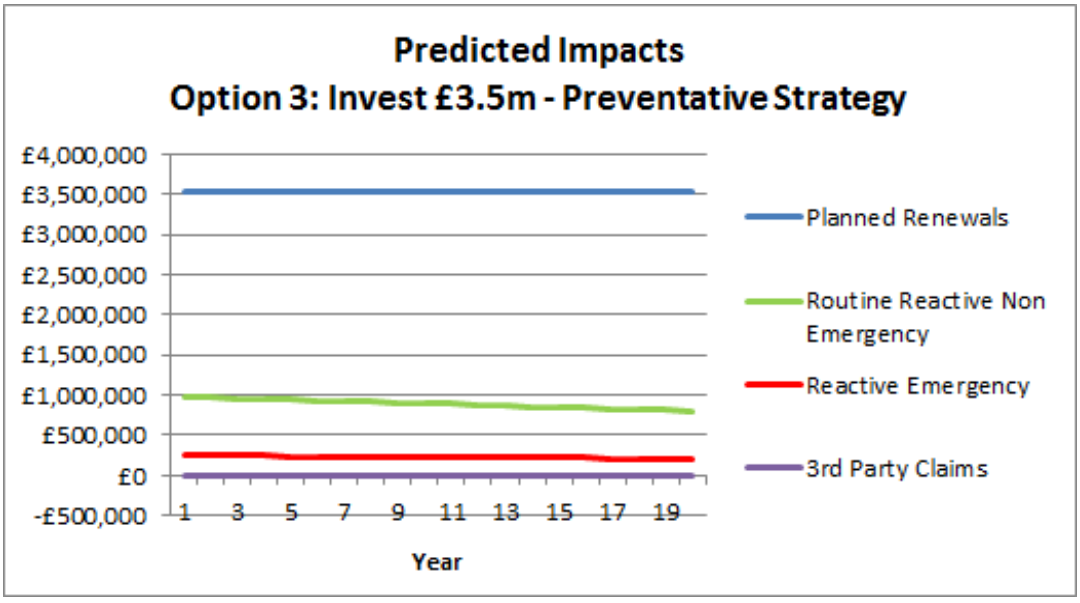
RAMP Cost Category	**Expenditure (£000's)** (2016/17 actual)	**%**
Routine - Reactive Repairs (emergency)	£250	4.1%
Routine - Reactive Repairs (non-emergency) - Patching	£975	15.8%
Routine Cyclic Maintenance	£379	6.1%
Planned Maintenance - Preventative	£2,325	37.7%
Planned Maintenance - Corrective	£1,215	19.7%
Inspections and survey (not covered under staff costs)	£13	0.2%
Operating Costs (winter service)	£998	16.2%
Improvements	£0	0.0%
TOTAL	**£6,155**	
Loss (3rd Party Claims associated with (c/ways)	£13	0.2%
TOTAL (including claims costs)	**£6,168**	

Figure 12 - Predicted Condition Option C3



This shows an improvement in condition of the carriageways over time resulting in the percentage of carriageway in need of maintenance (red + amber condition) decreasing from the current 33% to 26% in 20 years. However, the 'red' structural repairs is increasing.

Figure 13 - Predicted Impacts Option C3



Option Summary C3

The option of using preventative maintenance treatments is predicted to result in:

a. ↘ annual budget reducing slightly over time
b. ↗ an improvement of measured condition
c. ↘ a small decrease in the quantities of minor defects (pot holes and the like)
d. ↘ a small potential for decrease in 3rd party claims
e. ↗ customer satisfaction likely to remain constant or improve.
f. ↘ carbon emissions will reduce with lower journey times caused by the improvement in the condition of the road.
g. ↘ the structural condition is worsening

Total cost (over 20 years) estimated at **£121m**. Annual cost £6.1m. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

2.2.4. Option C4: Invest £3.5m – Achieve Steady State Condition using Minimum Quantity of Preventative Treatments

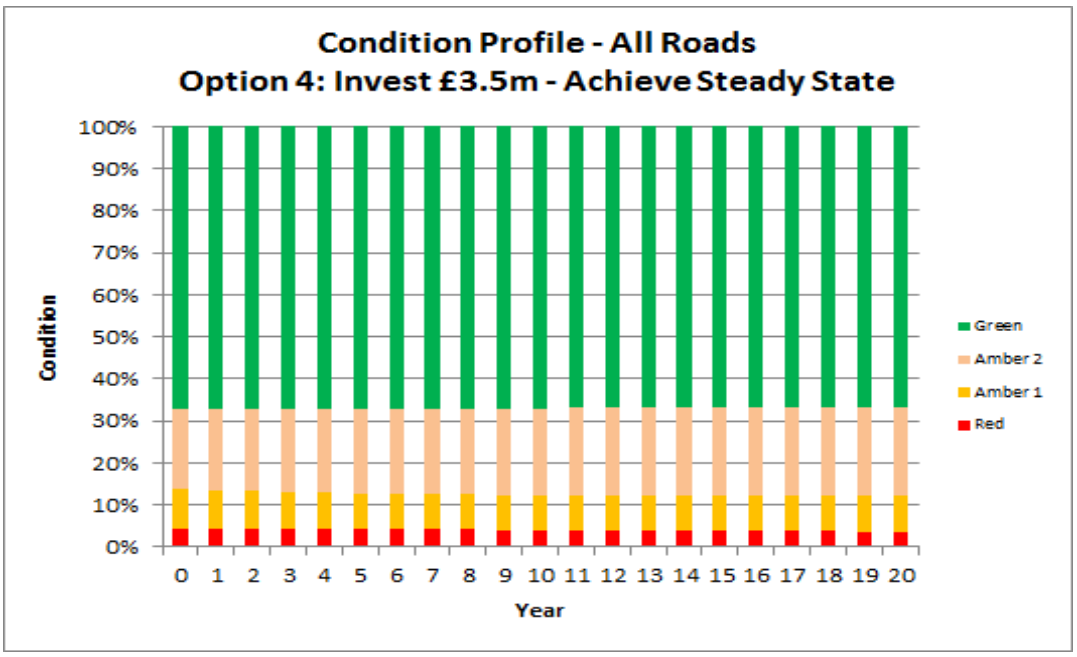
Budget

The forth option comprises achieving a steady state condition investing the proposed East Lothian Council 2016/17 planned maintenance budget using the minimum amount of surface dressing (preventative treatment).

Table 8 – Carriageway Investment Option C4

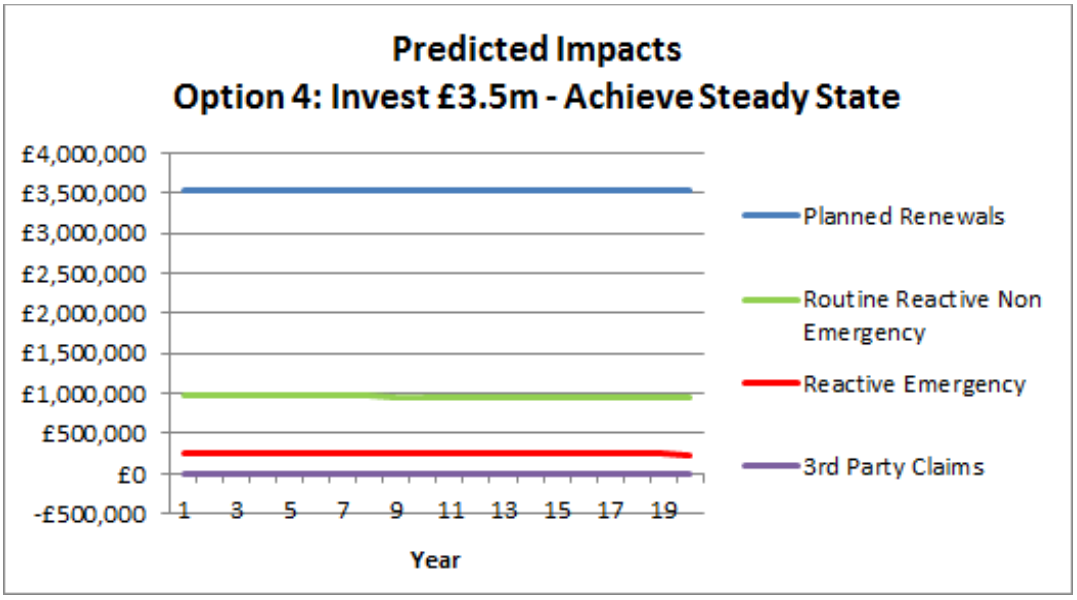
RAMP Cost Category	**Expenditure (£000's)** (2016/17 actual)	**%**
Routine - Reactive Repairs (emergency)	£250	4.1%
Routine - Reactive Repairs (non-emergency) - Patching	£975	15.8%
Routine Cyclic Maintenance	£379	6.1%
Planned Maintenance - Preventative	£1,609	26.1%
Planned Maintenance - Corrective	£1,931	31.3%
Inspections and survey (not covered under staff costs)	£13	0.2%
Operating Costs (winter service)	£998	16.2%
Improvements	£0	0.0%
TOTAL	**£6,155**	
Loss (3rd Party Claims associated with (c/ways)	£13	0.2%
TOTAL (including claims costs)	**£6,168**	

Figure 13 - Predicted Condition C4



This shows the overall RCI remaining constant over the 20 year period.

Figure 14 - Predicted Impacts C4



Option Summary C4

The option of using preventative maintenance treatments is predicted to result in:

Option Summary

The option of achieving a steady state using the proposed East Lothian Council planned maintenance budget is predicted to result in:

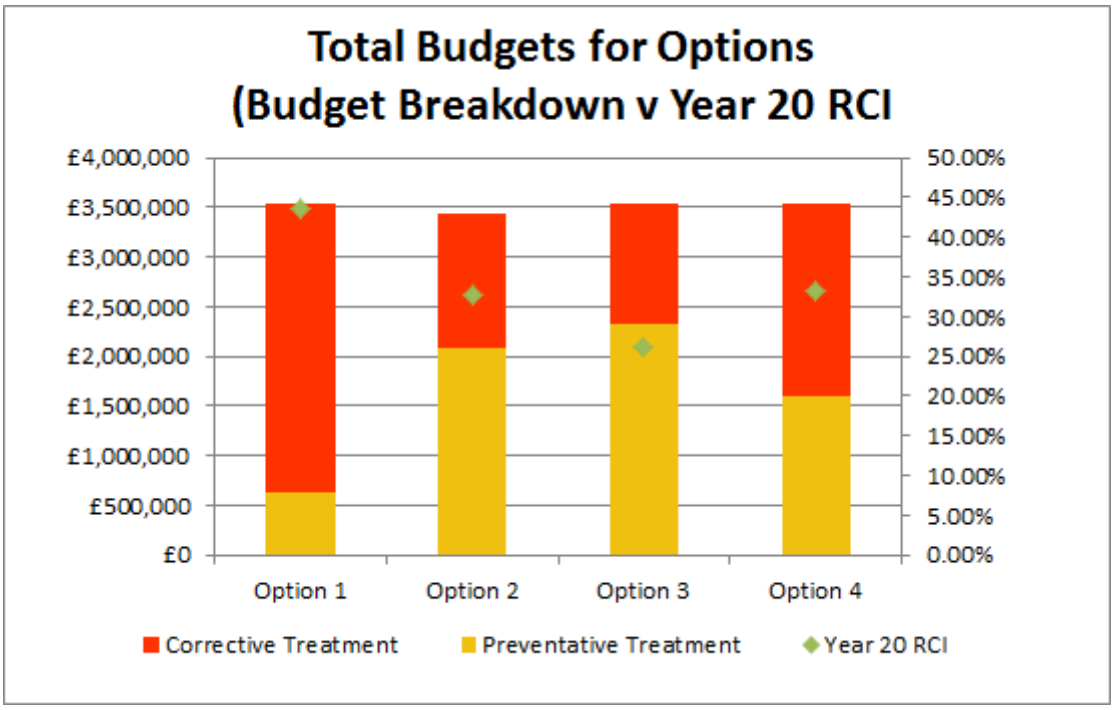
a. →annual budget remaining the same over time
b. →continuance of measured condition
c. →no increase in quantities of minor defects (pot holes and the like)
d. →continuance of current level of 3rd party claims
e. →The level of customer satisfaction will remain constant.
f. →carbon emissions will remain constant.

Total cost (over 20 years) estimated at **£123m.** Annual cost £6.1m. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

Recommendation

The following chart provides a summary of the treatment budgets and the year 20 RCI for the four options described above.

Figure 15- Summary Carriageway Option



- Option 1: Invest £3.5m – East Lothian Proposed 2015/16 Strategy
- Option 2: Maintain Current Condition – Mix of preventative and corrective
- Option 3: Invest £3.5m – Preventative Strategy
- Option 4: Invest £3.5m – Achieve Steady State Condition using Minimum Quantity

of Preventative Treatments

It is recommended that the council adopt Option 3, the preventative maintenance strategy in order to best utilise the monies which is predicted to have the greatest positive effect on the RCI measure.

Appendix B – Footways Status and Option Report

3.1 Status Report

Table 9 – Footway Asset Statistics

Asset Group: Footways

The Asset

Statistics

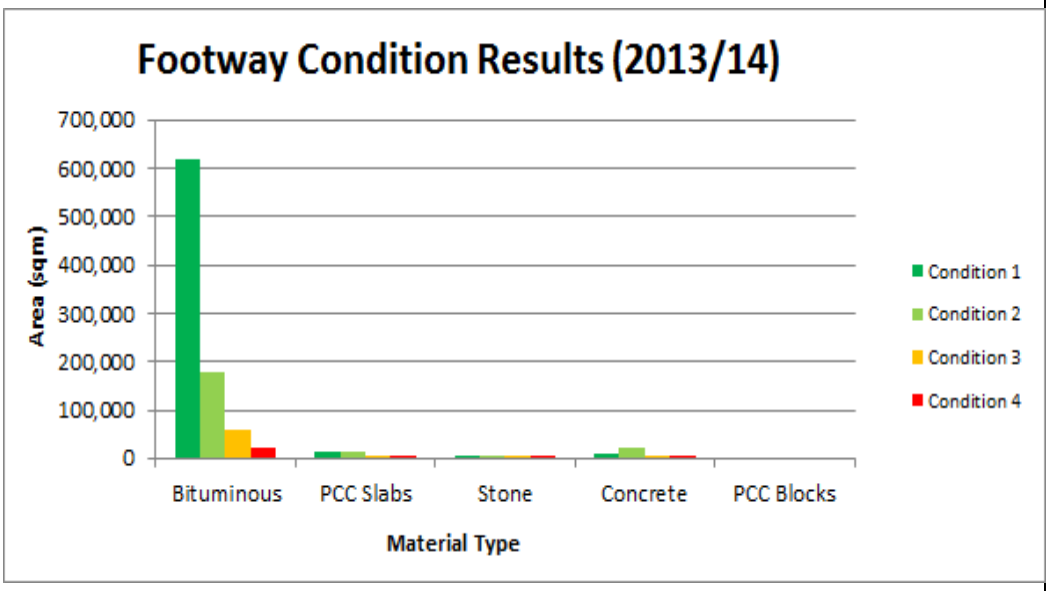
Footway Material Quantities ('000m²)						
Material Type	**1a**	**1**	**2**	**3**	**4**	**Total**
Bituminous	0.0	1.9	15.0	23.8	837.1	877.7
PCC Slabs	0.0	2.3	2.4	3.2	23.4	31.3
Stone	0.0	1.5	0.1	1.9	10.0	13.5
Concrete	0.0	3.1	1.9	1.2	33.9	40.1
PCC Blocks	0.0	0.0	0.0	0.0	0.0	**0.0**
Total	**0.0**	**8.8**	**19.3**	**30.0**	**904.4**	**962.6**

Commentary

- The survey data is over 5 years old and needs to be updated.

Figure 17 – Footway Condition

Condition



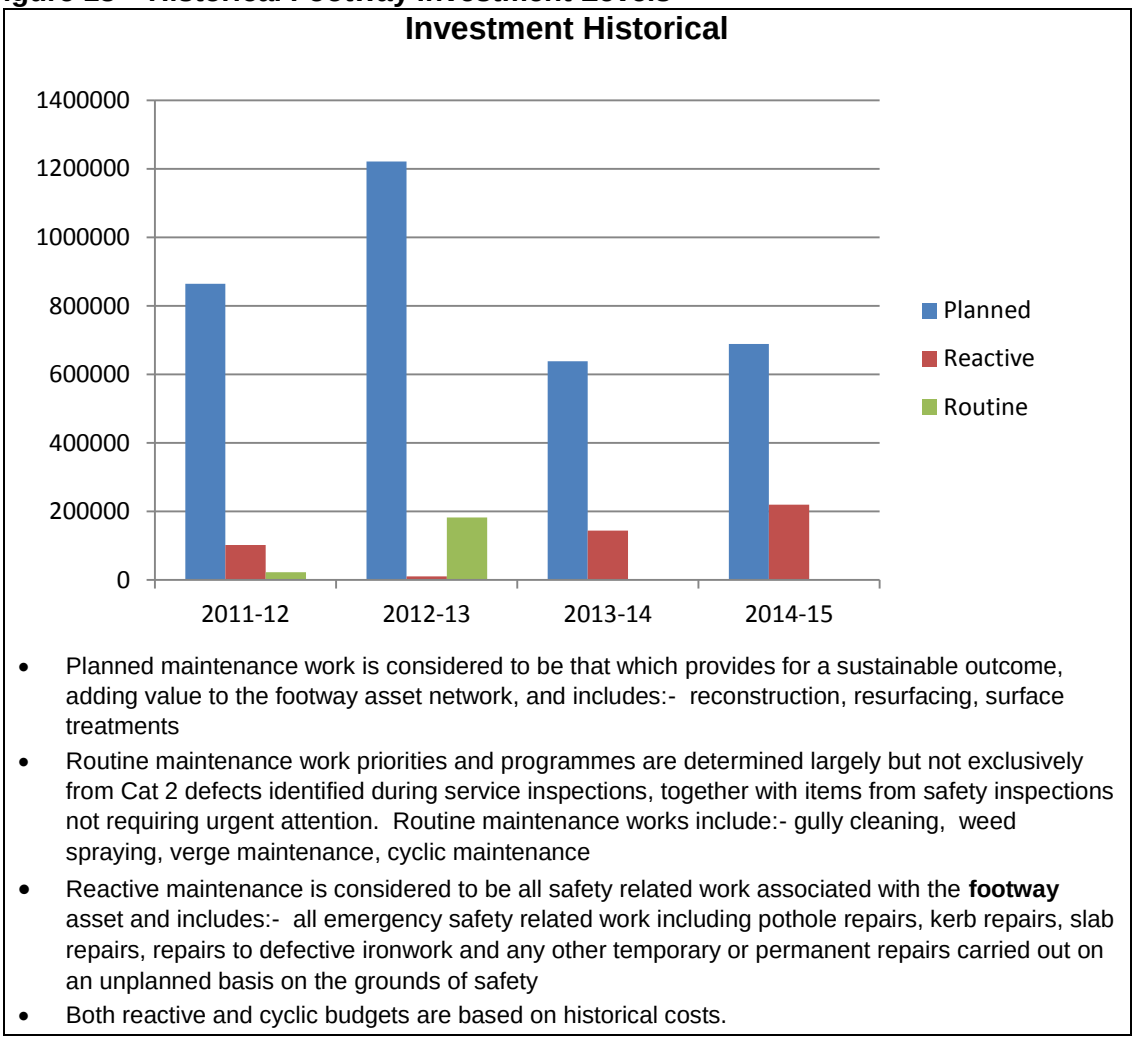
Condition Band Descriptions
Condition 1 –As New
Condition 2 –Aesthetically Impaired
Condition 3 – Minor Deterioration
Condition 4 –Major Deterioration

- The condition of the footway asset is obtained using the East Lothian Footway Condition Assessment Process.
- 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).

Table10 – Performance Indicators

Ref.	Description	2013/14 Result	Comments
PI45a (11.1.01)	% of Cat 1 defects made safe within response times	37.5%	
PI46 (11.2.01)	% of safety inspections completed on time	100%	
PI47 (12.1.01)	% of footway length to be considered for maintenance treatment	9.17%	
PI48 (12.1.02)	% of footway length treated	2.7%	
PI49b (16.1.03)	Total footway maintenance expenditure by footway length	£3002/km	

Figure 18 – Historical Footway Investment Levels



- Planned maintenance work is considered to be that which provides for a sustainable outcome, adding value to the footway asset network, and includes:- reconstruction, resurfacing, surface treatments
- Routine maintenance work priorities and programmes are determined largely but not exclusively from Cat 2 defects identified during service inspections, together with items from safety inspections not requiring urgent attention. Routine maintenance works include:- gully cleaning, weed spraying, verge maintenance, cyclic maintenance
- Reactive maintenance is considered to be all safety related work associated with the **footway** asset and includes:- all emergency safety related work including pothole repairs, kerb repairs, slab repairs, repairs to defective ironwork and any other temporary or permanent repairs carried out on an unplanned basis on the grounds of safety
- Both reactive and cyclic budgets are based on historical costs.

Table 11 – Footway Investment and Outputs

Cost Category	**£1,879k**	**Output**
Planned Maintenance - preventative	£92k	- 18,704 m^2 of slurry seal (£79,291) - 1254 m^2 of planned patching (£64k)
Planned Maintenance - Corrective	£528k	- 646 m^2 (11%) of resurfacing (£56k) - 1,870 m^2 (89%) of reconstruction (£472k)
Routine Cyclic Maintenance	£0k	
Routine - Reactive Repairs (emergency)	£0.94k	− 16no sites of cat 1 defects)(£940)
Routine - Reactive Repairs (non-emergency)	£219k	− 10 no. sites of housing stock defects (£46,881) − 15 no. sites of 'Find and Fix' (£128,476) − 6no. Misc(earthwork, veg) (£42,535) − 1no. Recoverable investigation (£1,725)
Routine - Inspection & Survey	£35k	- 3 no. Surveys and land enquiries
Loss#	£44k	− 5 No. Third Party claims settled
Improvements	£898k	- Musselburgh High St (£499,276) - 5no. Housing Stock upgrade (£65,774) - 4no.Cycleway imp (SUSTRANS) (£284,961) - 1no. CWSS (cycleway) (£48,538)
Operating Costs	£63k	− Winter Maintenance Costs

Table 12 – Footway Valuation

Footway Valuation by Hierarchy				
Footway Hierarchy	**Gross Replacement Cost**	**Depreciated Replacement Cost**	**Annualised Depreciation Cost**	**Depreciation**
Higher Amenity Footways	£0	£0	£0	£0
Other Footways	£68,613,514	£53,222,293	£763,675	£15,391,221
Total	**£68,613,514**	**£53,222,293**	**£763,675**	**£15,391,221**

Footways Valuation by Material Type					
Material Type	**Length (m)**	**Area (sqm)**	**Gross Replacement Cost**	**Depreciated Replacement Cost**	**Annualised Depreciation Cost**
Bituminous	438856	877712	£59,903,844	£48,004,146	£668,158
Slabs	15659	31318	£2,564,944	£1,757,407	£30,253
Stone	6755	13510	£2,780,358	£1,228,272	£46,339
Concrete	20026	40052	£3,364,368	£2,232,468	£18,925
Blocks	0	0	£0	£0	£0
Total	**481296**	**962592**	**£68,613,514**	**£53,222,293**	**£763,675**

The annualised depreciation (AD) was £0.763m which represents the average amount by which the asset will depreciate in one year if there is no investment in renewal of the footway asset. The majority of the ADC is associated with deterioration of the bituminous pavement assets, which is wholly expected as this represents a significant proportion of the asset group.

Current Status

As at 31 March 2015

- → continuance of annual budget
- ↘ reduction (deterioration) of measured condition
- ↗ increasing quantities of minor defects (pot holes and the like)
- ↗ increase in 3rd party claims

↘ decreasing customer satisfaction as a result of increasing reactive repairs

Key Issues

- Road services are responsible for repairing footways in Council housing estates. These footways are not on the inventory and therefore not the inspection roster. The normal footway surfaces in new housing estates are slabs. If these assets become the responsibility of the Roads Authority, the renewal strategy would be to replace the slabs with a paved surface. Discussions are currently ongoing to look at a long term strategy of adoption and transference between Service areas.

- Following significant grant aided investment in the public realm Planning documents (Maintenance Manuals) are specifying the need for specific footway treatments in Conservation Areas. The approval of these documents may force future footway renewal investment to be targeted at these sites instead of footways in poor condition. It is likely these surfaces will be more expensive than the normal paved surfaces undertaken in the majority of East Lothian. Long term revenue maintenance burdens must be taken into account when applying for external capital investment and developed into the long term asset status and option models.

- The need for improvements in footways and cycleways will be necessary to enable the success of Sustainable Transport Strategies. Walking and cycling provides a number of benefits to society including improved health and reduced carbon costs with less vehicle use. 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.

- The objective of the Town Centre Strategy is to attract more visitors to improve the local economy. The footway infrastructure will need to be improved with aesthetically pleasing slabs. There will be a need to ensure that the state of the infrastructure is always clean and defect free which will require additional cyclic maintenance. This will require to be evaluated as part of the options report on a case by case basis.

- There has been a change in the guidance to the functional hierarchy in 2015 which has not been adapted to Road Services. This guidance will be reviewed as part of the Asset and Regulatory workplan for 2016/17 and will include a review of the NSG traffic sensitivity and special engineering difficulty functionality.

- 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 accurate prediction models, 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.

- On a whole there has been little change in the condition of the footway/ cycleway network between intervening years.

Current Strategies

- The planned maintenance budget is targeted at the overall worst condition footways. Treatment types are selected to return the asset to an as new condition.
- The reactive maintenance budget is used for ensuring the footway asset remains safe for the public. The main safety defects repaired under this budget are potholes and loose slabs.

3.1 Footways Options 1: Maintain Current Investment

Budget

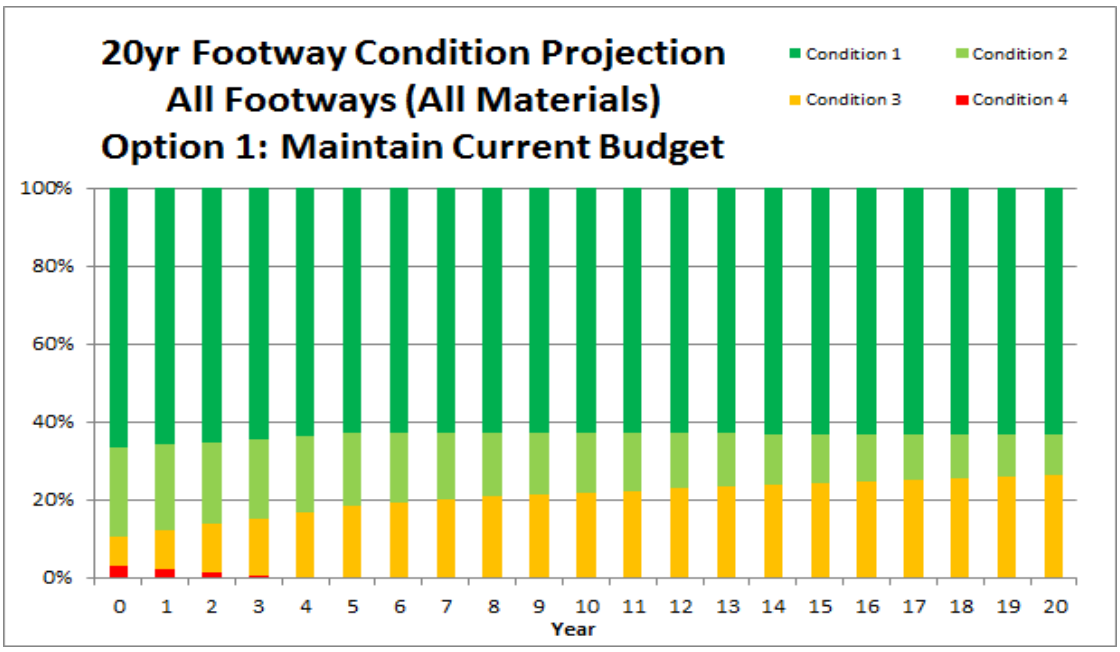
The first option is to investigate the effect of investing in the proposed East Lothian Council 2016/17 planned footway maintenance budget of £590,000 annually over the 20 year period. This strategy is to treat all major deteriorated (condition four) footways and the higher hierarchy footways with any surplus.

A breakdown of the total carriageway budget for 2016/17 is as follows:

Table 13 – Footway Investment Option F1

RAMP Cost Category	**Anticipated Budget (£000's)**	**%**
Routine - Reactive Repairs (emergency)	£0	0.0%
Routine - Reactive Repairs (non-emergency)	£65	18.7%
Routine Cyclic Maintenance	£0	0.0%
Planned Maintenance - Preventative	£0	0.0%
Planned Maintenance - Corrective	£590	76.4%
Inspections and survey	£0	0.0%
Operating Costs	£17	2.2%
TOTAL	**£751**	
Loss (3rd Party Claims associated with (footways)#	£21	2.7%
TOTAL (including claims costs)	**£772**	

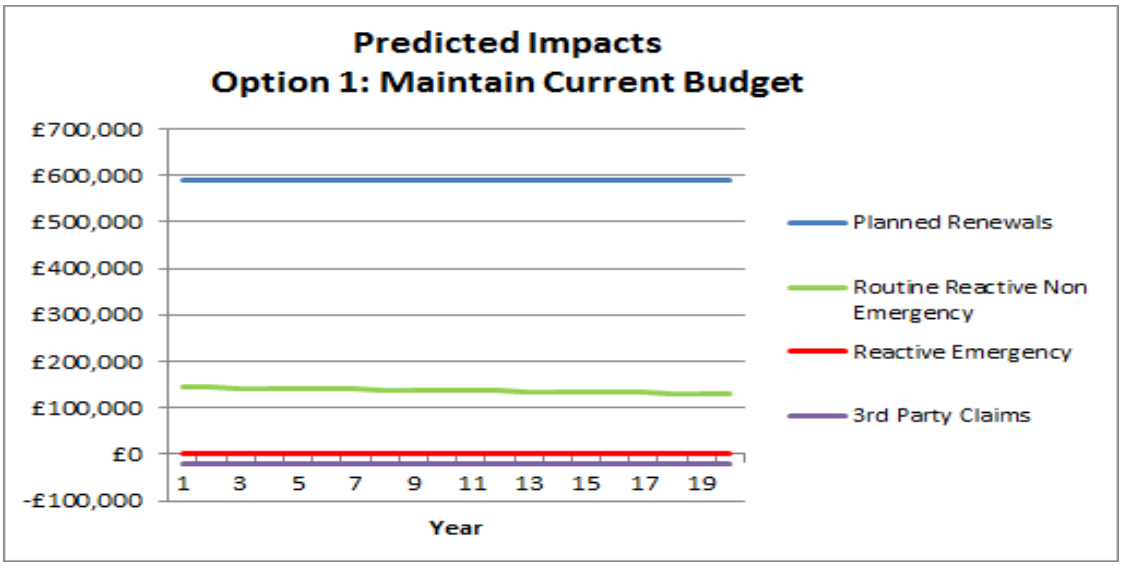
Figure 19 – Footway Predicted Condition F1



This shows the overall level of minor and major deteriorated (condition three) footways increasing from the current 11% to 27% in 20 years.

The overall level of condition four reduces to 0% which is the main target of this option.

Figure 19 – Footway Predicted Impacts F1



Summary

The baseline option of a continuance of current funding levels is predicted to result in:

a. ↘ reduces over time due to the reduction in the routine budget caused by the eliminating of the worst condition footways
b. ↘ overall reduction (deterioration) of overall measured condition. The positive aspect of this option is the removal of the worst condition footways.
c. ↘ quantity of minor defects (potholes and the like) will decrease.
d. ↘ It is likely there will be a reduction in 3rd party claims
e. ↘ level of customer satisfaction is likely to improve.

Total cost (over 20 years) estimated at **£15.3m.** Annual cost of £764,000 (No allowance has been made for construction inflation currently running at approximately 5% per annum)

3.2 Footways Options F2: Maintain Current Condition

Budget

The second option comprises a continuance of current condition levels the funding requirements for this being shown below:

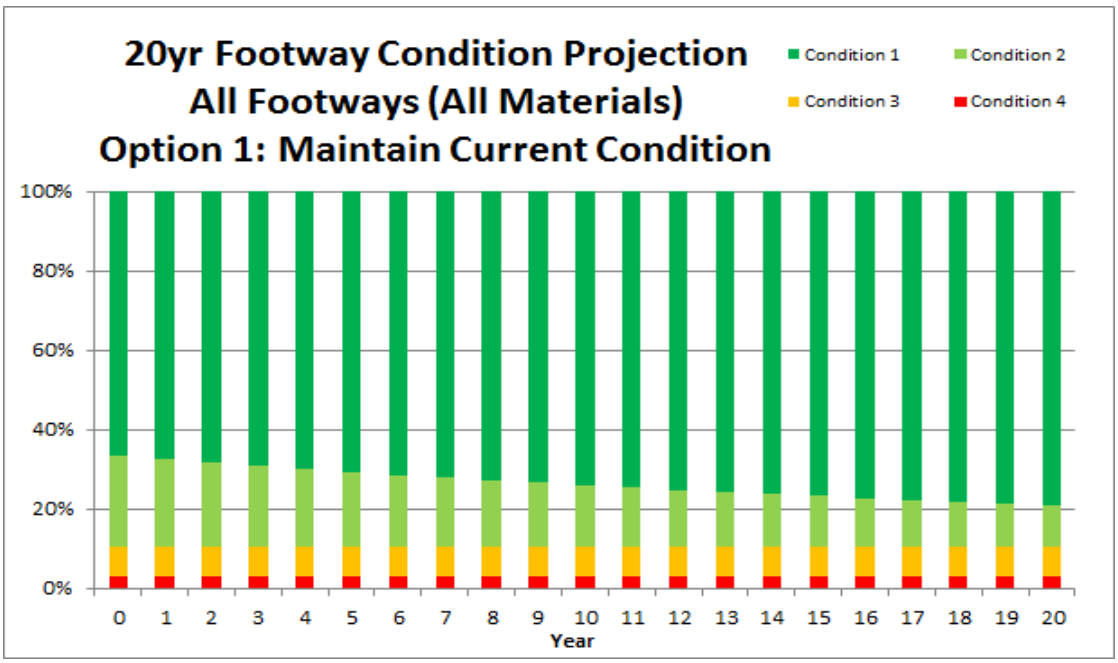
Note: this option only maintains the minor and major deteriorated (condition three and four) footways.

A breakdown of the total carriageway budget for 2016/17 is as follows:

Table 14 – Footway Investment Option F2

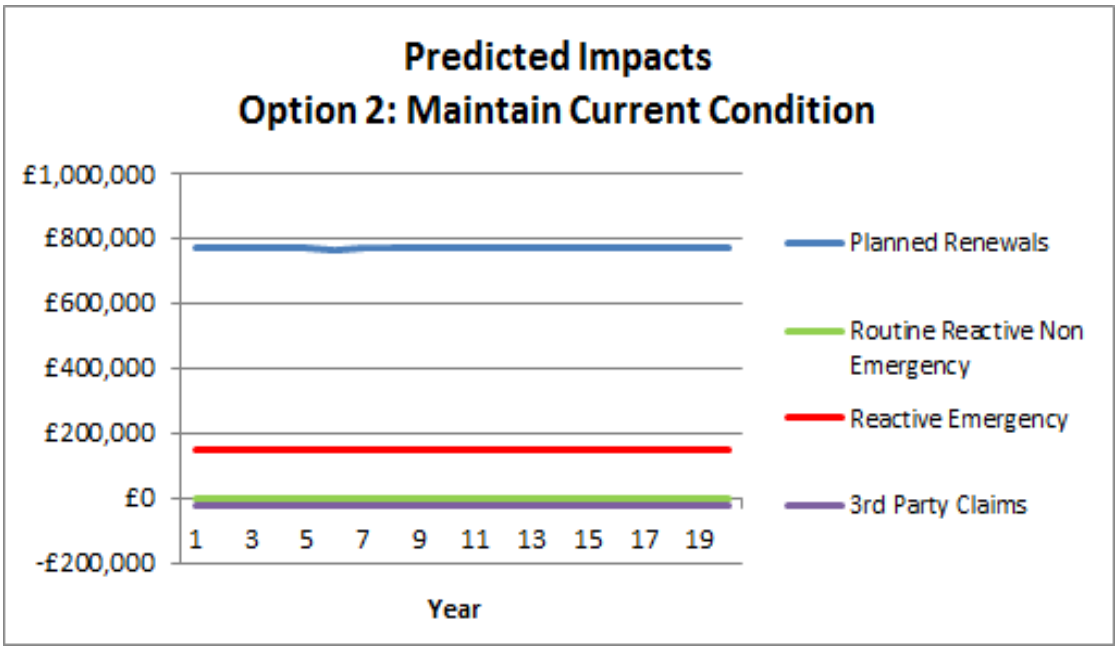
HAMP Cost Category	**Anticipated Budget (£000's)**	**%**
Routine - Reactive Repairs (emergency)	£0k	0.0%
Routine - Reactive Repairs (non-emergency), - Patching and Paving *	£65	15.1%
Routine Cyclic Maintenance (weeding)	£0k	0.0%
Planned Maintenance - Preventative	£39k	4.1%
Planned Maintenance - Corrective	£731k	76.8%
Inspections and survey (covered under staff costs)	£0k	0.0%
Operating Costs	£17k	1.8%
TOTAL	**£931k**	
Loss (3rd Party Claims associated with (footways)#	£21k	2.2%
TOTAL (including claims costs)	**£952k**	

Figure 20 – Footway Predicted Condition F2



This shows the level of minor and major deteriorated (condition three and four) footways remaining the same over time.

Figure 21 – Footway Predicted Impacts F2



Option Summary

The option of maintaining the current level of minor and major deteriorated (condition three and four) footways over 20 years will result in:

a. → annual budget remaining the same over time
b. → continuance of measured condition
c. → no increase in quantities of minor defects (pot holes and the like)
d. → continuance of current level of 3rd party claims
e. → level of customer satisfaction remains constant.

Total cost (over 20 years) estimated at **£16.3m.** Annual cost £815,000. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

2.2.5. Footways Option F3: Achieve Condition 4 of 0%

Budget

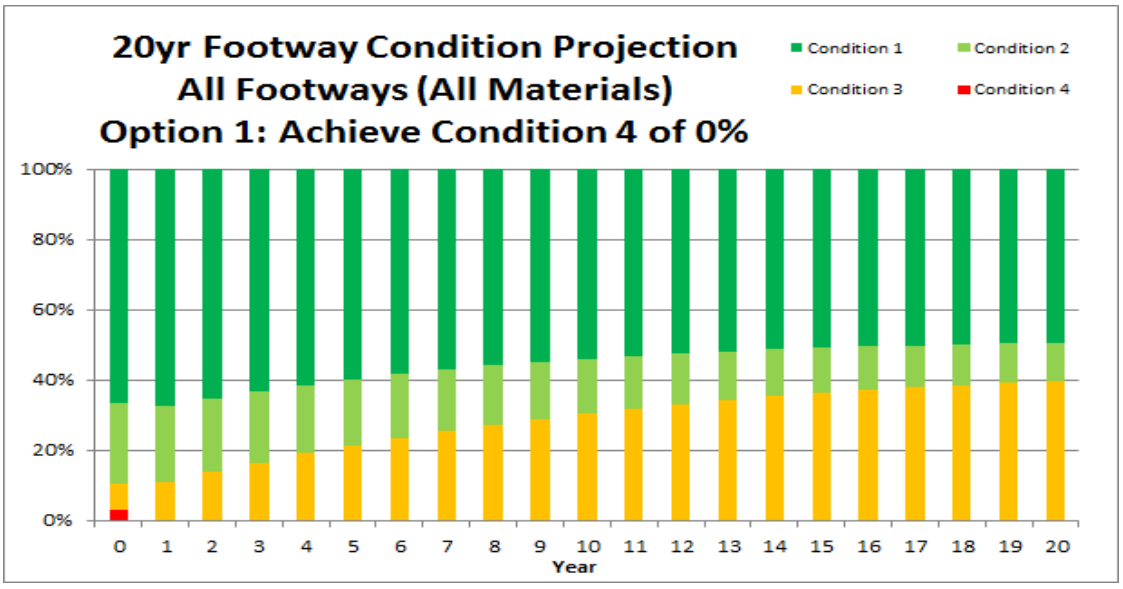
The third option comprises treating all major deterioration (condition four) footways in year one and then maintaining that level for the remaining 20 years. The planned maintenance budget profile for this option can be seen in the Impacts chart below.

A breakdown of the total carriageway budget for 2015/16 is as follows:

Table 15 – Footway Investment Option F3

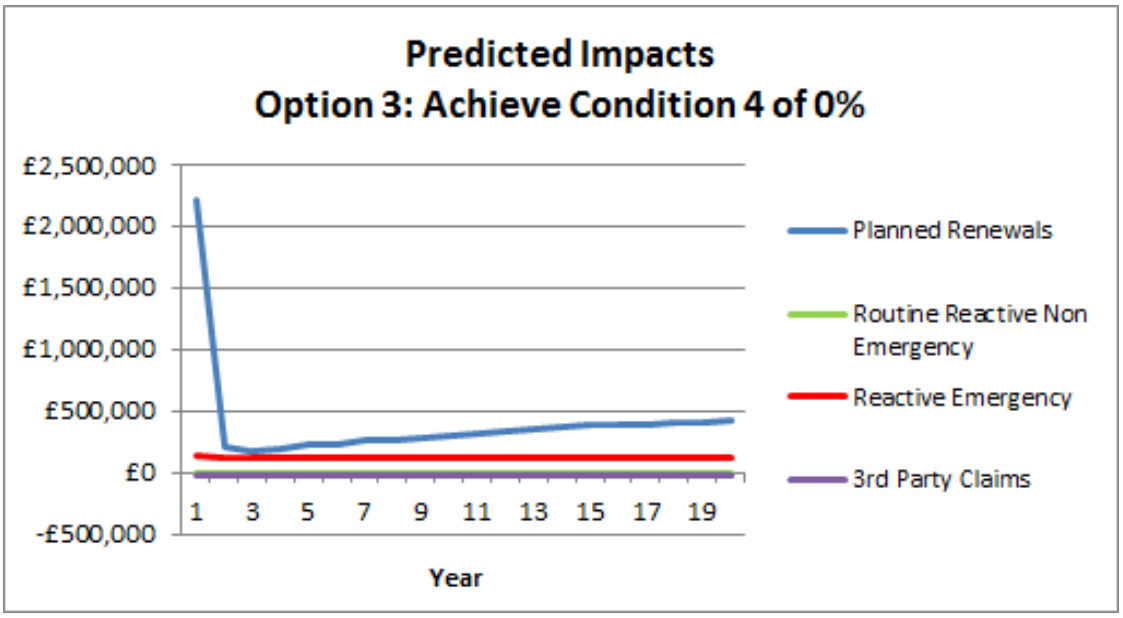
HAMP Cost Category	**Anticipated Budget**	**%**
Routine - Reactive Repairs (emergency)	£0k	0.0%
Routine - Reactive Repairs (non-emergency), - Patching and Paving *	£65k	6.0%
Routine Cyclic Maintenance (weeding)	£0k	0.0%
Planned Maintenance - Preventative	£0k	0.0%
Planned Maintenance - Corrective	£2,209k	92.4%
Inspections and survey (covered under staff costs)	£0k	0.0%
Operating Costs	£17k	0.7%
TOTAL	**£2,370k**	
Loss (3rd Party Claims associated with (footways)#	£21k	0.9%
TOTAL (including claims costs)	**£2,391k**	

Figure 22 – Footway Predicted Condition F3



This shows the level of major deteriorated (condition four) footways reduced to the target of 0%. Minor deteriorated (condition three) footways increases from 7% to 40%.

Figure 23 – Footway Predicted Impacts F3



The planned renewals budget for year 1 is £2,209k which enables the removal of all major deteriorated (condition four) footways. The average budget for the remaining 19 years is £310,000 which is lower than the current budget of £590,000

Option Summary

The option of removing and then maintaining the major deteriorated (condition four) footways at 0% is predicted to result in:

a. ↗ From year 2 onwards, after treating the backlog, the annual budget increases.
b. ↗ overall level of condition three and four increases (deteriorates). Condition four reduces down to 0%.
c. ↗ overall increase in minor defects (potholes and the like). The improvement in condition four would lead to a significant reduction in major defects.
d. ↗ level of 3rd party claims will increase with the increase in deteriorated sections of footway. The level of 3rd party payouts would decrease as the claimable defects have reduced.
e. ↘ likelihood of decreased customer satisfaction as the level of footway deterioration increases covering a higher percentage of the asset.

Total cost (over 20 years) estimated at **£11.3m.** Annual cost £564,000. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

2.2.6. Footways Option F4: Achieve Condition 4 of 0% and Condition 3 of 5%

Budget

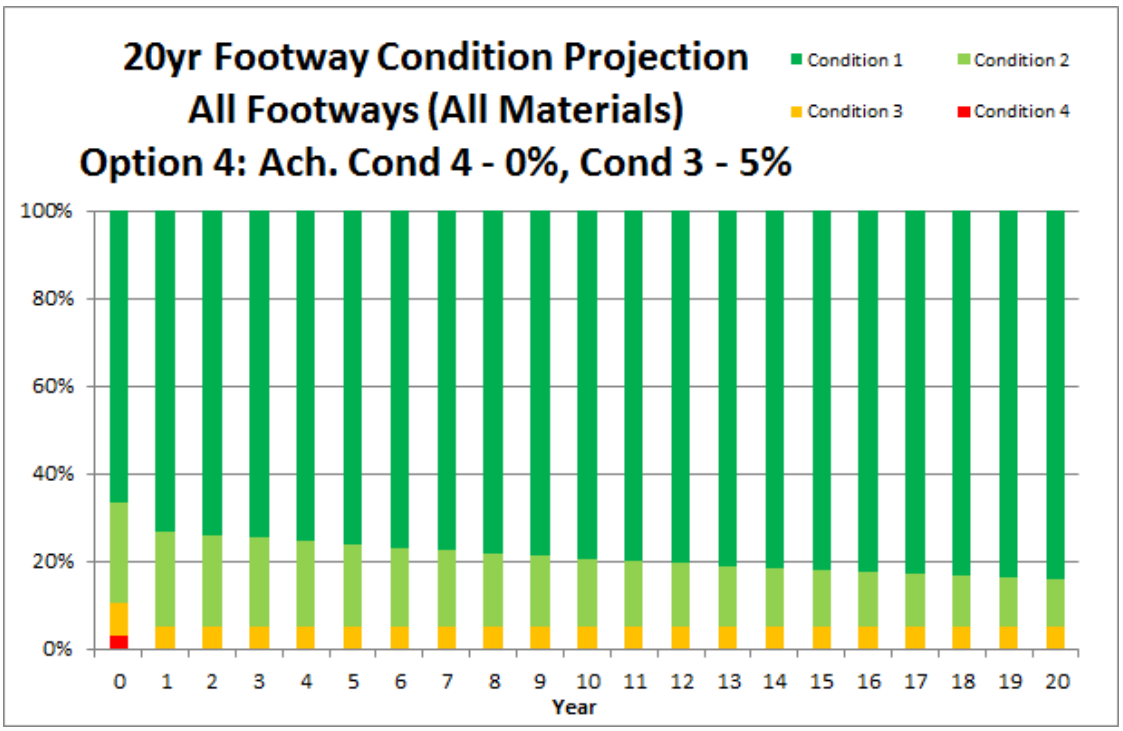
The forth option comprises reducing the level of minor deteriorated (condition three) footways to 5% and removing all major deteriorated (condition four) footways in year one and then maintaining these levels for the remaining 20 years. The planned maintenance budget profile for this option can be seen in the Impacts chart below.

A breakdown of the total carriageway budget for 2015/16 is as follows:

Table 16 – Footway Investment Option F4

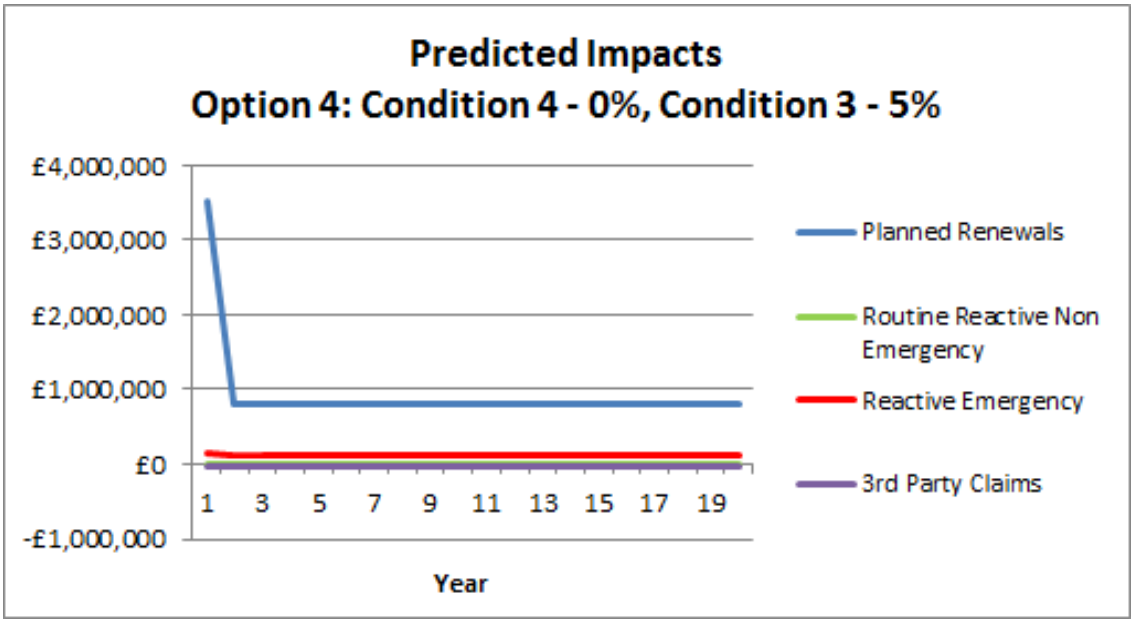
HAMP Cost Category	**Anticipated Budget**	**%**
Routine - Reactive Repairs (emergency)	£0k	0.0%
Routine - Reactive Repairs (non-emergency), - Patching and Paving *	£65k	3.9%
Routine Cyclic Maintenance (weeding)	£0k	0.0%
Planned Maintenance - Preventative	£0k	0.0%
Planned Maintenance - Corrective	£3,516k	95.0%
Inspections and survey (covered under staff costs)	£0k	0.0%
Operating Costs	£17k	0.5%
TOTAL	**£3,677k**	
Loss (3rd Party Claims associated with (footways)#	£21k	0.6%
TOTAL (including claims costs)	**£3,698k**	

Figure 24 – Footway Predicted Condition F4



The condition chart shows the achievement of reducing minor deteriorated (condition three) footways to 5% and removing all major deteriorated (condition four) footways in year one and then maintaining for year 20.

Figure 25 – Footway Predicted Impacts F4



The planned renewals budget for year 1 is £3,516k which enables the removal of major deteriorated (condition four) footways and reduction of minor deteriorated (condition

three) footways to 5%. The average budget for the remaining 19 years is £800,000 which is higher than the current budget of £590,000

Option Summary

The option of reducing all minor deteriorated (condition three) footways to 5% and removing all major deteriorated (condition four) footways in year one and then maintaining for 20 years is predicted to result in:

a. ↗ From year 2 onwards, after treating the backlog, the projected annual budget flattens off at a level higher than the current investment level.
b. ↘ overall level of condition three and four decreases (improves) from the current level.
c. ↘ reduction in minor defects (potholes and the like).
d. ↗ level of 3rd party claims will increase with the increase in deteriorated sections of footway. The level of 3rd party payouts would decrease as the claimable defects have been reduced.
e. ↘ likelihood of decreased customer satisfaction as the level of footway deterioration increases covering a higher percentage of the asset.

Total cost (over 20 years) estimated at **£21.9m.** Annual cost £1.1m. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

2.2.7. Footways Option F5: Achieve Condition 4 of 0% within 3 years and Condition 3 of 5% within 1 year

Budget

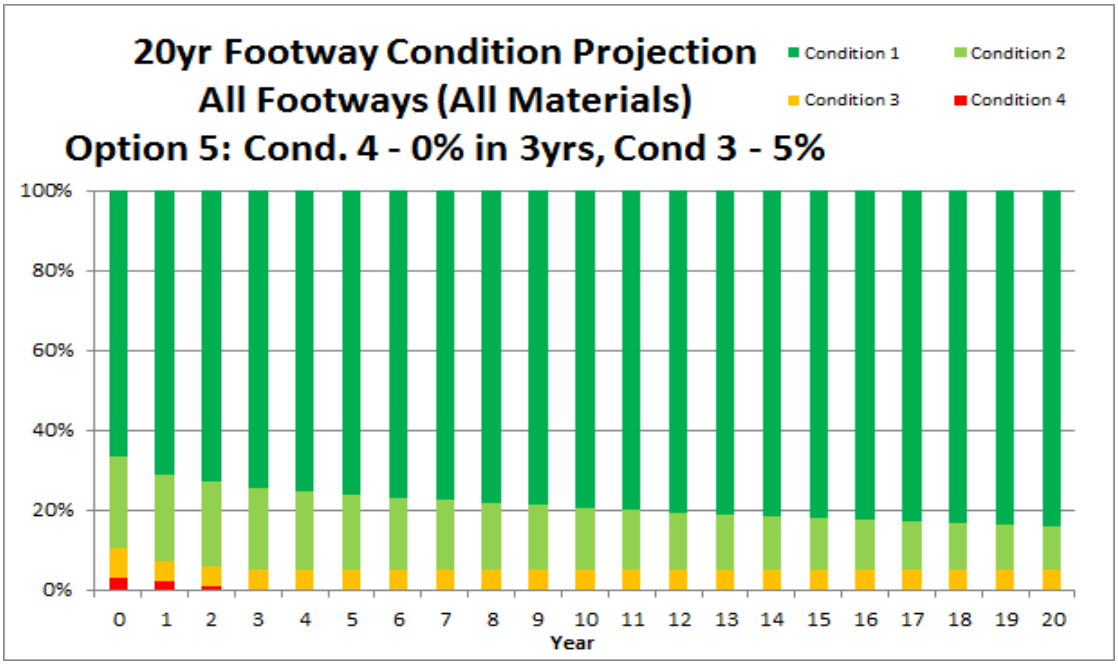
The fifth option comprises reducing minor deteriorated (condition three) footways to 5% in year one, removing all major deteriorated (condition four) footways by year three and then maintaining these levels for the remaining 20 years. The planned maintenance budget profile for this option can be seen in the Impacts chart below.

A breakdown of the total carriageway budget for 2015/16 is as follows:

Table 17 – Footway Investment Option F5

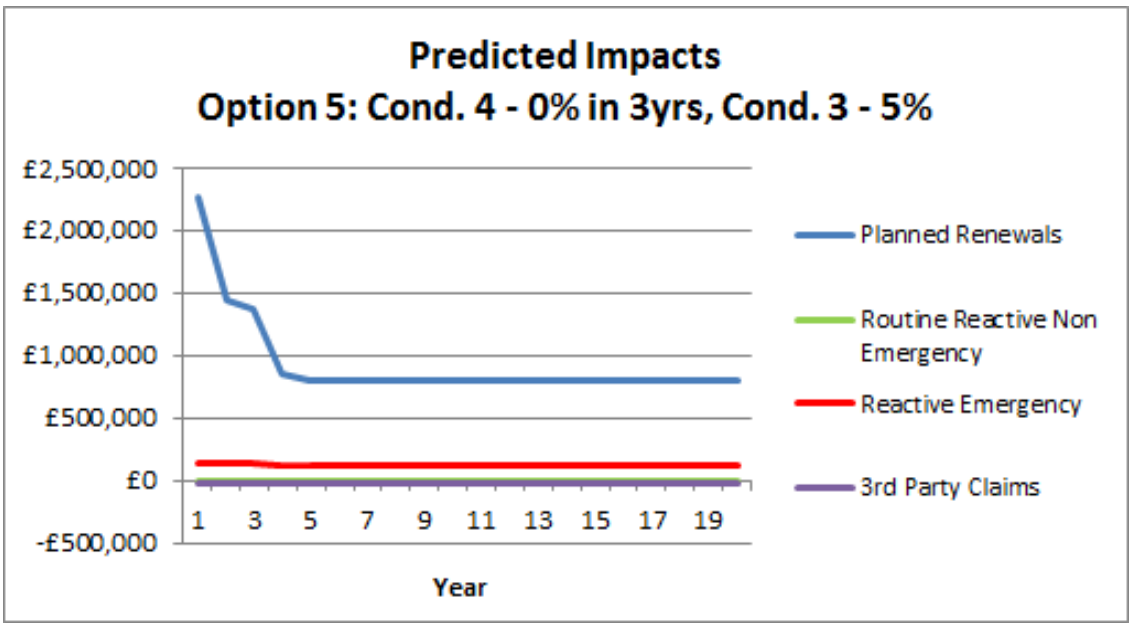
RAMP Cost Category	**Anticipated Budget**	**%**
Routine - Reactive Repairs (emergency)	£0k	0.0%
Routine - Reactive Repairs (non-emergency), - Patching and Paving *	£65k	5.9%
Routine Cyclic Maintenance (weeding)	£0k	0.0%
Planned Maintenance - Preventative	£0k	0.0%
Planned Maintenance - Corrective	£2,273k	92.6%
Inspections and survey (covered under staff costs)	£0k	0.0%
Operating Costs	£17k	0.7%
TOTAL	**£2,434k**	
Loss (3rd Party Claims associated with (footways)#	£21k	0.9%
TOTAL (including claims costs)	**£2,455k**	

Figure 26 – Footway Predicted Condition F5



This shows the level of condition 4 footways reducing to the target of 0% within 3 years and condition three reduces to the target of 5%.

Figure 27 – Footway Predicted Impacts F5



The average planned renewals budget for the first three years is £1,700k which enables the removal of condition four footways and reduction of condition three

footways to 5%. The average budget for the remaining 17 years is £800,000 which is higher than the current budget of £590,000

Option Summary

The option of reducing all minor deteriorated (condition three) footways to 5% and removing all major deteriorated (condition four) footways in year one and then maintaining for 20 years is predicted to result in:

a. ↗ From year 4 onwards, after treating the backlog, the projected annual budget flattens off at a level higher than the current investment level.
b. ↘ overall level of condition three and four decreases (improves) from the current level.
c. ↘ reduction in minor defects (potholes and the like).
d. ↗ level of 3rd party claims will increase with the increase in deteriorated sections of footway. The level of 3rd party payouts would decrease as the claimable defects have reduced.
e. ↘ likelihood of decreased customer satisfaction as the level of footway deterioration increases covering a higher percentage of the asset.

Total cost (over 20 years) estimated at **£21.9m.** Annual cost £1.1m. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

Recommendations

Appendix C – Street Lighting Asset Status and Option Report

Introduction

This report presents a summary of the council's lighting assets as at March 2015. The report complements the Road Asset Management Plan (RAMP). It provides information to enable choices about future levels of investment in the lighting asset.

Status

The status of the lighting asset is reported in terms of condition, the outputs delivered, the standards achieved and an indication of customer satisfaction.

Options

The report considers the following options:

- The effects of continuing with the current investment levels
- The predicted cost of maintaining current standards
- Achieving Council energy saving targets

Long Term Forecasts

Lighting assets deteriorate slowly. The impact of a level of investment cannot be fully understood by solely by looking at the predicted impact over the next couple of years. The report includes forecasts covering 20 years to enable decisions to be taken with an understanding of the long term implications.

Impacts Risk

It may not be possible to provide budgets capable of delivering an ideal service standard. Some compromises may need to be made. To aid with these decisions each option presented is accompanied by an assessment of its impact and the associated risks.

Table 18 – Street Lighting Asset Statistics

Asset Group: Street Lighting

	Statistics	Commentary
The Asset		• The accuracy of street lighting inventory is good. It is stored in the WDM Asset Management System. • Over the last year there has been an increase of 18 columns • The previous 5 years growth was 1,518 columns, an average growth rate of 1.4% per annum. • There has been 6 year low growth primarily due to the slowdown in the housing market and delays in adoption process. • A significant increase is now expected partially due to a catch up of adoptions but also a acceleration in house building. • The increase in lighting stock is wholly due to the adoption of new housing developments. • With a significant housing land supply needed for East Lothian over the next 10 years the street lighting inventory will markedly increase.

Table 6.2a Street Lighting Column Quantities

Column Material	Quantity
Non Galvanised Steel	9,595
Galvanised Steel	5,283
Concrete	0
Aluminium (pre 2000)	0
Aluminium (post 2000)	2,853
Stainless Steel	53
Cast Iron	0
Total	**17,784**

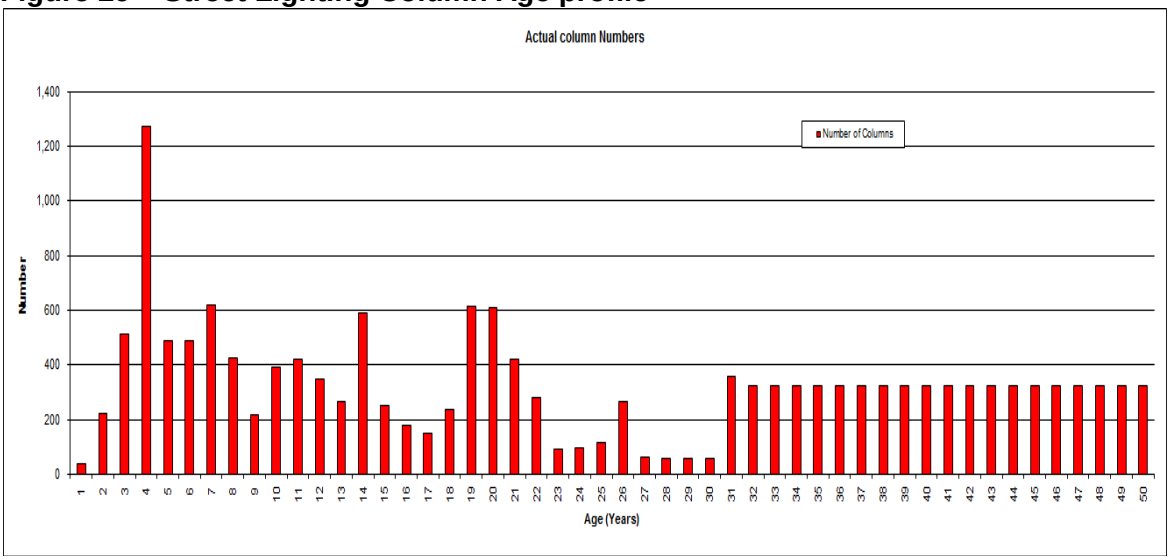
Table 6.2b Street Lighting Luminaire Quantities

Luminaires	Quantity
All	17,796
Total	**17,796**

Table 6.2c Street Lighting Cable Quantities

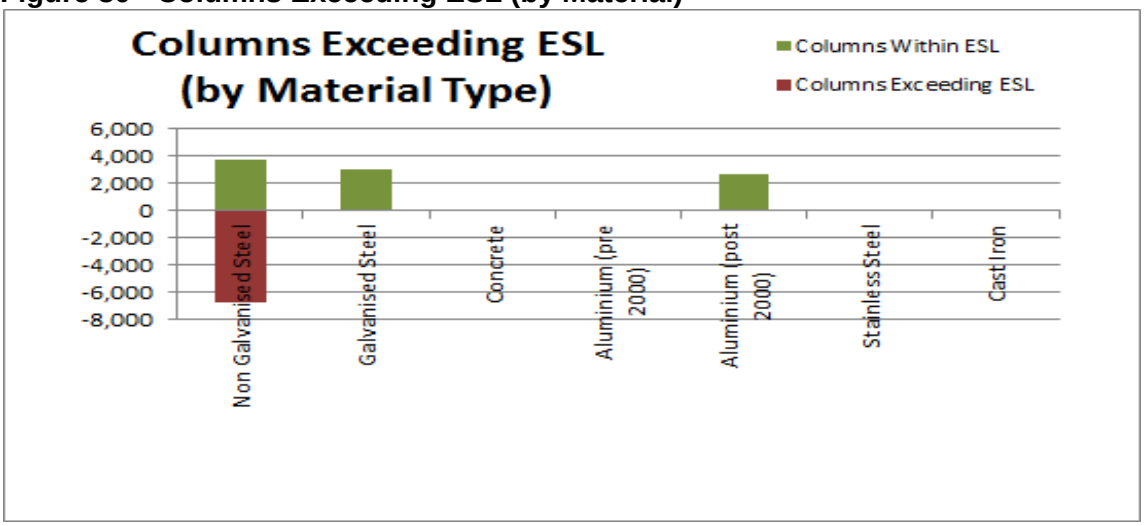
Cable Assets	Quantity (m)
Cable under Carriageway	21,418
Cable under Footway	376,650
Cable under Verge	11,019
Total	**409,087**

Figure 29 – Street Lighting Column Age profile



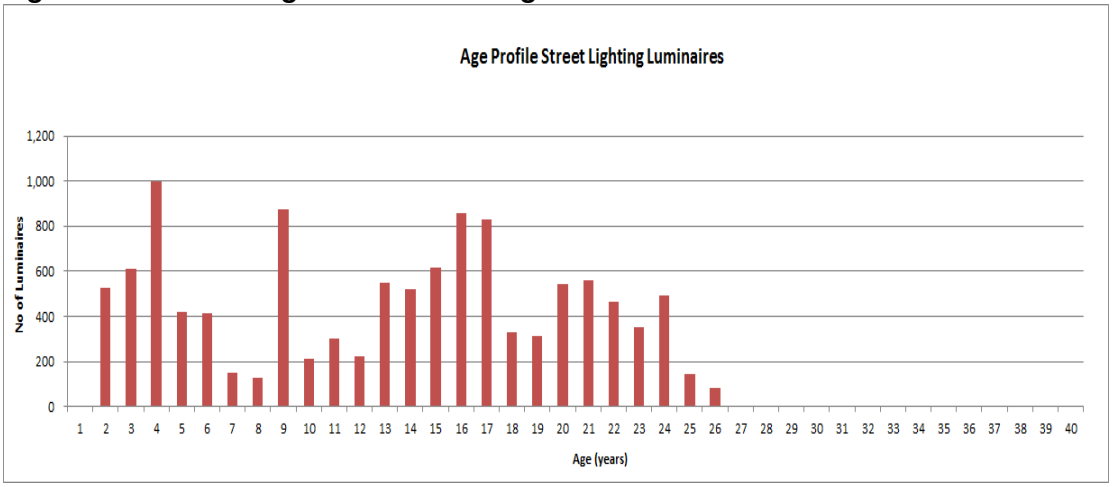
The age profile is calculated on the basis of historical information where it exists. Data over 30 year has been estimated.

Figure 30 - Columns Exceeding ESL (by Material)



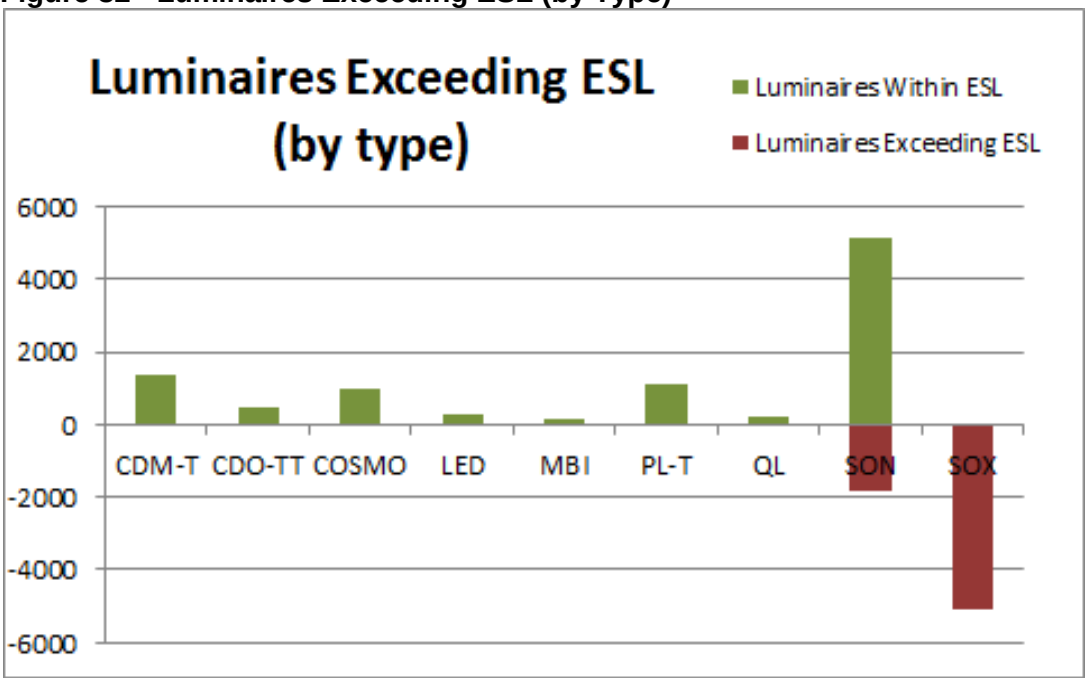
- In 2014/15, 41.82% of columns exceeded their Expected Service Life (ESL).
- The chart shows that all columns exceeding their ESL are non galvanised steel.
- These column types currently make up the majority of the future renewal programme.

Figure 31 – Street Light Luminaires Age Profile



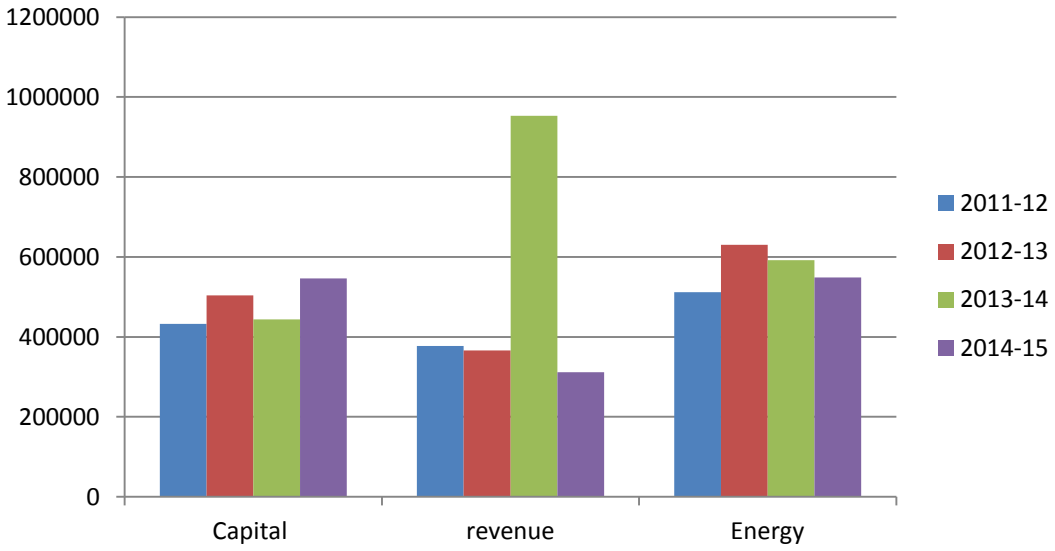
The age profile is calculated on the basis of historical information where it exists. Data over 30 year has been estimated.

Figure 32 - Luminaires Exceeding ESL (by Type)



- In 2013/14, 40.56% of luminaires exceeded their Expected Service Life (Note: ESL is assumed to be 20 years for all luminaire types)
- The chart shows that all SOX luminaires and a portion of SON luminaires exceed their ESL.
- Replacement of SOX luminaries is a high priority in forward work programmes due to their high running costs.

Figure 33 – Street Lighting Historical Investment



- Street lighting revenue expenditure excludes electricity and the cost of repairing street lighting equipment damaged by vehicle impact. The revenue budget addresses reactive- routine activities

- Street lighting capital expenditure includes the cost of bulk lantern replacement, white light upgrades, column replacement

- Energy includes the total annual energy expenditure on street lamp, sign and other lighting supplies directly attributable to street lighting. This relates to energy expenditure on all roads that is maintained by the roads authority at public expense (both adopted and un-adopted).

- Energy is purchased through a term Contract arrangement. The Contract is a national contract awarded by Scotland Excel. The current supplier is EDF. Energy and is purchased in advance and is hugely susceptible to market forces. Timing of the contract is award can be advantageous. Energy consumption is predicted by the use of MPAN. The adaption of stock to low wattage white light is predicted to safe £60k this financial year.

Table 18 Street Lighting Column Valuation

Street Lighting Column Assets	Gross Replacement Cost	Depreciated Replacement Cost	Annualised Depreciation Cost	Total Depreciation
Non Galvanised Steel	£17,610,558	£2,900,006	£704,422	£14,710,552
Galvanised Steel	£8,080,183	£5,323,951	£269,339	£2,756,232
Concrete	£0	£0	£0	£0
Aluminium (pre 2000)	£0	£0	£0	£0
Aluminium (post 2000)	£4,763,783	£4,070,992	£95,276	£692,791
Stainless Steel	£93,021	£77,022	£1,329	£15,999
Cast Iron	£0	£0	£0	£0
Cable Assets				
Cable under Carriageway	£2,248,911	£1,270,709	£37,482	£978,203
Cable under Footway	£21,751,540	£11,345,338	£362,526	£10,406,202
Cable under Verge	£404,948	£339,552	£6,749	£65,397
Other Street Lighting Assets				
Wall Bracket	£27,090	£17,889	£677	£9,201
Wooden Pole	£0	£0	£0	£0
High Mast Column	£0	£0	£0	£0
Control Cabinet	£28,560	£22,814	£571	£5,746
Total	**£55,008,594**	**£25,368,272**	**£1,478,371**	£29,640,322

Table 19 Street Lighting Luminaire Valuation

Street Lighting Luminaires Assets	Gross Replacement Cost	Depreciated Replacement Cost	Accumulated Consumption	Annualised Depreciation Cost
Total	£3,352,425.00	£2,323,249.75	£1,029,175.25	£167,621.25

Table 20 – Column Assets only

Street Lighting Column Assets	Gross Replacement Cost	Depreciated Replacement Cost	Accumulated Consumption	Annualised Depreciation Cost
Total	£55,008,594	£25,368,272.14	£29,640,322	£1,478,371.39

The annualised depreciation (AD) was £1.47m which represents the average amount by which the asset will depreciate in one year if there is no investment in renewal of the asset.

Table 21 – Street Lighting Investment and Outputs

Cost Category	**Investment £1,502,436**	**Output**
Planned Maintenance - Preventative	£25,943	1,460 No. columns corrosion protected (£25,943)
Planned Maintenance - Corrective (Renewals)	£443,833	333 No. Columns (£) 472 No. Lanterns (£)
Routine Cyclic Maintenance	£0	
Reactive Maintenance (Emergency)	£7,873	160 No. Emergency Attendance / Repairs (out of Hours) (£7,873)
Reactive Maintenance (non-safety related)	£383,402	2,079 No. Daytime Routine Repairs (£248,251) Other Repairs Non Routine (£49,327) Ancillary Materials (fuses etc) (£85,824)
Inspections & Survey	£49,327	3,961 No. Structural Test and Inspection (£29,706) 2,815 No. Electrical Test and Inspection (£19,621)
Operating Costs	£592,058	5,732,925kWhrs Electricity Consumption (£592,058)
Overheads*		

Service Standards

Reactive Maintenance Services

The Council is responsible for providing and maintaining good quality street lighting across East Lothian making our communities feel safer, extending the leisure and working day and reducing the fear of crime.

Maintenance activities are prioritised within the limits of available budgets as follows:

1. Ensure the safety of existing equipment
2. Keep existing lights working
3. Improve reliability of existing lighting
4. Upgrade lighting standards in areas already lit
5. Provide lighting in unlit areas (only if funded by others)

Repair/Response Times

- Repairs above ground to street lighting, signs and bollards are to be completed within 7 calendar days.
- Performance on repairs is measured and the target is set at 95% completed within 7 calendar days
- Repairs to underground cable faults, which are East Lothian Council responsibility to be completed within 7 days. If the cables are the responsibility of Scottish Power the faults will be reported to Scottish & Southern and a regular monitor of the situation kept until resolution of the fault
- Provide an effective emergency response within 2 hours.
- Evaluate and respond to written enquiries within 5 working days from receipt.

Emergencies

Emergencies are responded to within 2 hours and cover the following

- Lighting column, control pillar, lit sign pole damaged by vehicles
- Loose lanterns brackets, signs likely to fall and endanger the public
- Damage to lighting cables or overhead lines
- Lighting column or control pillar door missing and wiring disturbed
- Groups of lights (5 or more) are emergency and single lights out are not normally classed as emergencies and will be passed for repair the next working day.

Out of Hours Emergencies

An out of office hours and weekend emergency callout service is in place 365 days a year to deal with the Emergencies listed above.The Council Out of hours Contact Centre will record and process all calls received from the Police and the Public.

- Any issues identified are either rectified immediately if public safety is involved or programmed for upgrading at a later date.
- In cases of direct Public Safety, the Standby Operative will be called by the Contact Centre to investigate and decide on the appropriate action to be taken.

- On the first working day after any holiday shut down, all non-urgent requests will be dealt with speedily.

A comprehensive listing of all types of call and their respective priority rating is shown on in Table below. Responses are classified into 2 categories as follows:

PRIORITY 1 – EMERGENCY (matters that require immediate attention)

PRIORITY 2 – ROUTINE (matters that require to be notified to the Street Lighting Office at the start of the next working day)

Table 22 – Service Request priorities

STREET LIGHTING				
ACTIVITY	**PRIORITY**	**SERVICE REQUEST**	**PASS TO**	**COMMENTS**
Roads Street Lighting	1	Lighting column, control pillar or lit sign pole damaged by vehicles.	Standby Operative called out to attend	
	1	Loose lanterns brackets, signs likely to fall and endanger the public.	Standby Operative called out to attend	
	1	Damage to lighting cables or overhead Lines	Standby Operative called out to attend	
	1	Lighting column or control pillar or lit sign pole door off/ missing and wiring disturbed.	Standby Operative called out to attend	
	1	Groups or single lights out reported by the Police	Standby Operative called out to attend	Only at the request of the Police
	1	Reports of Columns corroded, likely to fall and endanger the public	Standby Operative called out to attend	
	2	Equipment loose/ bracket swung round but unlikely to fall or endanger public	The Street Lighting Office next working day	
	2	Groups or single lights out reported by the Public		
	2	Mandatory lit signs and bollards		
	2	Lighting continuously on		
Illuminated Traffic Bollards	1	Bollard base unit damaged / Uprooted and wires exposed	Standby Operative called out to attend	
	2	Bollard shell missing	The Street Lighting Office next working day	

Asset Performance and Benchmarking

Asset performance is measured using a suitable suite APSE (Association for Public Service Excellence) and SCOTS (Society Chief Officers Transportation Scotland) Performance Indicators (PIs). These PIs grouped under applicable categories are shown in the table below with our council's results over the last four years.

- Indicators:
  - Mandatory Indicator; - all authorities should provide this data statistic:
  - Other Important asset performance data that authorities should also consider collecting

Table 23 APSE/SCOTS Performance Indicators Yearly Trend Comparison

	PI Ref:	SCOTS / APSE PI Description	Council Results			
			2011/12	2012/13	2013/14	2014/15
Safety	Stat	Total number of street lights	16,935	17,931	18,147	17964
	Stat	Total number of street lighting columns	17,462	17,733	17,766	17784
	39	Percentage of columns with a valid Structural Test Certificate	100%	100%	100%	100%
	40	Percentage of street lights with a valid Electrical Test Certificate	100%	100%	100%	100%
Condition and Asset Preservation	29a	Faults as a percentage of street lighting stock	17.08%	16.01%	17.66%	12.2%
	Stat	Percentage of columns which have exceeded their Expected Service Life	32.84%	6.36%	38.42%	37.88%
	Stat	Percentage of lanterns which have exceeded their Expected Service Life	38.72%	40.14%	43.97%	42.56%
	29b	Mean time between failures (MTBF) in years	23.4	25.0	0.2	8.2%
	Stat	Percentage of columns replaced	2.23%	2.14%	1.87%	0.52%
	Stat	Percentage of lanterns replaced	3.03%	2.16%	2.60%	3.02%
Customer Service	3	Percentage of repairs within 7 days	93.11%	98.45%	96.10%	95%
	20	Average time taken to repair (elapsed days)	19.61	1.87	2.26	3.5
	27	Public calls as a percentage of faults	99.97%	100.00%	94.23%	100%
	28	Public calls as a percentage of street lights	17.07%	16.60%	16.64%	12.2%
	Stat	Percentage of street lights modern white light	20.06%	26.77%	30.51%	32.83%
Availability	2b	Percentage of street lights not working as planned on any one evening	43.00%	0.00%	9.03%	6.22%
	Stat	Number of night inspections annually	0	0	0	0
Financial	35	Actual capital investment as a percentage of annual depreciation (from AMP)	26.73%	31.36%	29.93%	34.17%
	36	Depreciated Replacement Cost (DRC) as a percentage of Gross Replacement Cost (GRC)	51.26%	97.53%	42.45%	43.17%
	33	Average cost (client) of repairing routine faults (eg. component replacement)	£113.24	£107.26	£77.46	NA
	34b	Individual cost of night inspecting a street light per light	£0.00	£0.00	£0.00	£0.00
	42	Revenue allocation per street light excluding electricity costs	£22.29	£20.42	£52.51	£17.33
	43	Capital allocation per street light - replacement	£25.52	£28.10	£24.46	£30.40
	1a	Total investment in infrastructure per street light	£47.81	£48.53	£76.97	£47.73
	Stat	Percentage Capital allocated to previously unlit areas	0.00%	0.00%	0.00%	0.00%
Environmental	18b	Average annual electricity consumption per street light (kWhrs))	341.22	322.27	315.92	312.23
	Stat	Average annual CO_2 emissions per street light (kg)	183.25	173.06	170.91	166.451
	Stat	Percentage of street lights Dimmable or Part Night Operation	0.11%	0.21%	0.21%	0.11%

Headline Results for East Lothian 2014/15

- The column and luminaire quantities exceeding expected service life continue to rise which reflects insufficient levels of planned maintenance investment.
- Average energy consumption and CO_2 emissions are reducing which reflects the focus on installing low energy equipment.

Investment Options

The options for future investment are presented in terms of the following:

1. **Structural Condition:** the replacement of columns that are structurally unsound or approaching that condition
2. **Lanterns/Equipment Age and Obsolescence:** replacement of equipment that is either reaching its end of service life or there is merit in replacing it with more modern equipment for the purposes of obtaining better lighting levels.
3. **Energy Efficiency:** replacement of existing or installation of new equipment in initiatives designed to deliver improved energy efficiency and or energy use reduction.
4. **Routine and Reactive Maintenance Standard:** potential changes to the standards applied to reactive and routine repairs
5. **Inspection and Testing:** potential changes to inspection and testing regimes.

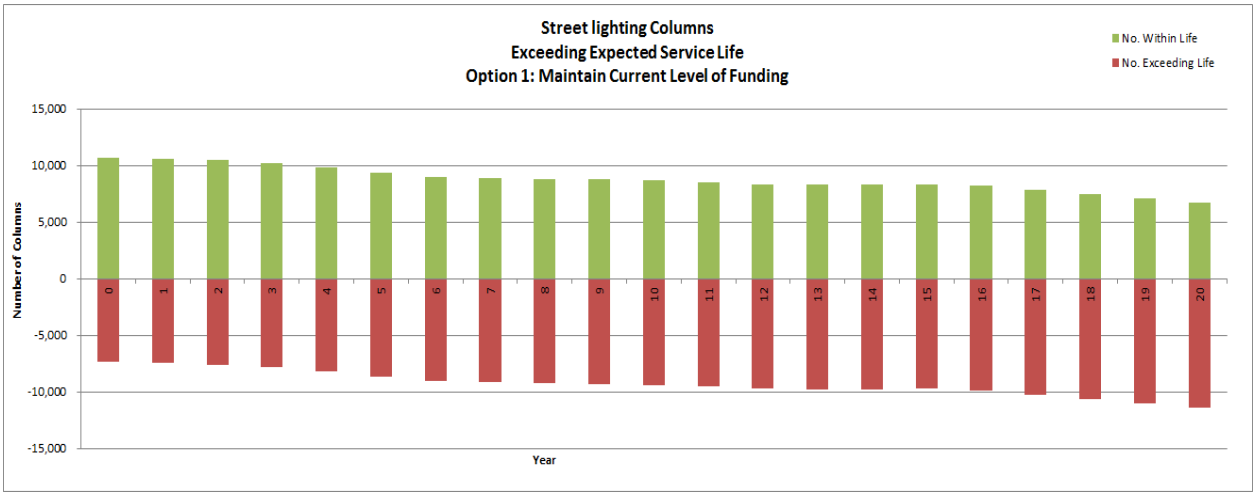
Structural Condition

(a) Predicted condition of columns with continued level of funding

Figure 34 below represents those street lighting columns which are presently within their expected design life (highlighted in green) and those which have exceeded their expected design life (highlighted in red). It is estimated that **41%** of columns currently exceed their expected service life and that this amounts to a financial backlog situation in the region of **£13,000,000** as shown by the graph below.

If the current annual level of investment of £150,000 was continued the quantity of columns achieving the expected service life at Year 20 would increase to **63%** amounting to a financial backlog of **£18,600,000**.

Figure 34 –Street Lighting Columns – Maintain Current Level of Funding



Columns Exceeding Expected Service Life - Option 1

(b) The predicted cost of maintaining current standards

Maintaining the lighting columns at the current age profile ("steady state" condition) will require an annual investment of approximately **£500,000.**

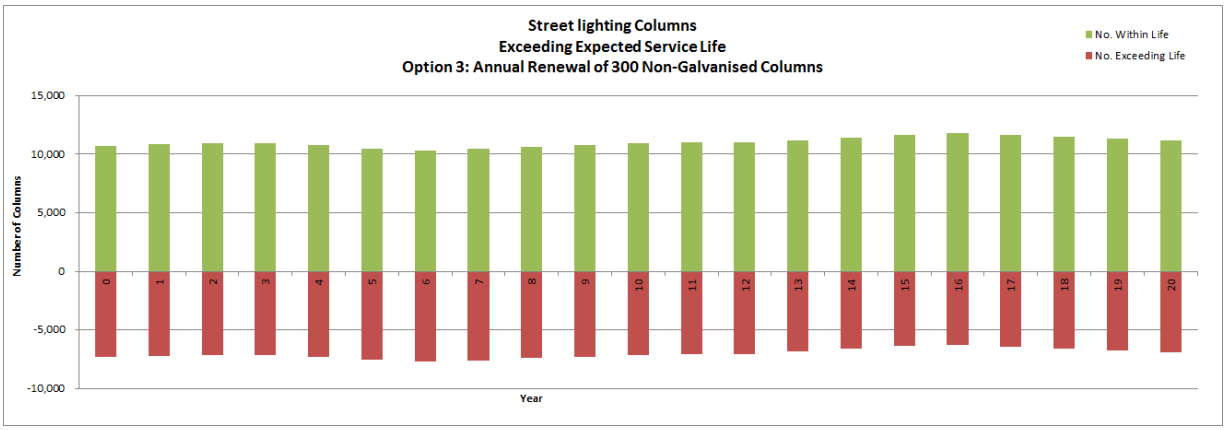
(c) Removal of non-galvanised columns currently over 30 years old

There are approximately 5,800 non-galvanised columns over 30 years old which is above the designated 25 year expected service life. These columns comprise 80% of the quantity currently exceeding the expected service life. The annual structural inspections continue to identify these column types in the amber condition band which in coming years will start to become a risk to the Council if not renewed.

This option proposes to renew these non-galvanised columns with aluminium columns over a 20 year period at an annual cost of £570,000. The aluminium columns have an expected service life of 50 years.

Figure 35 shows that the overall quantity of columns exceeding the expected service life would reduce from 41% to **38%** at Year 20 which will equate to a backlog of **£10,200,000**.

Figure 35 – Street Lighting Columns – 300no. Column renewals / year



Columns Exceeding Expected Service Life - Option 3

Luminaires

Luminaires are assessed using two criteria – age and energy efficiency.

Age

All luminaires have an expected service life which represents the average time that the asset will provide the required level of service. Once a luminaire reaches the expected service life there is a higher chance of faults occurring which leads to higher revenue costs and possibly reduced customer satisfaction.

Energy Efficiency

The biggest factor influencing future street lighting costs involve the price of electricity. Over the last decade the cost of electricity has increased significantly, with increases in excess of 15% per annum experienced since 2004. If this trend was to continue (with no reduction in street lighting energy demand) then this could add substantial costs to the street lighting service budget over the next 20 years.

The scale of future price increases is unknown. It is however possible that energy could become more expensive due to growing competition for resources and increased generation costs. It is therefore prudent to explore options for reducing street lighting energy usage while still maintaining an acceptable level of service.

East Lothian Council has targeted saving £15,000 per year by reducing street lighting energy costs. Note: energy costs include both electricity and carbon.

Evaluation of Energy Saving Initiatives

As part of the SCOTS RAMP project, a spreadsheet tool was developed for analysing and evaluating potential energy saving initiatives over a 20 year period. Within the spreadsheet all improvements are assumed to occur within the first five years. East Lothian Council's current street lighting energy reduction strategy is to upgrade all lanterns with LED equipment. An additional benefit with LED equipment is their longer life which leads to less maintenance and associated disruption to the public.
Table 23 below shows the results of the energy analysis of East Lothian current strategy:

Table 23 - Summary of Energy Saving Options: Network Wide

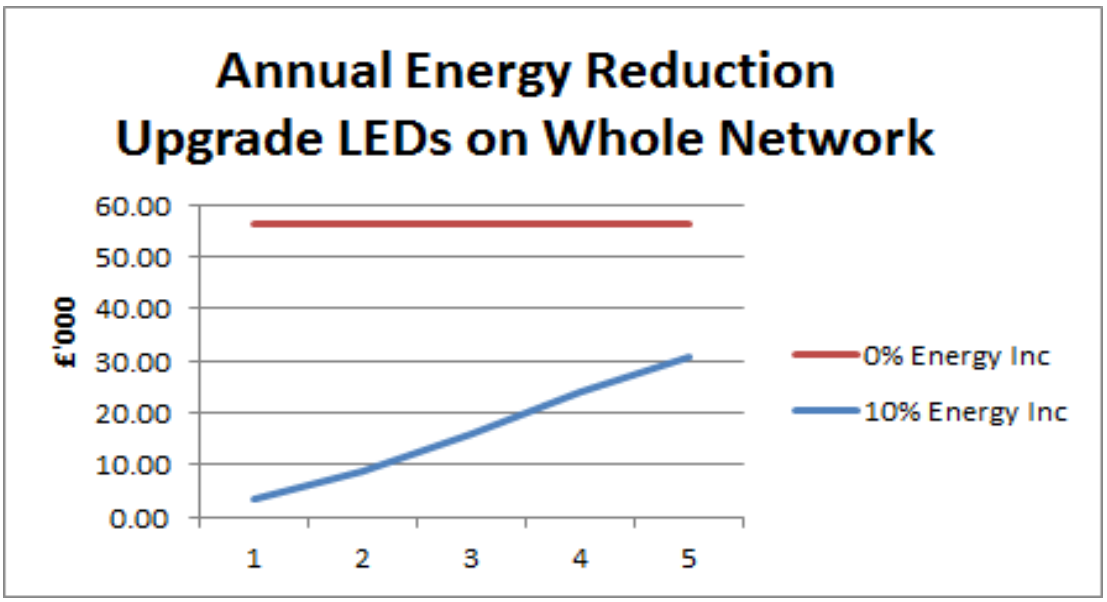
Energy Saving Option	Total Cost Over 20 yrs. (£000's - NPV)	Reduction in Carbon (t)	Cost Saving Benefit (£000's)	Investment Cost Over 5 yrs (£000's)	Benefit / Cost Ratio (BCR)	Pay-Back Period (years)
0 : Baseline	£37,150					
1 : Upgrade Lanterns with LED equipment	£23,997	19,787	£13,153	£4,450	2.96	7
2 : Dimming with LED equipment	£21,796	24,026	£15,354	£4,450	3.45	6

Table 23 shows that to upgrade the remaining lanterns in East Lothian to LED equipment provides a positive Benefit / Cost Ratio of 2.96. The pay-back period which represents the period it would take for the savings to pay back the initial investment is 7 years. The savings consist of energy costs from the lower wattage equipment and reduced maintenance costs.

The second option is to upgrade the lanterns to LED equipment and then dim them between 12:00am and 6:00am. This option provides a higher Benefit / Cost Ratio of 3.45 due to the additional energy savings from the dimming and a lower pay back period.

The assessment of actual annual energy savings for the first five years is shown in the following chart. The unknown factor is the long term level of growth in energy prices. Figure 2 shows the annual reduction with no increase and a 10% increase. The chart shows that the Council savings target of £15,000 per year would be achieved when there is no increase in energy prices.

Figure 36 Annual Energy Reduction - Upgrade LEDs on Whole Network



The maintenance reduction was based on both actual information and predictions. An analysis of all the faults calculates an average lantern life of 3 years. The maintenance costs for the new LED equipment were based on information from the providers. LED equipment is still relatively new and most installations around the United Kingdom are still in the first cycle. For this analysis the life of a LED lantern was assumed to be 10 years.

This option achieves an energy saving target of £15,000 but is unlikely to be undertaken due to the initial five year investment of £4,450,000. Additional options are considered below targeting smaller quantities of lanterns.

All lantern options below will consider and assess the age and energy profile.

(a) Maintaining current investment

Age Profile

Figure 37 below represents those street lighting lanterns which are presently within their expected design life (highlighted in green) and those which have exceeded their expected design life (highlighted in red). It is estimated that approaching **41%** of lanterns currently exceed their expected service life and that this amounts to a financial backlog situation in the region of **£2,145,000** as shown by Figure 1 below.
In 2014/15 East Lothian Council is projected to invest £418,000 in lower energy lanterns. This option considers investing £418,000 in lanterns for the next 20 years but in terms of the age profile this would be over investing. Figure 2.1a shows that after nine years of investing £418,000, all lanterns exceeding the expected service lives are renewed. If this level of investing continued lanterns still providing the required service

levels would be replaced. In this option from Year 9 onwards a budget sufficient to renew the lanterns as they achieve the expected service life would be provided. Figure 2.1b shows the overall budget profile for this option with an annual average of £154,000 from Year 9 onwards.

Figure 37: Luminaires Exceeding Expected Service – Option 1

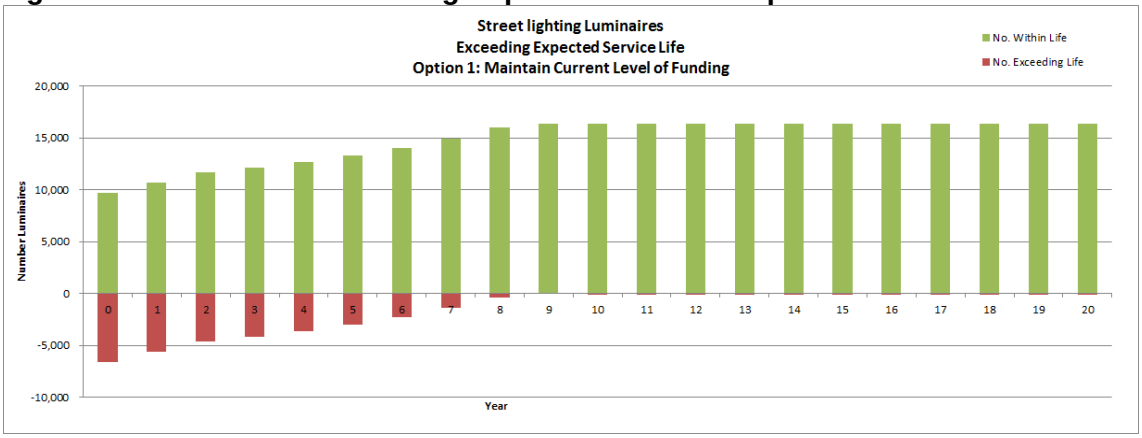
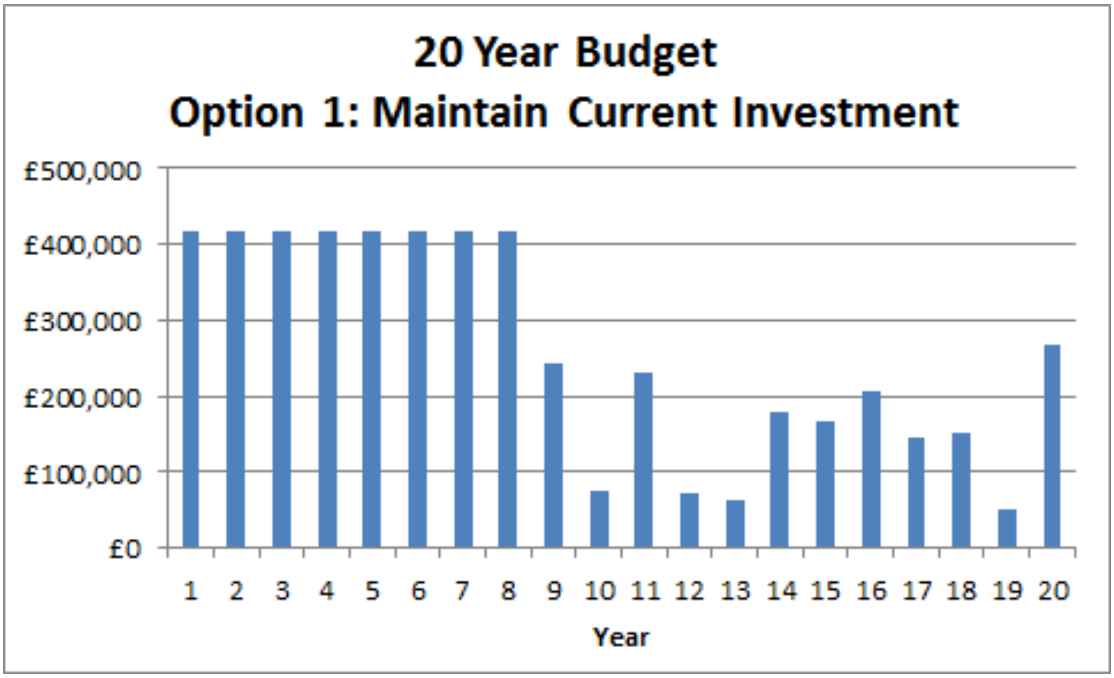


Figure 38 – 20 Year Luminaire Budget – Option 1



Energy Efficiency

The results of the energy savings from maintaining the current investment are shown in Table 24. The analysis only considers the first five years of investment to be consistent with Table 23.

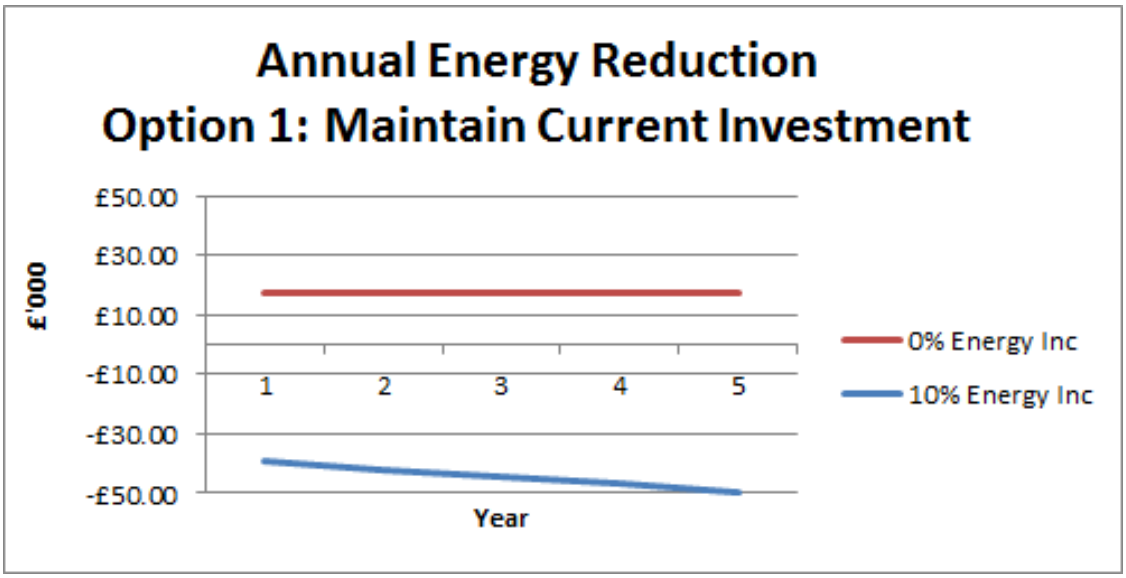
Table 24 shows that LED upgrade options with and without dimming both have positive Benefit / Cost Ratio and pay-back periods of 7 years and 6 years respectively.

Table 24 - Summary of Energy Saving Options: Option 2: Maintain Current Investment

Energy Saving Option	Total Cost Over 20 yrs. (£000's - NPV)	Reduction in Carbon (t)	Cost Saving Benefit (£000's)	Investment Cost Over 5 yrs (£000's)	Benefit / Cost Ratio (BCR)	Pay-Back Period (years)
0 : Baseline	£37,150					
1 : Upgrade Lanterns with LED equipment	£32,219	6,053	£4,931	£1,965	2.51	7
2 : Dimming with LED equipment	£31,324	7,778	£5,826	£1,965	2.96	6

The assessment of actual annual energy savings for the first five years is shown in the Figure 39 using projected energy increases of 0% and 10%. Figure 39 shows that the Council savings target of £15,000 per year would be achieved when there is no increase in energy prices.

Figure 39 – Annual Energy Reduction – Option 1



(b) Maintaining current standards

Age Profile

Maintaining the lighting lanterns at the current age profile ("steady state" condition) will require an annual investment of approximately **£200,000.**

Energy Efficiency

The results of the energy savings from maintaining the current investment are shown in Table 25 The analysis only considers the first five years of investment to be consistent with Table 23

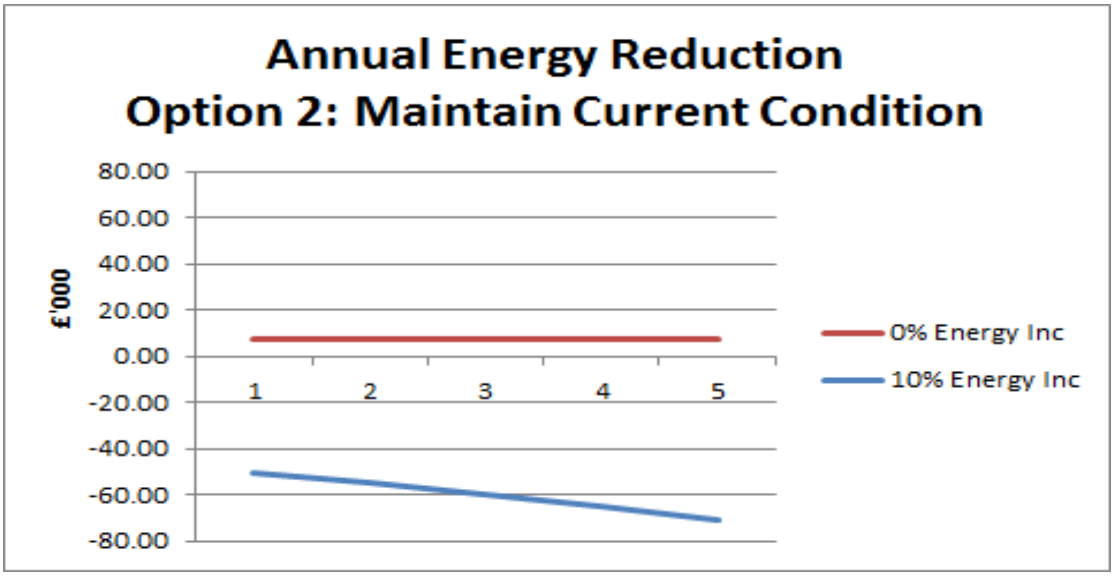
Table 25 shows that both LED upgrade options have positive Benefit / Cost Ratio and pay-back periods of 6 years.

Table 25 **Summary of Energy Saving Options: Option 2: Maintain Current Condition**

Energy Saving Option	Total Cost Over 20 yrs. (£000's - NPV)	Reduction in Carbon (t)	Cost Saving Benefit (£000's)	Investment Cost Over 5 yrs (£000's)	Benefit / Cost Ratio (BCR)	Pay-Back Period (years)
0 : Baseline	£37,150					
1 : Upgrade Lanterns with LED equipment	£34,569	2,542	£2,581	£872	2.96	6
2 : Dimming with LED equipment	£34,206	3,243	£2,944	£872	3.38	6

The assessment of actual annual energy savings for the first five years are shown in the Figure 40 using projected energy increases of 0% and 10%. Figure 40 shows that the Council savings target of £15,000 per year would not be achieved even if there was no increase in energy prices.

Figure 40 – Annual Energy reduction – Option 2



(c) Achieving East Lothian Council Annual Energy Savings Target of £15,000

This option investigates the luminaire programme which would be required to achieve the East Lothian Council Annual Energy Savings target of £15,000. This option will assume that there are no energy increases. The programme of luminaires

replacement will consist of all 70w SON types and sufficient 35w SOX types to achieve the energy savings target.

To enable the consistent use of the Energy Analysis Tool we will only assess the energy of the equipment upgraded in the first five years.

Age Profile

Figure 41 shows the 20 year age profile which occurs when annually investing £330,000 in lower energy lanterns. As with Option 1 this level of investment leads to over investing. The combined information on Figure 41 and 42 show that at Year 12 the level of lanterns exceeding the expected service life reaches zero. In this option from Year 12 onwards a budget sufficient to renew the lanterns as they achieve the expected service life would be provided. Figure 42 shows the overall budget profile for this option with an annual average of £120,000 from Year 12 onwards.

Figure 41: Luminaires Exceeding Expected Service – Option 3

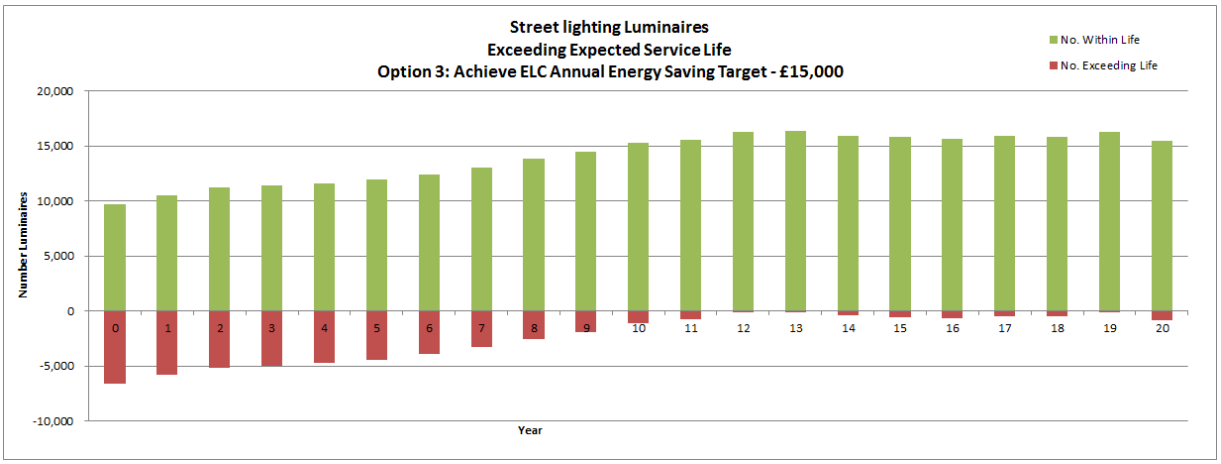
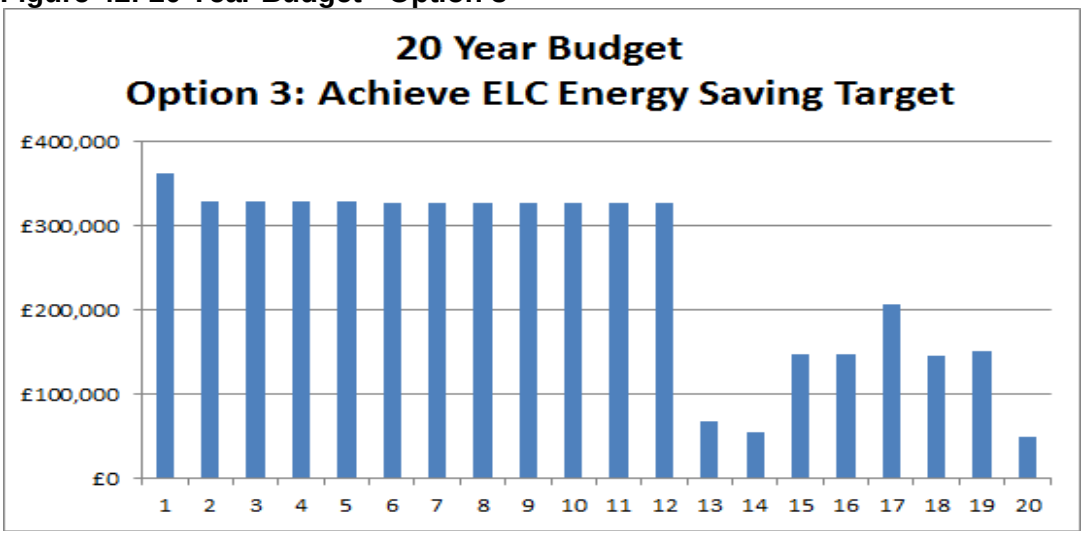


Figure 42: 20 Year Budget - Option 3



Energy Efficiency

The results of the energy savings from maintaining the current investment are shown in Table 26. The analysis only considers the first five years of investment to be consistent with Table 23.

Table 26 shows that LED upgrade options with and without dimming both have positive Benefit / Cost Ratio and pay-back periods of 8 years and 7 years respectively.

Table 26 Summary of Energy Saving Options: Option 3: Achieve ELC Energy Saving Target of £15,000

Energy Saving Option	Total Cost Over 20 yrs. (£000's - NPV)	Reduction in Carbon (t)	Cost Saving Benefit (£000's)	Investment Cost Over 5 yrs (£000's)	Benefit / Cost Ratio (BCR)	Pay-Back Period (years)
0 : Baseline	£37,150					
1 : Upgrade Lanterns with LED equipment	£33,588	5,231	£3,562	£1,529	2.33	8
2 : Dimming with LED equipment	£32,635	7,067	£4,515	£1,529	2.95	7

The assessment of actual annual energy savings for the first five years is shown in the Figure 40 assuming no increase in energy costs. Figure 43 shows that the Council savings target of £15,000 per year would be achieved

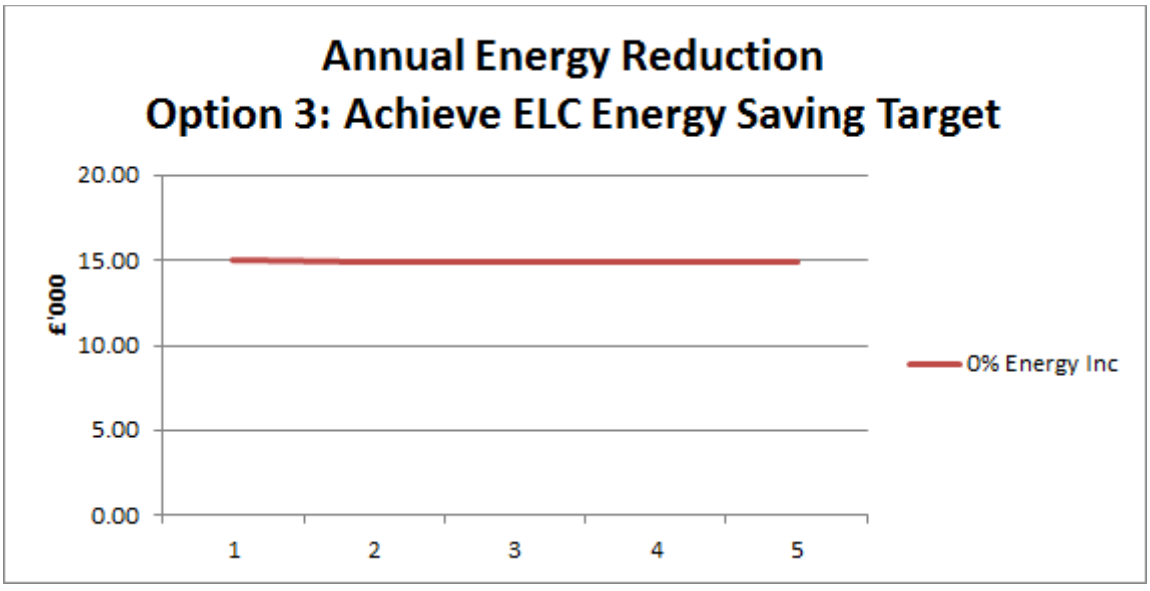


Figure 43: Annual Energy Reduction – Option 3

Planned Maintenance Recommendations

Routine and Reactive Maintenance

Street lighting routine and reactive maintenance comprises:

- Reactive Maintenance (Emergency); High priority repairs
- Reactive Maintenance (non-safety related); lower priority repairs

This part of the service currently costs the council £391,275 per annum, and this is expected to continue in the future.

Inspection and Testing:

Inspection and testing activities for street lighting comprise:

- 6 yearly electrical safety inspection and testing
- 6 yearly structural testing

The electrical and structural inspection are both undertaken at the same time.

These activities currently cost the council £50,000 per annum and this is expected to continue in the future.

Appendix E - Traffic Management Asset Status and Option Report

Introduction

This report presents a summary of the council's traffic management assets as at March 2015. It

- Describes the current condition of the asset
- Details the service that the asset and current budgets are able to provide
- Presents the options available for the future

The report complements the Road Asset Management Plan (RAMP). It provides information to assist with budget setting for traffic management assets.

Status

The status of the asset is provided in terms of current condition, the output that are delivered, the standards being achieved and, where possible, an indication of customer satisfaction.

Options

The report considers the following options:

- A continuance of current funding levels
- The predicted cost of maintaining current standards
- Predicted effect of specified budget change

Long Term Forecasts

Traffic management assets consist of components with known expected service lives. 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.

Impacts Risk

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.

3. Traffic Management Assets

2.3 Status Report

The Asset

The council's traffic management assets are made up of:

Table 27 – Traffic Management Asset Statistics

Asset Group: Traffic Signal Assets

Statistics

The Asset

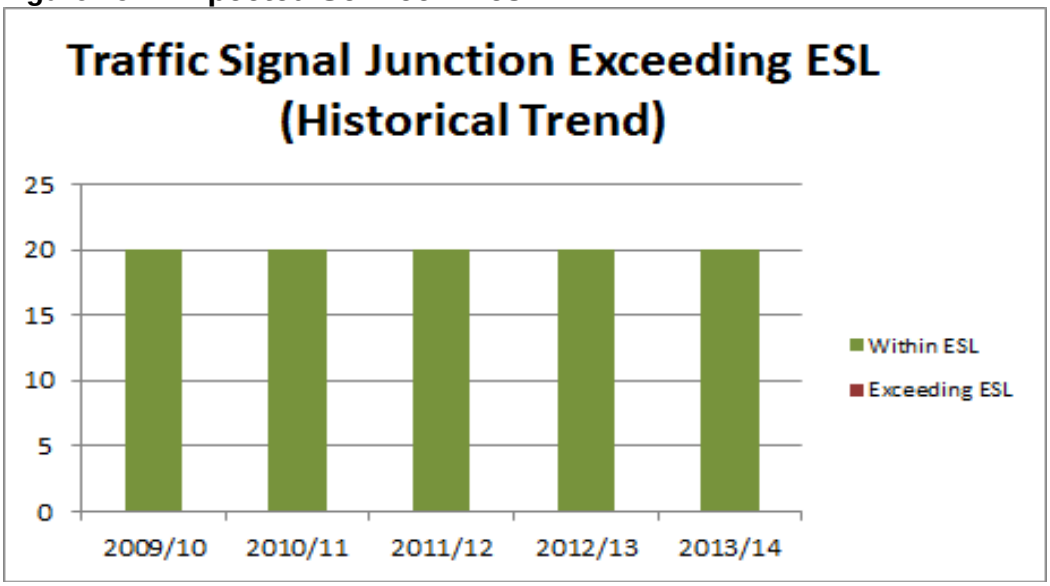
Traffic Management System Quantities	
Traffic Signal Types	**Quantity**
Traffic Signal (Junction) Subtypes	
Minor Junction	3
Medium Junction	22
Major Junction	1
Complex Junction	0
Traffic Signal (Pedestrian Crossing) Subtypes	
Single Carriageway	50
Double Carriageway	0
Total	**76**

Other Traffic Management System Quantities	
Other Traffic Management System Types	**Quantity**
Information Systems	0
Safety Cameras	0
Variable Message Signs	2
Vehicle Activated Signs	25
Real Time Passenger Information	0
Total	**27**

Commentary

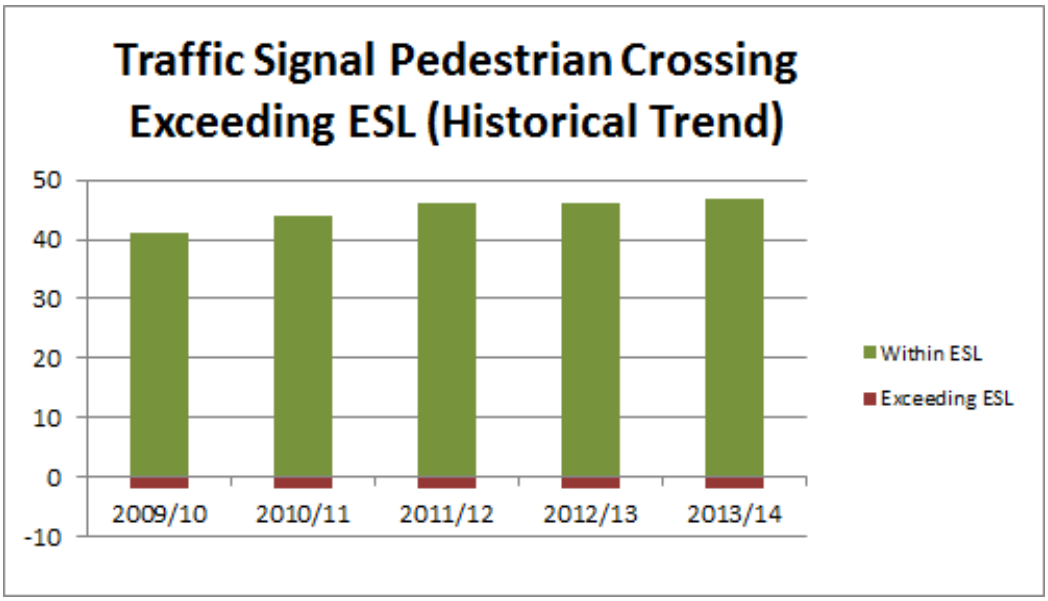
- The confidence of traffic signals inventory is high. It is stored in a Microsoft Excel Spreadsheet.
- The traffic signal asset has grown by 2 sites in the financial year. There has been a 10% growth in the previous 5 years.
- There are 5 proposed signalisation treatments being proposed this financial year; CWSS, and S75 improvements.

Figure 45 - Expected Service Lives



- The traffic signal junctions assets are all within the expected service life.
- To ensure this level of condition is maintained a minimum of one site need to be renewed annually.

Figure 46 - Expected Service Lives



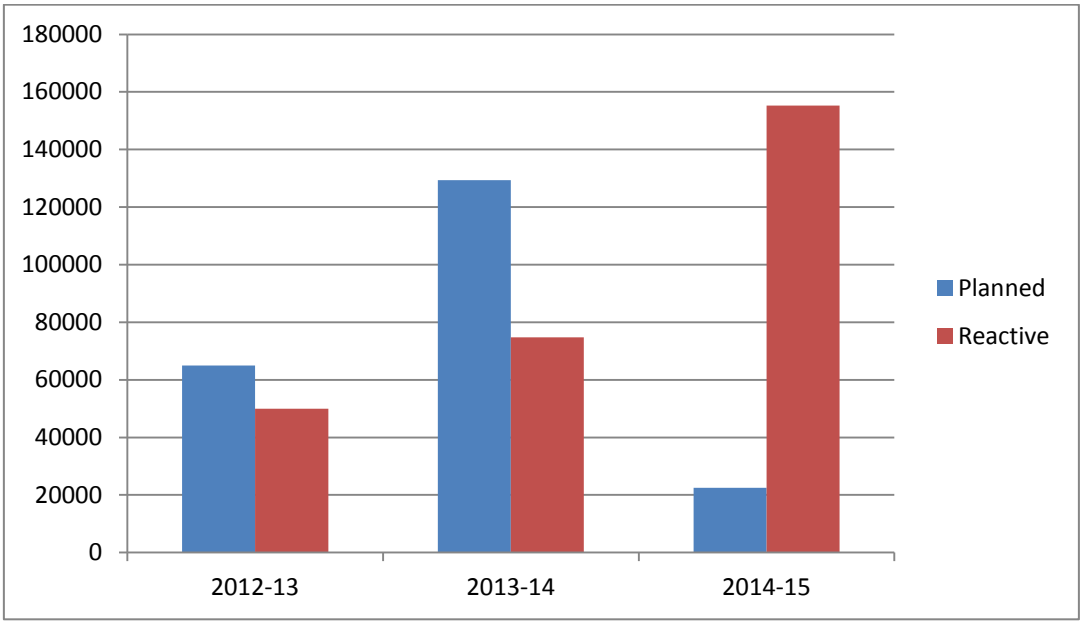
- Only two pedestrian crossing traffic signals are exceeding the expected service life.
- These were both installed in 1981 and have had very little maintenance undertaken since.

Table 28 - Performance Management

Description	2014/15 Result	Comments

Number of faults identified / reported	155	Increase of 21 from 2013-14
Number of above faults rectified within applicable target time	151	Target response time to repair faulty traffic signals (urgent) = 4 hours Target response time to repair faulty traffic signals (non urgent) = 48 hours
Number of above faults rectified on first visit	151	

Figure 47 – Traffic Management systems Historical Investment



Reactive Works are generally undertaken by Siemens Plc on behalf of East of Scotland LA's and managed on a term maintenance basis.

- Planned maintenance work is considered to be that which provides for a sustainable outcome, adding value to the traffic management system asset, and includes replacement/renewal of signalised junctions and crossings including all infrastructure associated with the installation e.g., poles, signal heads, underground cabling and apparatus, etc.
- Reactive maintenance is considered to be all non pre-planned work associated with the traffic management system asset which was not specifically identified prior to budgets being set for the year, and would include repair of dark lamps, damaged infrastructure (poles/signal heads/cabinets etc) and cabling faults, etc.

Table 29 - Investment and Output2014/15)

Cost Category	£181.7k	Output
Planned Maintenance -	£0.9k	– UTC service upgrade (£964)

Preventative		
Planned Maintenance - Corrective	£21.5k	− High street, Dunbar (£21,537)
Routine Cyclic Maintenance	£0k	
Routine - Reactive Repairs (emergency)	£52.8k	− 151 no. Urgent Fault Responses (£52,834k)
Routine - Reactive Repairs (non-emergency)	£58.7k	- Belhaven (£1468) - Temp traffic management (£57,282)
Routine - Inspection & Survey	£6.3k	− CEC (£393) − Advertisement (£5,949)
Operating Costs		Energy costs included in street lighting
Improvements	£41.5k	- Olivebank (£18,881) - Schaw Road (£22,626)
Overhead	£0k	−
Loss	£0k	-

Table 30 Valuation

Traffic Management Systems Valuation				
Traffic Management System Assets	**Gross Replacement Cost**	**Depreciated Replacement Cost**	**Annualised Depreciation Cost**	**Total Depreciation**
Traffic Signal (Junction) Subtypes				
Minor Junction	£120,000	£82,000	£6,000	£38,000
Medium Junction	£1,100,000	£555,000	£55,000	£545,000
Major Junction	£60,000	£45,000	£3,000	£15,000
Complex Junction	£0	£0	£0	£0
Traffic Signal (Pedestrian Crossing) Subtypes				
Single Carriageway	£2,000,000	£986,000	£100,000	£1,014,000
Double Carriageway	£0	£0	£0	£0
Other Traffic Management System Subtypes				
Information Systems	£0	£0	£0	£0
Safety Cameras	£0	£0	£0	£0
Variable Message Signs	£30,000	£18,000	£3,000	£12,000
Vehicle Activated Signs	£125,000	£70,000	£12,500	£55,000
Real Time Passenger Information	£0	£0	£0	£0
Total	**£3,435,000**	**£1,756,000**	**£179,500**	**£1,679,000**

The annualised depreciation (AD) was £179,500 which represents the average amount by which the asset will depreciate in one year if there is no investment in renewal of the asset

Key Issues

The level of budget has been reduced in relation to the current good condition of the traffic signal asset. It is important that a certain level of investment is still provided to maintain the assets and avoid extra costs from lack of maintenance in the future.

Current Strategies

To continue to create business cases for funding to enable all traffic signal sites to be renewed prior to reaching the expected service life.

To continue to keep the customers level of satisfaction high by reacting to faults within the prescribed response time.

To implement a strategy to install LED lamps to enable cost savings in energy and reactive maintenance.

Current Status

As at 31 March 2014

- ↗ annual budget decreasing over time
- ↘ reduction (deterioration) of measured condition
- ↘ increasing quantities of minor defects
- ↘ increase in 3rd party claims

↘ decreasing customer satisfaction as a result of increasing reactive repairs.

Traffic Management Assets Options

Option 1: Maintain Current Budget - £50,000 per annum

Budget

The first option comprises a continuance of current funding levels of £50,000 per annum. The resulting condition charts for each traffic signal type are shown below:

Table 31 – Traffic Management Investment Option T1

RAMP Cost Category	**Expenditure (£000's)** (2013/14 actual)	**%**
Routine - Reactive Repairs (emergency)	£0k	0.0%
Routine - Reactive Repairs (non-emergency)	£75k	60.0%
Routine Cyclic Maintenance	£0k	0.0%
Planned Maintenance - Preventative	£0k	0.0%
Planned Maintenance - Corrective	£50k	40.0%
Inspections and survey (not covered under staff costs)	£0k	0.0%
Operating Costs	£0k	0.0%
TOTAL	**£125**	
Loss (3rd Party Claims associated with (c/ways)	£0k	0.0%
TOTAL (including claims costs)	**£125**	

Figure 47 - Predicted Condition T1

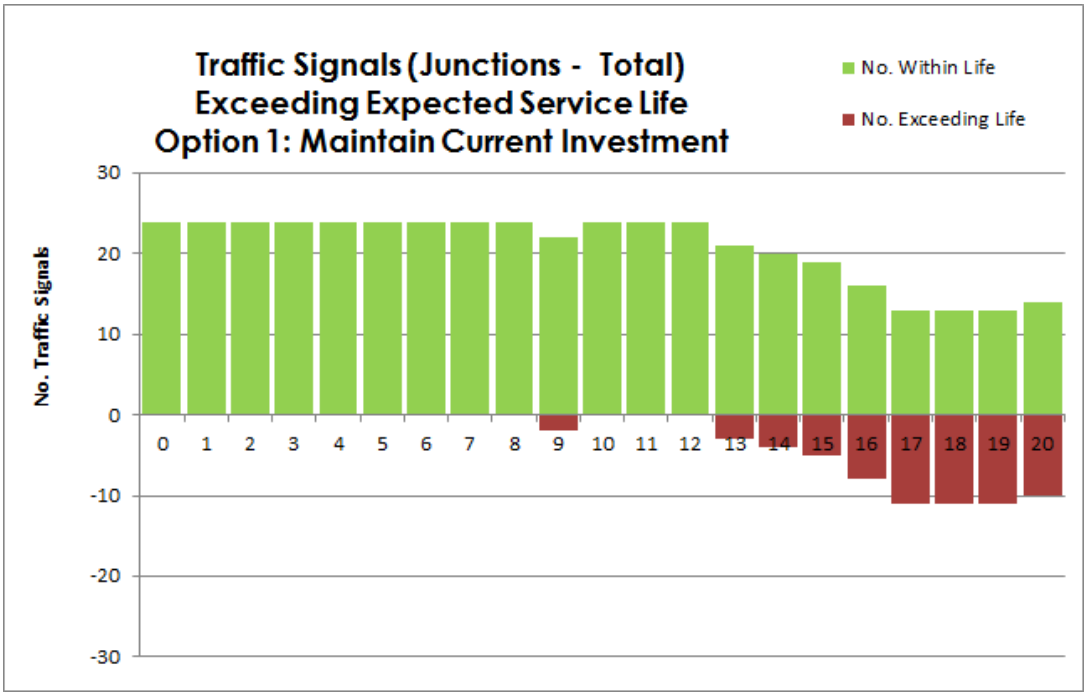


Figure 47 – Predicted Condition T1A

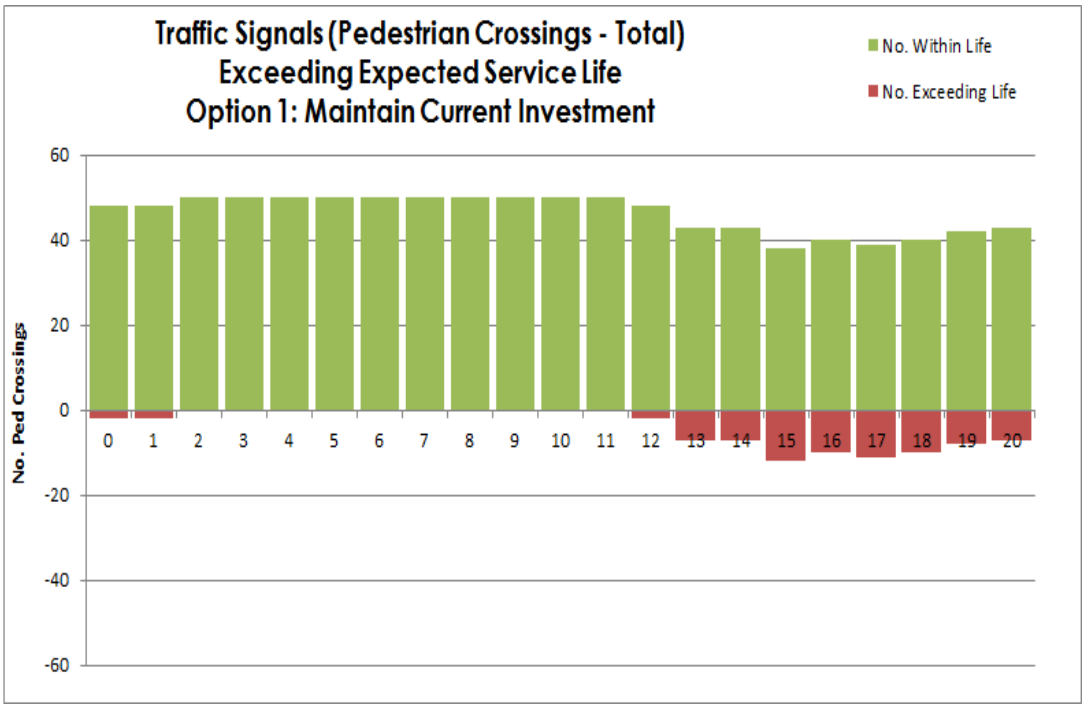


Figure 48 – Predicted Impacts T1 by Asset Category

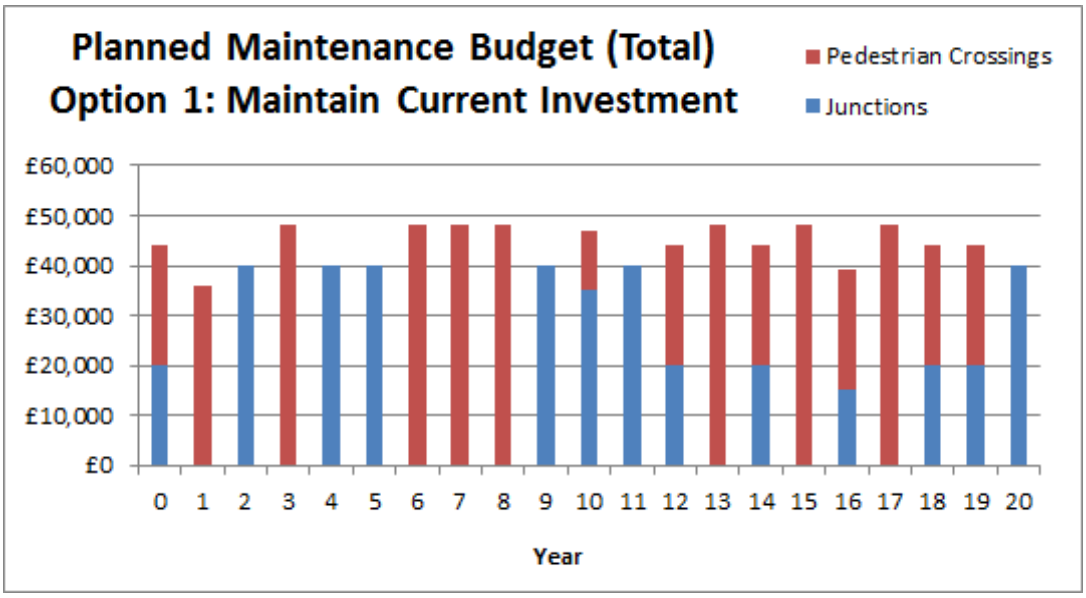
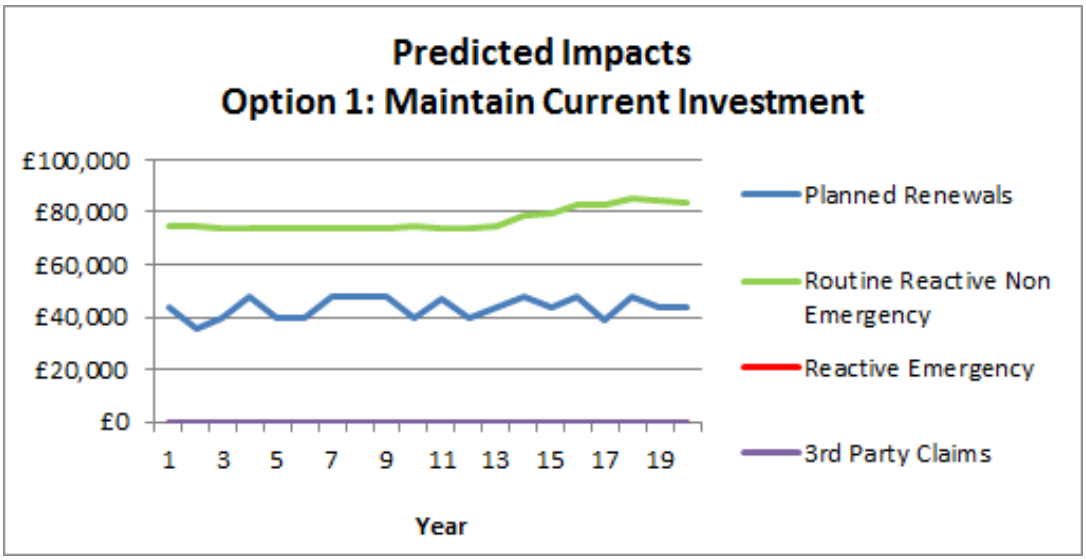


Figure 49 – Predicted Impacts T1 by Activity



Comments: This shows the current level of spending is sufficient for the next eleven years. An increase in budget will be required after that time to keep the asset up to the current technological level. The additional budget will also aid in keeping the reactive costs at a constant or reduced level.

Option Summary

The baseline option of a continuance of current funding levels is predicted to result in:

a. ↗ annual budget growing over time to accommodate increasing reactive repairs
b. ↘ reduction (deterioration) of measured condition
c. ↗ increasing quantities of minor defects
d. ↗ potential for increase in 3rd party claims
e. ↘ likelihood of decreased customer satisfaction as a result of increasing repairs causing unnecessary delays

Total cost (over 20 years) estimated at **£2.4m.** Annual cost £121,000 initially. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

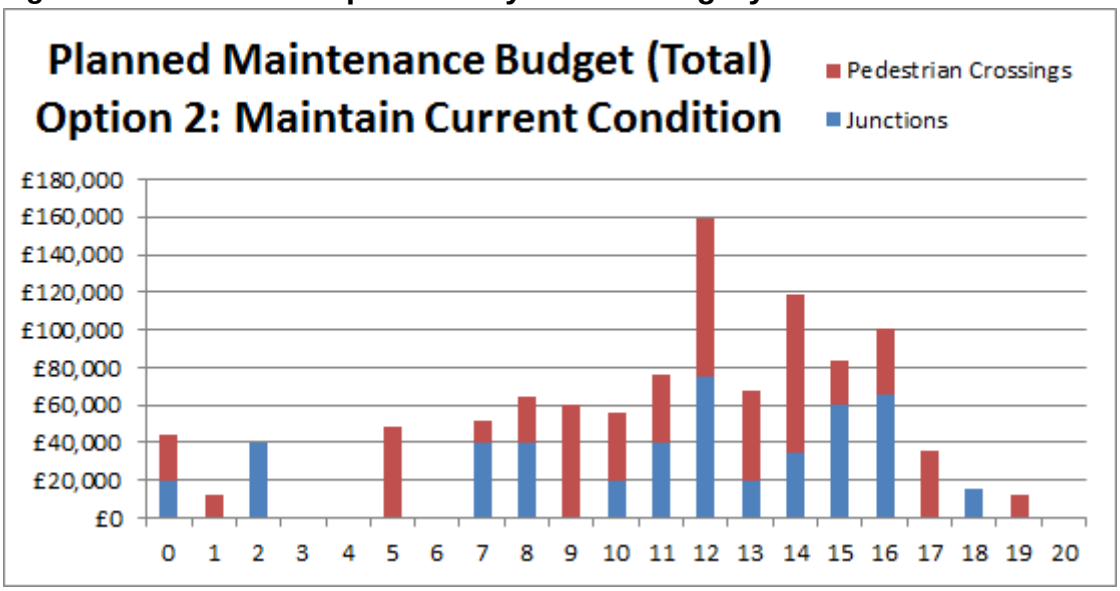
2.2.8. Option 2: Maintain Current Condition

Budget

The second option comprises a continuance of current condition levels. This is the budget required to maintain all junction traffic signal below the ESL and all but two pedestrian crossing traffic signals at the ESL.

The following charts show the twenty year budget profile for both sets of traffic signal assets

Figure 50 - Predicted Impacts T2 by Asset Category

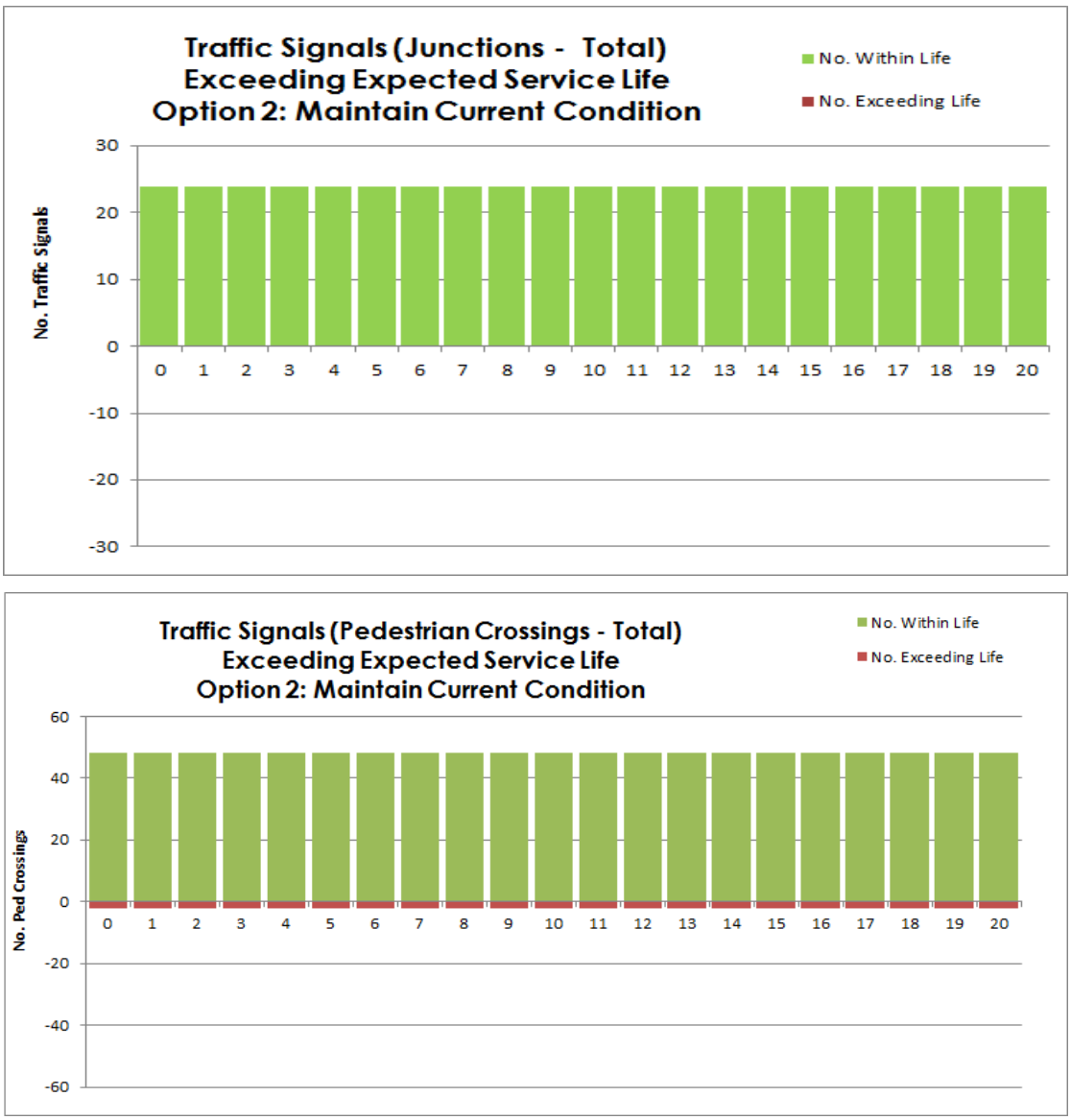


The following table shows all annual costs required to maintain the current condition of the assets except the Planned Maintenance Budget.

Table 31 Traffic Management Investment Option T2

RAMP Cost Category	**Expenditure (£000's)** (2015/16 actual)	**%**
Routine - Reactive Repairs (emergency)	£0k	0.0%
Routine - Reactive Repairs (non-emergency)	£75k	100.0%
Routine Cyclic Maintenance	£0k	0.0%
Inspections and survey (not covered under staff costs)	£0k	0.0%
Operating Costs	£0k	0.0%
TOTAL	**£75k**	
Loss (3rd Party Claims associated with (c/ways)	£0	0.0%
TOTAL (including claims costs)	**£75k**	

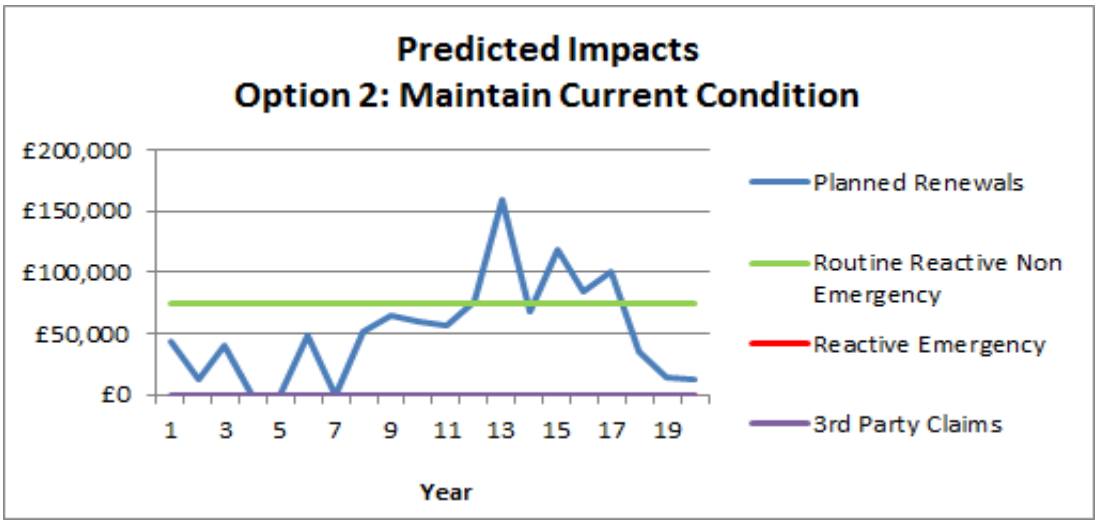
Figure 51- Predicted Condition (maintain current Condition) Option T2



This shows the condition of the traffic signals remaining the same over time.

The Planned Maintenance Chart shows that in several of the first ten years no traffic signal renewals would be required. This chart also shows that in the second ten years the required investment increases to over £100,000 in several of the years.

Figure 52 - Predicted Impacts option T2



Option Summary

The option of a continuance of current condition levels is predicted to result in:

a. ↗ planned maintenance budget increases over time in conjunction with the age profile. Maintaining the condition allows the reactive budgets to remain steady.

b. → continuance of measured condition

c. → no increase in quantities of minor defects

d. → continuation of no 3rd party claims

e. ↘ level of customer satisfaction remains constant.

Total cost (over 20 years) estimated at **£2.5m.** Annual cost £127,000 initially. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

2.2.9. Option 3: Achieve target of all Traffic Signals within the ESL

Budget

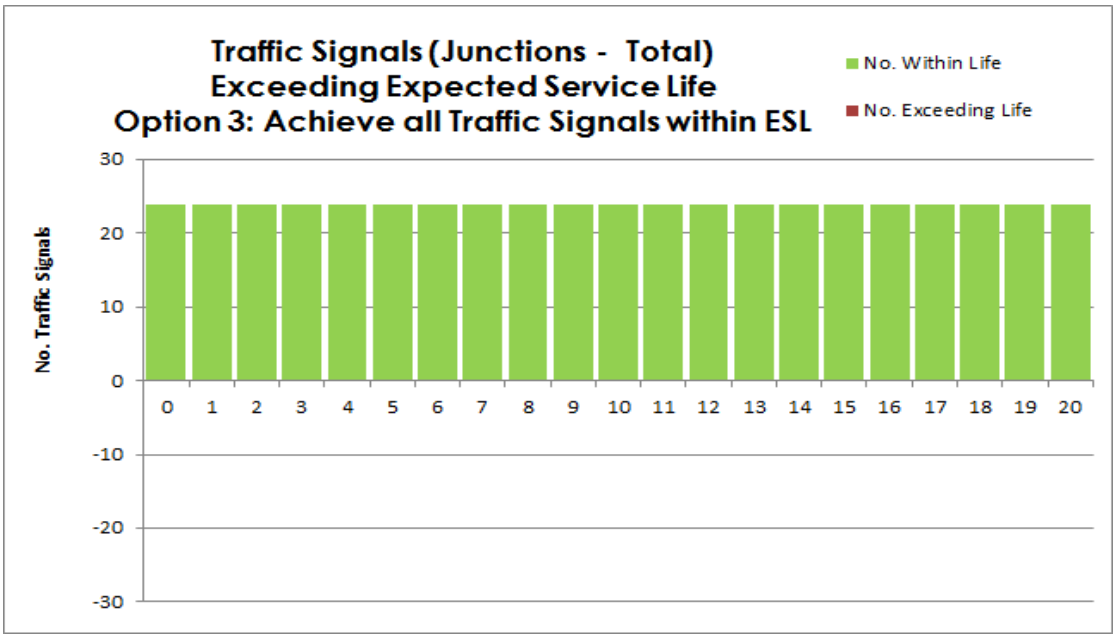
The third option comprises treating all traffic signals currently exceeding the expected service life and then maintaining that level for the remaining 20 years.

A breakdown of the total carriageway budget for 2015/16 is as follows:

Table 32 – Traffic Management Systems Investment Option T3

RAMP Cost Category	**Expenditure (£000's)** (2016/17)	**%**
Routine - Reactive Repairs (emergency)	£0k	0.0%
Routine - Reactive Repairs (non-emergency)	£75k	46.0%
Routine Cyclic Maintenance	£0k	0.0%
Planned Maintenance - Preventative	£0k	0.0%
Planned Maintenance - Corrective	£88k	54.0%
Inspections and survey (not covered under staff costs)	£0k	0.0%
Operating Costs	£0k	0.0%
TOTAL	**£163**	
Loss (3rd Party Claims associated with (c/ways)	£0k	0.0%
TOTAL (including claims costs)	**£125**	

Figure 53 - Predicted Condition (maintain current Condition) Option T3



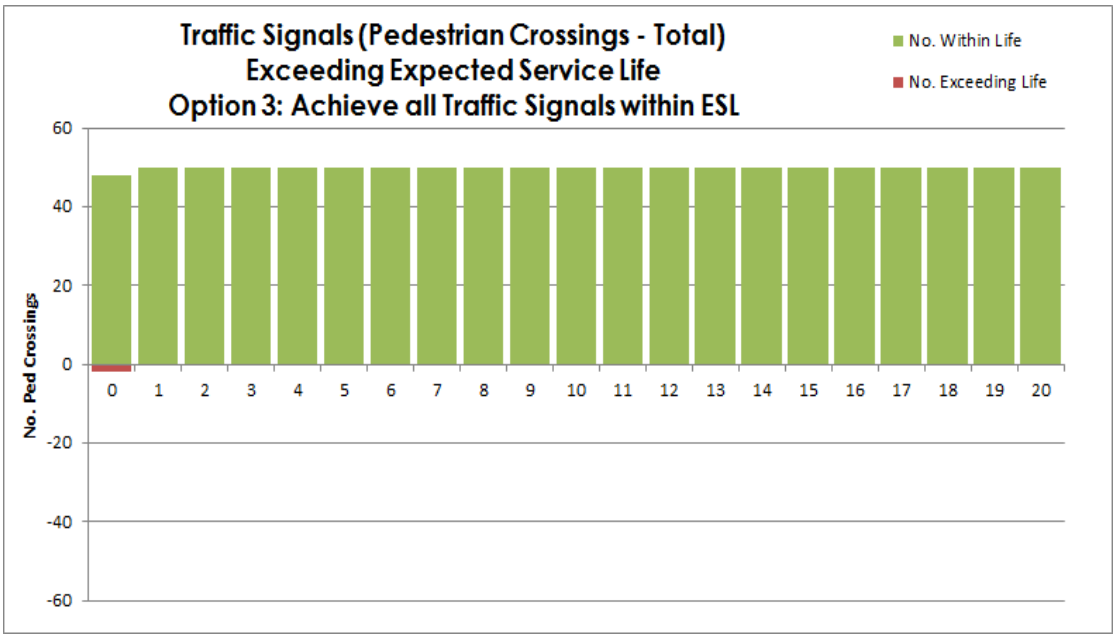


Figure 54 - Predicted Impacts T3 by Asset Category

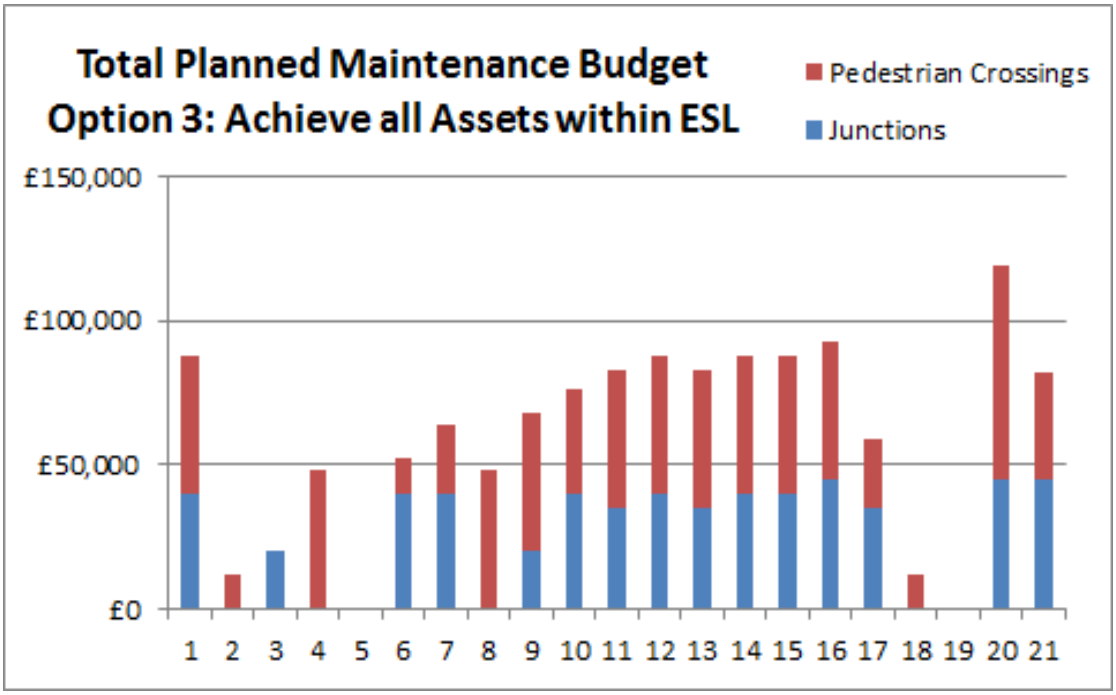
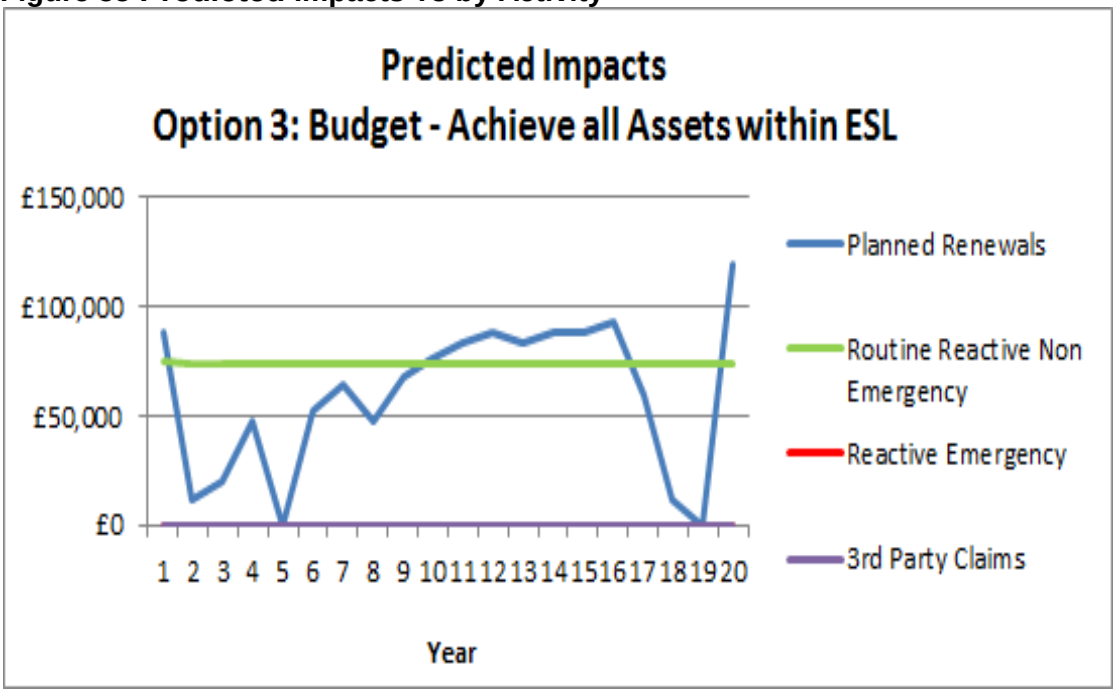


Figure 55 Predicted Impacts T3 by Activity



Comments:

The above information shows that there are very little assets in need of renewal in the next five years. A higher percentage of the assets are under ten years old and therefore the need for renewal budgets is not required until Year 10.

Option Summary

The option of renewing and maintaining all assets under the expected service life is predicted to result in:

a. ↗ annual budget growing over time due to a higher level of assets needing renewal in later years.
b. → continuance of measured condition
c. → no increase in quantities of minor defects
d. → continuation of no 3rd party claims
e. → level of customer satisfaction remains constant.

Total cost (over 20 years) estimated at **£2.7m.** Annual cost £134,000 initially. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

2.2.10. Option 4: Spread renewals evenly investing a maximum of £80,000

Budget

The forth option comprises spreading future investment evenly while ensuring all traffic signals remain within the expected service life. This option enables consistent investment to be provided and removes the years where significant increases in budget would be needed to renew a number of traffic signals reaching the expected service life. This would require renewing some traffic signals that have not achieved the expected service life.

A breakdown of the total carriageway budget for 2015/16 is as follows:

Table 33 – Traffic Management Systems Investment Option T4

RAMP Cost Category	**Expenditure (£000's)** (2015/16 actual)	**%**
Routine - Reactive Repairs (emergency)	£0k	0.0%
Routine - Reactive Repairs (non-emergency)	£75k	46.0%
Routine Cyclic Maintenance	£0k	0.0%
Planned Maintenance - Preventative	£0k	0.0%
Planned Maintenance - Corrective	£88k	54.0%
Inspections and survey (not covered under staff costs)	£0k	0.0%
Operating Costs	£0k	0.0%
TOTAL	**£163**	
Loss (3rd Party Claims associated with (c/ways)	£0k	0.0%
TOTAL (including claims costs)	**£125**	

Figure 56 - Predicted Condition (maintain current Condition) Option T3

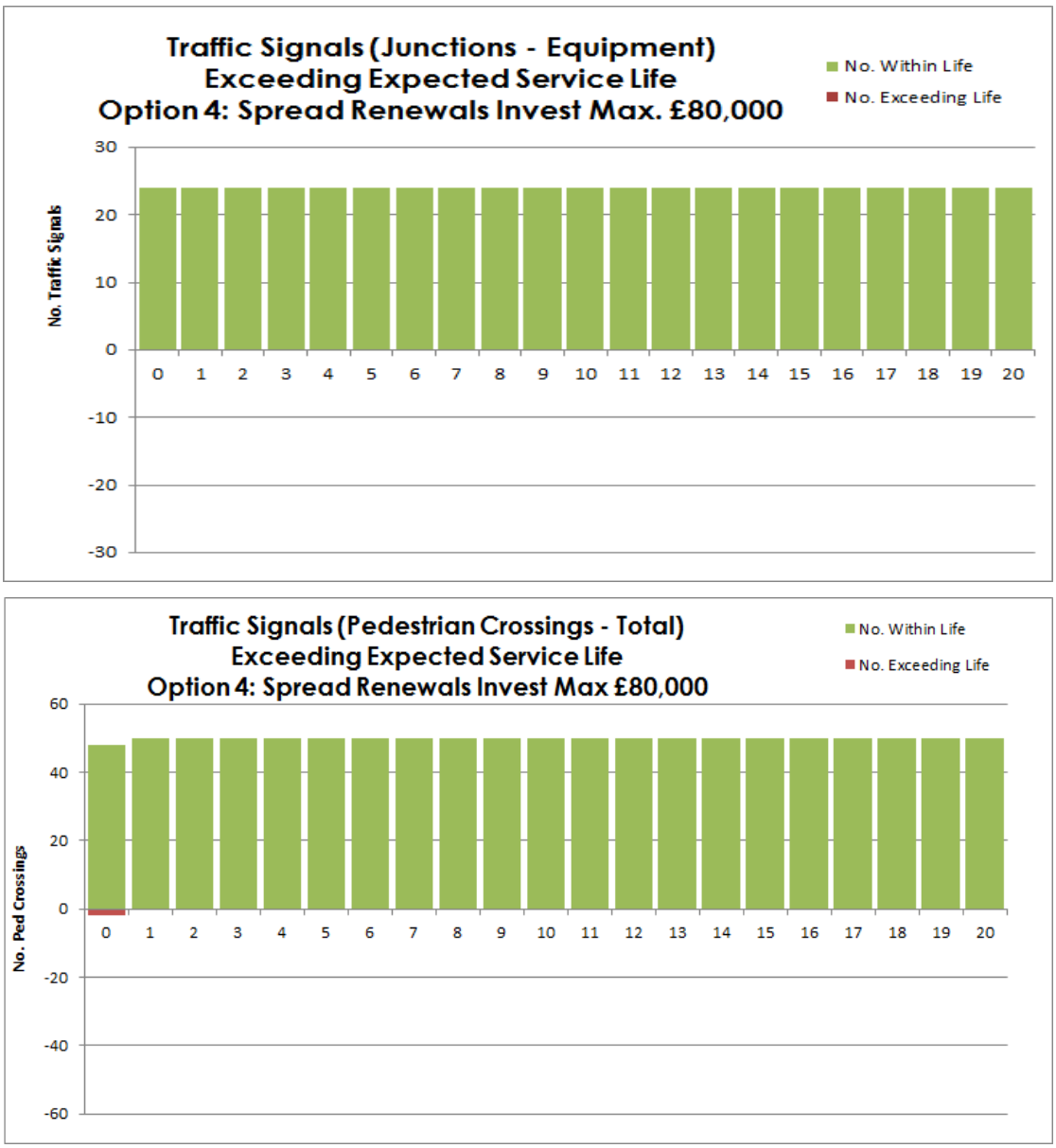


Figure 57 – Comparison between Actual Completion Year and Estimated Service Life (Junctions)

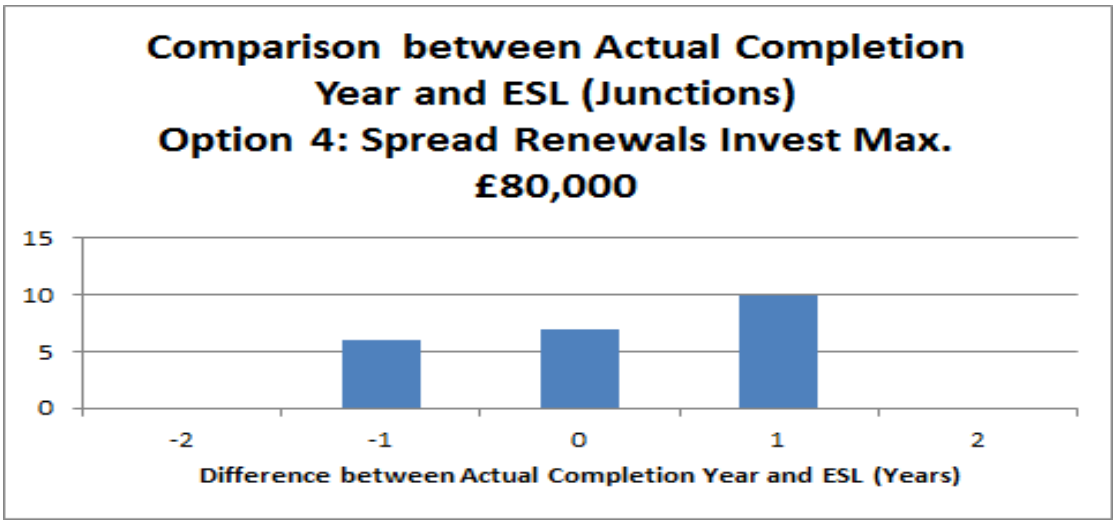


Figure 58 – Comparison between Actual Completion Year and Estimated Service Life (Ped Crossings)

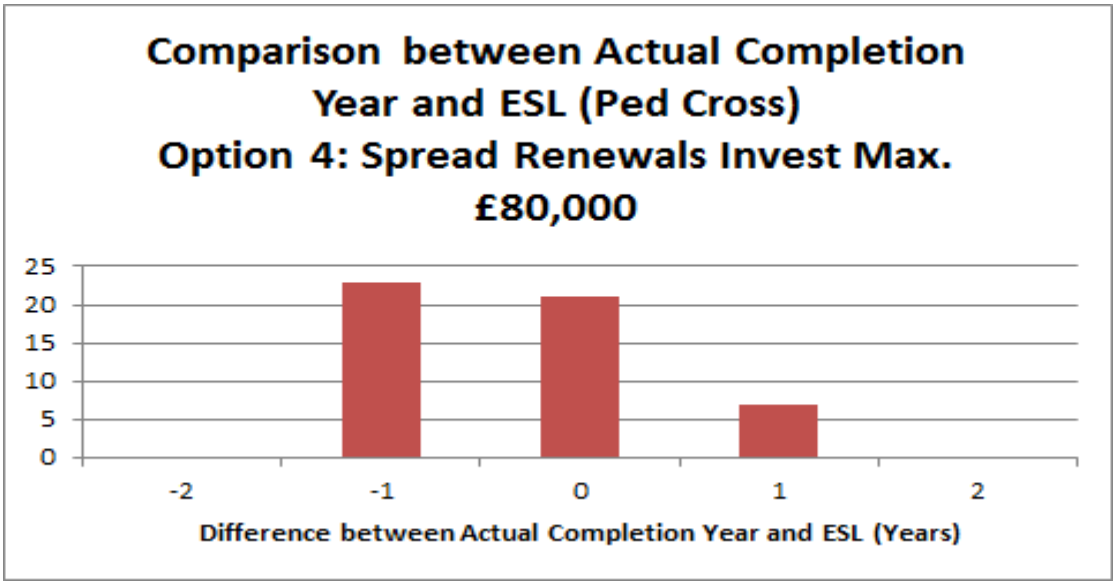


Figure 59 – Predicted Impact T4by Asset Category

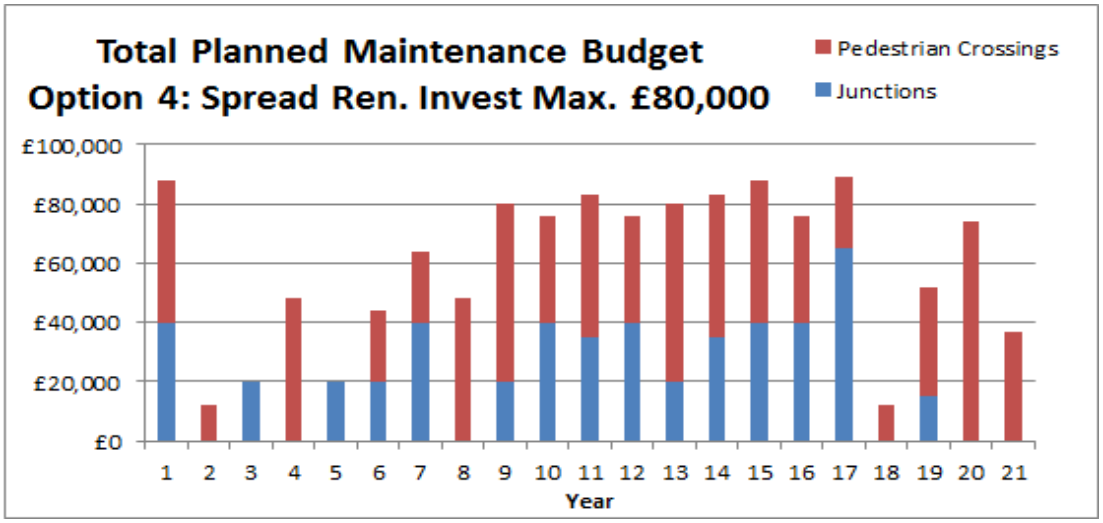
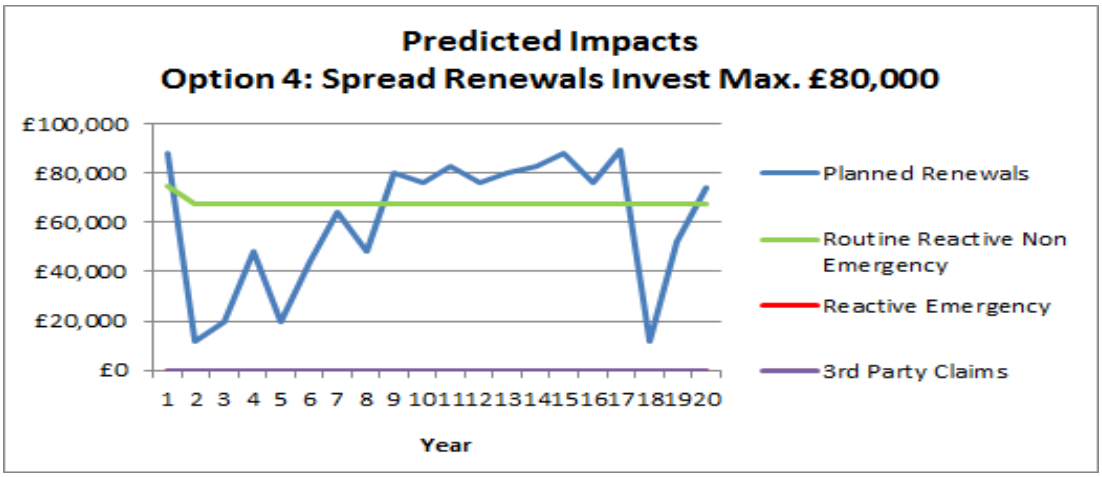


Figure 60 – Predicted Impact T4 by Activity



The above Planned Maintenance Budget chart shows that from Year 9 onwards a budget of approximately £80,000 is required to maintain all the traffic signals within the expected service life.

This option requires renewing some traffic signals ahead of time. The Comparison charts above show that the maximum loss of life due to early renewal is only 1 year. This occurs more with Pedestrian Crossing assets due to the lower cost which enables them to be included when surplus budget is available.

Option Summary

The option of renewing and maintaining all assets under the expected service life is predicted to result in:

a. ↗ annual budget growing over time due to a higher level of assets needing renewal in later years.
b. → continuance of measured condition
c. → no increase in quantities of minor defects
d. → continuation of no 3rd party claims
e. → level of customer satisfaction remains constant.

Total cost (over 20 years) estimated at **£2.6m.** Annual cost £129,000 initially. (No allowance has been made for construction inflation currently running at approximately 5% per annum)

Recommendation

To invest £80,000 / year in the renewal of traffic management systems to balance spend over the long term.