Appendix 4 – Commuted Sums and relative maintenance periods.

* 1. The commuted sum is to cover the cost of maintenance over a period of 30 years. As the sum is paid in total in advance, the sum is subjected to a formula using a cumulative present value factor. This formula in effect makes the 30 year maintenance cost equate to 21.79 times the current annual maintenance cost.
	2. Using this multiplying factor, it is possible to calculate the level of commuted sum that a developer will be required to pay for each type open space.
	3. The following formula has been used to calculate the maintenance obligation:-

 **Commuted sum = Σ Mp / (1+D/100) T**

where: Mp = Estimated periodic maintenance cost based on current rates.

 D = Periodic Discounted Rate (effective annual interest rate)(%)

 T = Time period before expenditure will be incurred or cyclical period (years)

Periodic Discounted Rate (D).

The discount rate (effective annual interest rate) is 2.2% which is calculated as follows: -

 **D = ((LTNBR / RPIX) -1) x 100**

Where: LTNBR is the Long Term Neutral Base Rate (Currently 4.5% ie 1.045)

 RPIX is the Retail Price Index excluding mortgage payments, taken as 2.25% i.e. 1.0225 for this example.

therefore **D = ((1.045 / 1.0225)-1) x 100 = 2.2%**

The RPIX rate is published by the office of National Statistics on a monthly basis and suitable figures for the calculation will be adopted as necessary to reflect any significant long term changes in the rate. Similarly the current rates may be amended to reflect any changes in costs.

* 1. For a sum deposited in respect to a future maintenance activity, interest will be accrued up until the activity must be carried out, although over the same period inflation will tend to reduce the value of the deposit. This effect is taken into account by the use of the Periodic Discounted Rate which represents the effective interest rate.
	2. The calculation is based on the conversion of future expenditure, (the cost of which is known at today’s prices), being converted into a Net Present Value (NPV). This is the sum which if deposited today and invested at the periodic discounted rate would provide the sum required for the activity to be undertaken when it becomes due in ‘T’ years.
	3. For Example: Considering the costs for annual mowing of a new open space. The commuted sum must include for the mowing, cost of mower and labour.
	4. The cost of undertaking the work is calculated through the integrated contract rates and has been determined to be £850 per annum at current rates. The activity will be required each year as it is the total cost for annual maintenance. Three commuted maintenance sum periods have been given as examples. 9 a figure for 120 years maintenance – effectively ‘in perpetuity’ has also been given for comparison)
	5. Using the formula

NPV factor = Σ 1 / (1 + D / 100) T where D is the Periodic Discounted Rate calculated at 2.2% as outlined above.

Effectively NPV for one item of maintenance:

 every year for **15 years** = 10.77774

 every year for **20 years** = 14.21514

 every year for **30 years** = 21.79260

 (every year for 120 years = 41.60823)

* 1. Commuted sum for maintenance = Current Cost x NPV factor

 For a 15 year maintenance period = £850.00 x 10.77774 = £9,161.00

 For a 20 year maintenance period = £850.00 x 14.21514 = £12,083.00

 For a 30 year maintenance period = £850.00 x 21.79260 = £15,745.00

 (For a 120 year maintenance period =£850.00 x 41.60823 = £35,367.00)

 therefore the commuted sum required would be

 **£9,161.00 for 15 years maintenance**

 **£12,083.00 for 20 years maintenance**

 **£15,745.00 for 30 years maintenance**

 **£36,367.00 for 120 years maintenance**

**(Effectively a NPV of approx. 45 would be required to make the maintenance operation cost neutral in perpetuity. For the example above this would give a commuted sum of £38,250 for the £850.00 per annum maintenance operation)**

* 1. The tables showing expenditure and the effect of inflation on these sums are shown below.









|  |  |
| --- | --- |
| **Interest earned on deposited sum (LTNBR)** | **in perpetuity maintenance (NPV of 45)** |
| **years** | **deposited sum** | **INTEREST RATE% (LTNBR)** | **Interest sum** | **deposited sum plus interest** | **expenditure** | **deposited sum + interest - Expenditure** |
| **1** | **£38,250.00** | **4.5** | **£1,721.25** | **£39,971.25** | **£850.00** | **£39,121.25** |
| **2** | **£39,121.25** | **4.5** | **£1,760.46** | **£40,881.71** | **£888.68** | **£39,993.03** |
| **3** | **£39,993.03** | **4.5** | **£1,799.69** | **£41,792.71** | **£908.68** | **£40,884.04** |
| **4** | **£40,884.04** | **4.5** | **£1,839.78** | **£42,723.82** | **£929.12** | **£41,794.70** |
| **5** | **£41,794.70** | **4.5** | **£1,880.76** | **£43,675.46** | **£950.03** | **£42,725.43** |
| **6** | **£42,725.43** | **4.5** | **£1,922.64** | **£44,648.08** | **£971.40** | **£43,676.68** |
| **7** | **£43,676.68** | **4.5** | **£1,965.45** | **£45,642.13** | **£993.26** | **£44,648.87** |
| **8** | **£44,648.87** | **4.5** | **£2,009.20** | **£46,658.07** | **£1,015.61** | **£45,642.46** |
| **9** | **£45,642.46** | **4.5** | **£2,053.91** | **£47,696.37** | **£1,038.46** | **£46,657.91** |
| **10** | **£46,657.91** | **4.5** | **£2,099.61** | **£48,757.52** | **£1,061.82** | **£47,695.70** |
| **11** | **£47,695.70** | **4.5** | **£2,146.31** | **£49,842.00** | **£1,085.71** | **£48,756.29** |
| **12** | **£48,756.29** | **4.5** | **£2,194.03** | **£50,950.32** | **£1,110.14** | **£49,840.18** |
| **13** | **£49,840.18** | **4.5** | **£2,242.81** | **£52,082.99** | **£1,135.12** | **£50,947.87** |
| **14** | **£50,947.87** | **4.5** | **£2,292.65** | **£53,240.52** | **£1,160.66** | **£52,079.86** |
| **15** | **£52,079.86** | **4.5** | **£2,343.59** | **£54,423.45** | **£1,186.78** | **£53,236.68** |
| **16** | **£53,236.68** | **4.5** | **£2,395.65** | **£55,632.33** | **£1,213.48** | **£54,418.85** |
| **17** | **£54,418.85** | **4.5** | **£2,448.85** | **£56,867.70** | **£1,240.78** | **£55,626.92** |
| **18** | **£55,626.92** | **4.5** | **£2,503.21** | **£58,130.13** | **£1,268.70** | **£56,861.43** |
| **19** | **£56,861.43** | **4.5** | **£2,558.76** | **£59,420.19** | **£1,297.24** | **£58,122.95** |
| **20** | **£58,122.95** | **4.5** | **£2,615.53** | **£60,738.48** | **£1,326.43** | **£59,412.05** |
| **21** | **£59,412.05** | **4.5** | **£2,673.54** | **£62,085.59** | **£1,356.28** | **£60,729.31** |
| **22** | **£60,729.31** | **4.5** | **£2,732.82** | **£63,462.13** | **£1,386.79** | **£62,075.34** |
| **23** | **£62,075.34** | **4.5** | **£2,793.39** | **£64,868.73** | **£1,418.00** | **£63,450.73** |
| **24** | **£63,450.73** | **4.5** | **£2,855.28** | **£66,306.01** | **£1,449.90** | **£64,856.11** |
| **25** | **£64,856.11** | **4.5** | **£2,918.53** | **£67,774.64** | **£1,482.52** | **£66,292.11** |
| **26** | **£66,292.11** | **4.5** | **£2,983.15** | **£69,275.26** | **£1,515.88** | **£67,759.38** |
| **27** | **£67,759.38** | **4.5** | **£3,049.17** | **£70,808.55** | **£1,549.99** | **£69,258.56** |
| **28** | **£69,258.56** | **4.5** | **£3,116.64** | **£72,375.20** | **£1,584.86** | **£70,790.33** |
| **29** | **£70,790.33** | **4.5** | **£3,185.57** | **£73,975.90** | **£1,620.52** | **£72,355.38** |
| **30** | **£72,355.38** | **4.5** | **£3,255.99** | **£75,611.37** | **£1,656.98** | **£73,954.38** |
| **31** | **£73,954.38** | **4.5** | **£3,327.95** | **£77,282.33** | **£1,694.27** | **£75,588.06** |
| **32** | **£75,588.06** | **4.5** | **£3,401.46** | **£78,989.53** | **£1,732.39** | **£77,257.14** |
| **33** | **£77,257.14** | **4.5** | **£3,476.57** | **£80,733.71** | **£1,771.37** | **£78,962.34** |
| **34** | **£78,962.34** | **4.5** | **£3,553.31** | **£82,515.65** | **£1,811.22** | **£80,704.43** |
| **35** | **£80,704.43** | **4.5** | **£3,631.70** | **£84,336.13** | **£1,851.97** | **£82,484.15** |
| **36** | **£82,484.15** | **4.5** | **£3,711.79** | **£86,195.94** | **£1,893.64** | **£84,302.30** |
| **37** | **£84,302.30** | **4.5** | **£3,793.60** | **£88,095.90** | **£1,936.25** | **£86,159.65** |
| **38** | **£86,159.65** | **4.5** | **£3,877.18** | **£90,036.83** | **£1,979.82** | **£88,057.02** |
| **39** | **£88,057.02** | **4.5** | **£3,962.57** | **£92,019.58** | **£2,024.36** | **£89,995.22** |
| **40** | **£89,995.22** | **4.5** | **£4,049.78** | **£94,045.00** | **£2,069.91** | **£91,975.09** |
| **41** | **£91,975.09** | **4.5** | **£4,138.88** | **£96,113.97** | **£2,116.48** | **£93,997.49** |
| **42** | **£93,997.49** | **4.5** | **£4,229.89** | **£98,227.38** | **£2,164.10** | **£96,063.27** |
| **43** | **£96,063.27** | **4.5** | **£4,322.85** | **£100,386.12** | **£2,212.80** | **£98,173.32** |
| **44** | **£98,173.32** | **4.5** | **£4,417.80** | **£102,591.12** | **£2,262.58** | **£100,328.54** |
| **45** | **£100,328.54** | **4.5** | **£4,514.78** | **£104,843.32** | **£2,313.49** | **£102,529.83** |
| **46** | **£102,529.83** | **4.5** | **£4,613.84** | **£107,143.67** | **£2,365.55** | **£104,778.12** |
| **47** | **£104,778.12** | **4.5** | **£4,715.02** | **£109,493.14** | **£2,418.77** | **£107,074.37** |
| **48** | **£107,074.37** | **4.5** | **£4,818.35** | **£111,892.71** | **£2,473.19** | **£109,419.52** |
| **49** | **£109,419.52** | **4.5** | **£4,923.88** | **£114,343.40** | **£2,528.84** | **£111,814.56** |
| **50** | **£111,814.56** | **4.5** | **£5,031.66** | **£116,846.21** | **£2,585.74** | **£114,260.47** |
| **51** | **£114,260.47** | **4.5** | **£5,141.72** | **£119,402.19** | **£2,643.92** | **£116,758.28** |
| **52** | **£116,758.28** | **4.5** | **£5,254.12** | **£122,012.40** | **£2,703.41** | **£119,308.99** |
| **53** | **£119,308.99** | **4.5** | **£5,368.90** | **£124,677.90** | **£2,764.23** | **£121,913.66** |
| **54** | **£121,913.66** | **4.5** | **£5,486.11** | **£127,399.78** | **£2,826.43** | **£124,573.35** |
| **55** | **£124,573.35** | **4.5** | **£5,605.80** | **£130,179.15** | **£2,890.02** | **£127,289.13** |
| **56** | **£127,289.13** | **4.5** | **£5,728.01** | **£133,017.14** | **£2,955.05** | **£130,062.09** |
| **57** | **£130,062.09** | **4.5** | **£5,852.79** | **£135,914.88** | **£3,021.54** | **£132,893.34** |
| **58** | **£132,893.34** | **4.5** | **£5,980.20** | **£138,873.55** | **£3,089.52** | **£135,784.02** |
| **59** | **£135,784.02** | **4.5** | **£6,110.28** | **£141,894.30** | **£3,159.04** | **£138,735.27** |
| **60** | **£138,735.27** | **4.5** | **£6,243.09** | **£144,978.36** | **£3,230.11** | **£141,748.24** |
| **61** | **£141,748.24** | **4.5** | **£6,378.67** | **£148,126.91** | **£3,302.79** | **£144,824.12** |
| **62** | **£144,824.12** | **4.5** | **£6,517.09** | **£151,341.20** | **£3,377.10** | **£147,964.10** |
| **63** | **£147,964.10** | **4.5** | **£6,658.38** | **£154,622.48** | **£3,453.09** | **£151,169.39** |
| **64** | **£151,169.39** | **4.5** | **£6,802.62** | **£157,972.02** | **£3,530.78** | **£154,441.23** |
| **65** | **£154,441.23** | **4.5** | **£6,949.86** | **£161,391.09** | **£3,610.23** | **£157,780.86** |
| **66** | **£157,780.86** | **4.5** | **£7,100.14** | **£164,881.00** | **£3,691.46** | **£161,189.54** |
| **67** | **£161,189.54** | **4.5** | **£7,253.53** | **£168,443.07** | **£3,774.51** | **£164,668.56** |
| **68** | **£164,668.56** | **4.5** | **£7,410.09** | **£172,078.64** | **£3,859.44** | **£168,219.20** |
| **69** | **£168,219.20** | **4.5** | **£7,569.86** | **£175,789.07** | **£3,946.28** | **£171,842.79** |
| **70** | **£171,842.79** | **4.5** | **£7,732.93** | **£179,575.71** | **£4,035.07** | **£175,540.64** |
| **71** | **£175,540.64** | **4.5** | **£7,899.33** | **£183,439.97** | **£4,125.86** | **£179,314.11** |
| **72** | **£179,314.11** | **4.5** | **£8,069.14** | **£187,383.25** | **£4,218.69** | **£183,164.56** |
| **73** | **£183,164.56** | **4.5** | **£8,242.40** | **£191,406.96** | **£4,313.61** | **£187,093.35** |
| **74** | **£187,093.35** | **4.5** | **£8,419.20** | **£195,512.55** | **£4,410.67** | **£191,101.88** |
| **75** | **£191,101.88** | **4.5** | **£8,599.58** | **£199,701.47** | **£4,509.91** | **£195,191.56** |
| **76** | **£195,191.56** | **4.5** | **£8,783.62** | **£203,975.18** | **£4,611.38** | **£199,363.80** |
| **77** | **£199,363.80** | **4.5** | **£8,971.37** | **£208,335.17** | **£4,715.14** | **£203,620.03** |
| **78** | **£203,620.03** | **4.5** | **£9,162.90** | **£212,782.93** | **£4,821.23** | **£207,961.70** |
| **79** | **£207,961.70** | **4.5** | **£9,358.28** | **£217,319.98** | **£4,929.71** | **£212,390.28** |
| **80** | **£212,390.28** | **4.5** | **£9,557.56** | **£221,947.84** | **£5,040.62** | **£216,907.22** |
| **81** | **£216,907.22** | **4.5** | **£9,760.82** | **£226,668.04** | **£5,154.04** | **£221,514.00** |
| **82** | **£221,514.00** | **4.5** | **£9,968.13** | **£231,482.13** | **£5,270.00** | **£226,212.13** |
| **83** | **£226,212.13** | **4.5** | **£10,179.55** | **£236,391.68** | **£5,388.58** | **£231,003.10** |
| **84** | **£231,003.10** | **4.5** | **£10,395.14** | **£241,398.24** | **£5,509.82** | **£235,888.41** |
| **85** | **£235,888.41** | **4.5** | **£10,614.98** | **£246,503.39** | **£5,633.79** | **£240,869.60** |
| **86** | **£240,869.60** | **4.5** | **£10,839.13** | **£251,708.73** | **£5,760.55** | **£245,948.18** |
| **87** | **£245,948.18** | **4.5** | **£11,067.67** | **£257,015.85** | **£5,890.17** | **£251,125.68** |
| **88** | **£251,125.68** | **4.5** | **£11,300.66** | **£262,426.34** | **£6,022.69** | **£256,403.64** |
| **89** | **£256,403.64** | **4.5** | **£11,538.16** | **£267,941.81** | **£6,158.20** | **£261,783.60** |
| **90** | **£261,783.60** | **4.5** | **£11,780.26** | **£273,563.87** | **£6,296.76** | **£267,267.10** |
| **91** | **£267,267.10** | **4.5** | **£12,027.02** | **£279,294.12** | **£6,438.44** | **£272,855.68** |
| **92** | **£272,855.68** | **4.5** | **£12,278.51** | **£285,134.19** | **£6,583.31** | **£278,550.88** |
| **93** | **£278,550.88** | **4.5** | **£12,534.79** | **£291,085.67** | **£6,731.43** | **£284,354.24** |
| **94** | **£284,354.24** | **4.5** | **£12,795.94** | **£297,150.18** | **£6,882.89** | **£290,267.29** |
| **95** | **£290,267.29** | **4.5** | **£13,062.03** | **£303,329.32** | **£7,037.75** | **£296,291.57** |
| **96** | **£296,291.57** | **4.5** | **£13,333.12** | **£309,624.69** | **£7,196.10** | **£302,428.59** |
| **97** | **£302,428.59** | **4.5** | **£13,609.29** | **£316,037.87** | **£7,358.01** | **£308,679.86** |
| **98** | **£308,679.86** | **4.5** | **£13,890.59** | **£322,570.45** | **£7,523.57** | **£315,046.88** |
| **99** | **£315,046.88** | **4.5** | **£14,177.11** | **£329,223.99** | **£7,692.85** | **£321,531.14** |
| **100** | **£321,531.14** | **4.5** | **£14,468.90** | **£336,000.04** | **£7,865.94** | **£328,134.10** |
| **101** | **£328,134.10** | **4.5** | **£14,766.03** | **£342,900.14** | **£8,042.92** | **£334,857.21** |
| **102** | **£334,857.21** | **4.5** | **£15,068.57** | **£349,925.79** | **£8,223.89** | **£341,701.90** |
| **103** | **£341,701.90** | **4.5** | **£15,376.59** | **£357,078.48** | **£8,408.93** | **£348,669.56** |
| **104** | **£348,669.56** | **4.5** | **£15,690.13** | **£364,359.69** | **£8,598.13** | **£355,761.56** |
| **105** | **£355,761.56** | **4.5** | **£16,009.27** | **£371,770.83** | **£8,791.58** | **£362,979.25** |
| **106** | **£362,979.25** | **4.5** | **£16,334.07** | **£379,313.31** | **£8,989.40** | **£370,323.92** |
| **107** | **£370,323.92** | **4.5** | **£16,664.58** | **£386,988.49** | **£9,191.66** | **£377,796.84** |
| **108** | **£377,796.84** | **4.5** | **£17,000.86** | **£394,797.69** | **£9,398.47** | **£385,399.23** |
| **109** | **£385,399.23** | **4.5** | **£17,342.97** | **£402,742.19** | **£9,609.93** | **£393,132.26** |
| **110** | **£393,132.26** | **4.5** | **£17,690.95** | **£410,823.21** | **£9,826.16** | **£400,997.05** |
| **111** | **£400,997.05** | **4.5** | **£18,044.87** | **£419,041.92** | **£10,047.25** | **£408,994.67** |
| **112** | **£408,994.67** | **4.5** | **£18,404.76** | **£427,399.43** | **£10,273.31** | **£417,126.12** |
| **113** | **£417,126.12** | **4.5** | **£18,770.68** | **£435,896.79** | **£10,504.46** | **£425,392.33** |
| **114** | **£425,392.33** | **4.5** | **£19,142.66** | **£444,534.99** | **£10,740.81** | **£433,794.18** |
| **115** | **£433,794.18** | **4.5** | **£19,520.74** | **£453,314.92** | **£10,982.48** | **£442,332.44** |
| **116** | **£442,332.44** | **4.5** | **£19,904.96** | **£462,237.40** | **£11,229.58** | **£451,007.82** |
| **117** | **£451,007.82** | **4.5** | **£20,295.35** | **£471,303.17** | **£11,482.25** | **£459,820.92** |
| **118** | **£459,820.92** | **4.5** | **£20,691.94** | **£480,512.86** | **£11,740.60** | **£468,772.26** |
| **119** | **£468,772.26** | **4.5** | **£21,094.75** | **£489,867.01** | **£12,004.76** | **£477,862.25** |
| **120** | **£477,862.25** | **4.5** | **£21,503.80** | **£499,366.05** | **£12,274.87** | **£487,091.18** |