Executive **25 September 2007**

Report of the Director of City Strategy

SUSTAINABLE STREET LIGHTING STRATEGY

Summary

1. The use of street lights and illuminated signs can be of considerable benefit for safety, preventing night time injury accidents, reducing street crime and the fear of crime, promoting sustainable transport such as walking and cycling, and facilitating social inclusion.

2. This proposed Sustainable Street Lighting Strategy has been prepared to ensure that the effects of street lighting are minimised in terms of the use of natural resources for the supply of equipment and services, the use of energy to power the lights and the light pollution produced.

3. The proposed strategy (Annex A) sets out, in a series of policy statements, the way in which the Council will deliver a sustainable street lighting service. An Action Plan is included covering:

- Procurement of services and energy
- Asset management
- Waste management
- Design and installation of new lighting schemes
- Consideration and use of new technology
- Seeking improvement in Supplementary Planning Guidance to incorporate sustainable street lighting where possible
- Investigating new sources of funding

Background

Sustainability

4. Sustainability has a number of definitions but for the purposes of this strategy it is the ability to provide for the needs of the world's current population without damaging the ability of future generations to provide for themselves. When a process is sustainable, it can be carried out over and over without negative environmental effects or impossibly high costs to anyone involved.

Scope

5. The services covered in this strategy are street lighting, illuminated signs, and flood lighting for which the Council has responsibility. It covers:

- the supply of energy
- the maintenance of existing assets
- the design and installation of new assets

Current Stock

6. The Council's street lighting and illuminated sign assets are as follows:

- 17335 street lights
- 1856 illuminated signs and bollards
- 286 other lighting units

Standards

7. There is no statutory duty to provide street lighting but where the Council has provided street lighting, there is a duty to maintain it. The majority of traffic signs do, however, require direct illumination in locations where street lighting is present.

8. The standards used are in accordance with general legislation and more specifically street lighting industry standards and codes of practice.

Current Practice

- For approximately three years all new installations of a standard, non-ornate nature, utilize flat glass/full cut off lanterns which are dark skies compliant. The lantern currently being used is the Holophane QSM.
- The modern lanterns used incorporate full electronic control gear giving maximum energy efficiency and, where possible, white sources of light are used. Again for the last three years, about 600 new or replacement lanterns have been installed each year to gradually improve the stock.
- Design of street lighting schemes is in accordance with the current BS5489 CEN13201 specifications and incorporate all guidance from the Institution of Lighting Engineers, including those relating to the reduction of light pollution.
- Schemes are designed to the minimum applicable levels.
- Column heights are kept to a minimum

9. The current arrangements for reuse and recycling are extensive:

- Lamps and lanterns are sent to specialist companies to strip out the components (ballasts, capacitors etc), to remove sodium, mercury and PCBs. Quartz glass is recycled, as is steel, copper and aluminium.
- Concrete columns are crushed and the reinforcing removed allowing all the material to be reused or recycled.
- Steel columns are fully recycled.

- Old and damaged bollard shells are recycled and we buy recycled bollards when possible.

10. The power, supplied by npower as part of a consortium arrangement through YPO, comes from combined heat and power sources and does not attract the climate change levy as it is regarded as being 'green'. It is, however, not as green as power from true renewable sources, but this source of power is not readily accessible due to limited availability.

11. Whilst the use of solar power for street lighting is still being developed, so that it meets the necessary standards, its introduction is seen as inevitable within a relatively short time as the technology improves. We are, however, at the stage of being able to install illuminated bollards with LED lights using solar power.

Why the need for a strategy?

Light Pollution

12. Light pollution is defined as the wasted light reflected or shone directly into the night sky from artificial sources resulting in sky glow and a reduction in the ability to view the natural night sky.

13. The increasing awareness of light pollution was highlighted by the campaign for dark skies, initially by the Campaign for the Protection of Rural England. Light pollution is an important issue that needs to be considered in new lighting designs and also in terms of how emerging technology could impact on existing street lighting assets to reduce lighting levels and light pollution.

Energy Use

14. There are increasing opportunities, as technology develops, to take advantage of energy from renewable sources, particularly solar energy. The use of appropriate energy saving technology also needs to be factored into the sustainable street lighting strategy.

New Technology

15. Street lighting has seen considerable advances in technology in recent years to produce better quality light that is more directional and controllable. The technology is now starting to be introduced in such a way that street lights are capable of being controlled remotely and we are probably at the start of a new era for street lighting. This needs to be recognised in the strategy so that there is sufficient flexibility to take advantage of trialling emerging new technology, particularly if grants can be obtained to assist with this, and, of course, to take advantage of proven technology.

Use of natural resources

16. The street lighting service consumes raw materials in the manufacture of equipment, its installation and ongoing maintenance. Whilst this is

unavoidable it should be controlled through consideration of whole life costs and through the purchase of recycled products.

Reduction in waste

17. The street lighting service produces waste materials and in accordance with the waste hierarchy these materials should be properly managed to reduce their output, through whole life costing, to reuse materials where possible and to recycle material. Only the absolute minimum quantity of waste should be sent away to authorised disposal sites.

Current trends

Possible Effects of Climate Change

18. Climate change will impact on all the different assets that make up the highway network and this could affect street lighting and illuminated signs through:

1 Increased water damage due to flooding from watercourses or inadequate/blocked drainage systems
2 Accelerated riverbank or drainage ditch erosion alongside carriageways and footways affecting the stability of lighting columns
3 Fast-flowing and intense water run-off (surface and sub-surface effects)
4 Changes in water tables affecting highway foundations and the stability of columns
5 Impact from falling objects due to high winds (trees and high-sided vehicles)
6 Uprooting of road surfaces attached to vegetation which is blown over
7 Damage from drought, causing subsidence, cracking etc affecting column foundations
8 Weather dependant windows for maintenance activities shrinking due to the changes in weather patterns
9 Increased incidence of fires adjacent to the highway

Emerging Technology

19, Emerging technologies are focussing on energy efficiencies and heat dissipation of equipment. There are some advances in remote monitoring and controls, helping to reduce burning hours and allowing the ability to vary lighting levels. Progress has been made in lamp technologies and the Philips Cosmopolis system is seen as a market leader but this remains limited in availability due to it being heavily used on PFI schemes. However, when detailed comparisons are made it actually has a lower efficacy than 'high pressure sodium plus', despite the increased publicity.

20. Regarding the use of monitoring systems, we are already utilising a trial site at the Rawcliffe Bar P&R site, using our private cable network for the transmitting of signals. We are also looking at others elsewhere in the country to compare the main systems on the market. This gives us the advantage of

finding the best systems for use within York before contemplating any citywide rollouts.

21. Certain local authorities have taken a lead, for example Milton Keynes and Kirklees but they are happy to share information at forums such as the Yorkshire Lighting Group and the YPO Lighting Group. This Council is an active participant in both forums.

22. As an example of this emerging technology, Milton Keynes has a city wide remote monitoring and switching/dimming regime. It is one of the largest trial sites in the UK, done in partnership with two manufacturers, where street lights are electronically linked to a central computer that records the status and fault information. This removes the need for regular lighting inspections and reduces repair and response times. Also it allows variable light control for different times of the night and helps to increase equipment longevity. This is the same system being promoted by the City of Oslo and currently on trial at the Rawcliffe Bar park and ride site. It cannot however interface with other manufacturer's equipment or systems.

23. Kirklees have recently been given funding for "green" technologies. These vary from mains connected solar lighting through to electronic control and monitoring and this is then coupled with green technology in houses and businesses for a "whole" community approach. Some of the equipment installed cannot be used in conjunction with an adopted public highway as it cannot be guaranteed to stay lit, as battery technology is not sufficient developed.

24. The possibility of further utilising the Council's WIFI mesh community system, currently being developed for the CCTV system is of interest, to see if this technology could be better utilised than GPRS for switching off or dimming light systems. This is in the initial stages of investigation.

Variable Light Control

25. A highway authority has the power, not a duty, under the Highways Act 1980 to provide and maintain road lighting.

26. Recent increases in the cost of energy have caused some local authorities to review their policy on the provision, operation and maintenance of street lighting to try to minimize these increases. The initial view of a number of local authorities is to reduce energy cost by a partial switching off, operating street lighting for shorter periods, or dimming light levels.

Partial Switching Off

27. A small number of councils, notably Essex, have taken the radical step to reduce CO2 emissions and light pollution, and to conserve energy by attempting to change the normal practice of keeping street lighting on all night long. In certain types of locations street lighting is turned off, usually from midnight or 1.00 am until 5.00 am. The use of a specialist type of photo

electric cell enables this to happen and this is then reflected in the energy usage.

28. Measures such as this have a number of implications outlined later in the report and should Members be interested in investigating this further then a protocol would need to be developed for identification of sites and consultation on the proposals, in conjunction with the police and Safer York Partnership

The Essex County Council experience

29. The County Council's normal practice has been for streetlights to be kept on throughout the hours of darkness, regardless of where they are located. But in the face of increasing concern about the disadvantages of light pollution and the need to conserve energy, the Council has revised its approach.

In July 2006 the council determined that street lights would be automatically switched off between midnight and 5am (GMT) where it is appropriate to do so.

The council did this as a responsible approach to tackle global environmental issues at a local level. Being a large and diverse county, Essex County Council took the view that it was sensible to work in ways that are flexible enough to recognise that whilst it will clearly be appropriate for all night lighting to remain in certain areas, it is wasteful for this practice to be generally applied across the county.

The partial switching off of lights will only be done with full consultation, including the Police, before taking this forward and the council intends to progressively introduce its new policy across Essex.

Whilst this action has been criticised by many lighting professionals, as well as the ILE and the UK Lighting board, it does appear, following discussions with the street lighting engineer for Essex County Council, that this criticism was not fully informed.

Dimming the lighting levels of newly installed systems

30. Newly installed lighting systems produce more light in the initial stages of their lives than when they have settled down to their normal light outputs in 2 or 3 years. Lighting designs are based on the light outputs achieved once the levels have settled down to normal tolerances. It would be much better, from an energy saving and light pollution point of view, if these new systems could be dimmed down in the first two years to 'normal' output levels but the technology has not been available to do this. However things are changing rapidly and the technology is almost ready to be used.

31. This form of dimming will have no noticeable impact in terms of customers expectations of a new lighting system, other than perhaps an acceptance that lighting levels are normal and not too bright.

Dimming the lighting levels of existing systems

32. Following the same sort of reasoning as with switching lights off for certain periods of the night, it is now possible if modern technology is used, to dim street lights and to therefore reduce energy and light pollution. As with switching off this needs to be used with care and if pursed a protocol for any introduction would need to be approved by Members.

Benefits and drawbacks of partial switching off lights and dimming lighting levels of existing systems

33. The obvious benefit is a saving in the use of energy, but when looked at in wider terms the benefits are:

- Reduced energy means reduced costs
- Reductions in the Council's carbon emissions and therefore its carbon footprint
- Reduced light emissions
- Demonstration of social and civic responsibility in response to global issues such as climate change
- Demonstration of environmental awareness

34. The drawbacks to switching off or dimming lights are essentially the loss of having a normal lighting system in place and the loss of the benefits it provides, as set out in the next section.

Benefits of retaining existing systems

35. Modern street lighting provides many community benefits by

- Preventing night time personal injury accidents
- Reducing street crime – the use of CCTV systems, for example is only feasible at night by the provision and maintenance of modern street lighting
- Reducing the fear of crime
- Promoting sustainable transport, including walking and cycling
- Facilitating social inclusion by providing the freedom to walk along and use our streets after dark
- Promoting economic development by supporting 24 hour leisure economy and distribution
- Facilitate lifelong learning by providing after dark access to educational facilities
- Assisting with emergency services to identify locations and carry out their duties.

36. Unless provided by separate order, restricted roads and their associated 30mph speed limits are established by the presence of a 'system of lighting furnished by lamps placed not more than 200 yards apart'. It may well be that the presence of lights, even though they are not switched on as fully, or lit to the same level as would normally be the case at night, is sufficient to continue

to make the speed limit legal, but further advice on this would be sought as required.

Alternatives to partial switching off and dimming light systems

37. As an alternative to partial switching lights off or dimming, there are other ways to keep street lighting lit whilst helping to reduce costs. These alternatives will also help to reduce the impact of street lighting on the environment by reducing the discharge of greenhouse gasses and reducing the effects of light pollution. Many of the proposals, listed below, can be incorporated into existing street lighting in an invest to save approach, whereas others can only sensibly be installed into new or replacement street lighting.

- Re-adjustment of the lighting levels at which photo-cells switch street lighting – *suitable for high pressure sodium lamps on modern control gear*

- Selective reductions in residential lighting – *in rural or purely residential locations, with low crime, it may be possible to consider switching off, or preferably, dimming street lighting during the after midnight hours.*

- Reduced traffic route lighting – *many traffic routes have peak flows for relatively short periods and low level at night. The use of electronic dimming technology could lead to energy reductions.*

- Design to the lowest feasible lighting classification – *giving careful consideration to type, use and location of the road (already in place but procedures need to be more robust).*

- Adoption of 'white light' sources – *particularly in residential locations, resulting in lower energy consumption and better visual ambience (already in place).*

- Conversion of older lighting equipment – *modern road lanterns, with improved lamps, reflectors and electronic control gear, offer much greater energy efficiency (already being done where possible).*

- Photo-cell control of illuminated traffic signs and bollards – *signs and bollards of often lit 24 hours per day. The introduction of small, electronic photo-cells could provide a simple, economic means of ensuring these units are only switched on when required after dark. The use of high reflective signs should be considered as an alternative to illuminated signs where legally permitted (already in place where possible).*

- Reactive lighting, reacting to movement and going from dim to full brightness. Whilst this is something that will continue to be kept under review, particularly for footway lighting, its implementation would result in fluctuating light levels which can cause problems and nuisance.

38. The above measures may only result in energy cost savings by moving onto a different type of tariff to that currently used i.e. half hourly rates. However,

altering the consumption energy pattern may result in the energy suppliers adjusting their unit costs to reflect this different pattern of use.

Key issues within York

39. There are opportunities each year, mainly as part of the highway improvement and highway safety programme, to introduce new street lighting schemes. It is important that the design of these schemes complies with the relevant design standards but not in a slavish way that is out of step with the surroundings, the wishes of the community and the desire to be sustainable. The strategy is a way of making sure that these issues are properly considered and that street lighting scheme designs are challenged to ensure that they meet the aims and objectives of the strategy.

40. Due to recent advances in street lighting technology, this is also an appropriate time to consider the direction in which the Council should proceed as it is highly likely that as this technology develops, prices will gradually become more affordable, whilst at the same time, environmental factors become even more important.

Options

41. Members have the option to approve, amend or reject the strategy in its present form. Putting forward some form of alternative strategy has not been pursued as a radically different alternative is not available.

42. The strategy proposed does not attempt to prescribe detailed specifications, it is pitched at a level to allow a flexible approach that is capable of natural change and development as new technology and circumstances develop. The strategy requires regular reports to be provided to Members and as part of this reporting procedure, Members will be updated on progress with the Action Plan.

Consultation

43. This report has not been used for consultation purposes. It is, however, based on information obtained from a number of professional bodies, other local authorities and a cross section of officers within the Council.

Corporate Priorities

44. Maintenance of the street lighting, illuminated signs and flood lighting has a direct impact on several of the Council's corporate aims and priorities:

Corporate Aim 1: (Environment)

Take pride in the City by improving quality and sustainability, creating a clean and safe environment.

Specific priorities:

1.1 Increase resident satisfaction and pride with their local neighbourhoods.

1.2 Protect and enhance the built and green environment that makes York unique.

1.3 Make getting around York easier, more reliable and less damaging to the environment.

Corporate Aim 3: (Economy)

Strengthen and diversify York's economy and improve employment opportunities for residents.

Not directly relevant to any of the specific priorities, but good quality highway infrastructure is vital to the local economy.

Corporate Aim 4: (Safer City)

Create a safe City through transparent partnership working with other agencies and the local community.

Specific priority:

4.7 Make York's roads safer for all types of user.

Corporate Aim 8: (Corporate Health)

Transform City of York Council into an excellent customer-focused "can do" authority.

Specific priority:

8.9 Manage the Council's property, IT and other assets on behalf of York residents.

Implications

Human Resources

45. There are no Human Resources implications in this report.

Equalities

46. There are no equality implications in this report.

Legal

47. The Council, as highway authority, has the power, not a duty, under the Highways Act 1980 to provide road lighting but it has a duty to maintain the lighting for which it responsible. The Council also has a statutory duty to carry out highway maintenance under the same Act.

Crime and Disorder

48. There are no crime and disorder implications in this report and the street lighting service aims to have a positive effect on crime. However, should Members at some point wish to pursue the partial switching off or dimming of existing lighting systems then the potential effect of this on crime and disorder issues would need to be considered at that time.

Information Technology

49. There are no information technology implications in this report.

Property

50. There are property implications in this report but, as with crime and disorder, this would need to be reassessed should partial switching off or dimming be considered at some point.

Other

51. There are no other implications in this report.

Financial Implications

52. There are no financial implications arising directly from this report or from the strategy. The introduction of new technology may well have a financial impact but this will be assessed in whole life terms and will be subject to approval by Members as part of a detailed report. An indication of the current costs associated with switching off lights and dimming light systems is outlined below.

Current costs associated with switching off lights and dimming light systems

53. To provide reduced energy costs, by switching lights off (having them lit for shorter periods) or by variation of lighting levels (dimming), extra equipment would be needed.

54. Large scale supply of new equipment is best introduced as part of new schemes, the larger the better, such as PFI.

55. At present this extra equipment requirement, and typical costs, is as follows:

- The cost of the Node for the Lantern is around £150.00 – (the Node controls the light and 'talks' to the central controller)
- The cost of the central controller (one for around every 250 lights at present, although development is in place to increase this number) is £400.00.
- The cost of the software and management is over £10,000 per annum

56. As mentioned earlier, possible alternative solutions, such as the extended use of the developing WIFI network, will also be considered.

57. The costs are expected to reduce as the technology becomes more accepted. However, based on these costs, it would be extremely expensive to carry out anything approaching a citywide roll out although a phased approach may be possible. If proposals could be examined properly in whole life terms, taking into account environmental and social factors as well as costs, then the savings in energy and night scouting may not, at present, outweigh the capital costs. There is, however, no recognized evaluation technique currently available to allow this complex assessment to be made.

58. With variable levels (dimming) there is only one system that has been recently approved by the energy companies for the purpose of reducing the bills and even then it is difficult to have this reflected in the actual energy costs. This is because the electricity companies seem to be unwilling to allow any such system to be used as an alternative for metering as they do not have full control over it, however, in some locations they have been forced to accept this by OFGEM.

59. If complete wholesale shutdown of lighting systems for periods of the night is considered, the reduction in energy usage will result in previous price agreements being re-negotiated. Whether this would result in a rise in the units costs due to the lower use remains to be seen.

60. At the present time, until this emerging technology is more developed, the approach being taken by this Council is to replace lanterns with units having full electronic control gear, offering lower wattage and less power consumption. This has been reflected in the street lighting inventory and is providing the best deal we can obtain on energy supply.

Risk Management

61. In compliance with the Council's risk management strategy, the main risks that have been identified in this report are:

- Strategic Risks, arising from judgements in relation to medium term goals for the service
- Physical Risks, arising from potential underinvestment in assets
- Financial Risks, from pressures on budgets
- People Risks, affecting staff if budgets decline

62. Measured in terms of impact and likelihood the risk score for all of the above has been assessed at less than 16. This means that at this point the risks need only to be monitored as they do not provide a real threat to the achievement of the objectives of this report.

Recommendation

63. The Executive is recommended to approve the sustainable street lighting strategy in Annex A.

Reason: To demonstrate the strategic importance of the service and to enable it to develop and improve within set parameters to deliver the most sustainable outcome.

Contact Details

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Report Approved ✓ **Date** 11/9/07

Chief Officer : Bill Woolley
Director of City Strategy

Specialist Implications Officer(s) None

Wards Affected: *List wards or tick box to indicate all* **All** ✓

For further information please contact the author of the report

Background Papers:

Annexes

Annex A – Sustainable Street Lighting Strategy
Annex B – Street Lighting and Illuminated Signs – Specification and Notes for Guidance to Consultants, Developers and Contractors