

Preserving
the
“Dark Sky”
of Wadhurst



November 2012

Wadhurst & District Astronomical Society

www.wadhurstastro.co.uk

The cover composite photograph is copyright and is published with the kind permission of Dr. Don Goldman of Astrodon Imaging in the U.S.A. Astrodon Imaging is a major supplier of scientific grade optical filters to observatories around the world. Dr. Goldman visited and stayed in Wadhurst in 2011 and gave a talk to our society. He was so impressed with the village and sky quality that as part of his presentation he took this image of the village signpost and superimposed it on a deep-sky image of Melotte 15 in the Heart nebula.

Contents

In a Nutshell	3
Introduction	4
Purpose of the Document	4
Wadhurst & District Astronomical Society	4
What is Light Pollution?	5
High Pressure or Low Pressure Sodium – Which is Best?	7
Low Pressure Sodium (LPS) Lighting.....	8
What Type of Street Light is Best?	9
Examples of Poor Street Lighting Design in Wadhurst.....	10
The Parish of Wadhurst.....	11
The Survey.....	12
The Sample Locations	13
Survey Point 1 - Village Centre and Washwell Car Park.....	14
Survey Point 2 - Uplands College and Main Car Park Area.....	15
Wadhurst Main Car Park	16
Survey Point 3 – Durgates and Jonas Lane Area	17
Survey Point 4 – Sparrows Green, Turners Green Area.....	18
Sparrows Green Recreation Ground	18
Survey Point 5 – Woods Green Area	19
Survey Point 6 – Cousley Wood - Sleepers Stile Road Area	20
Survey Point 7 – Bartley Mill Road Area	21
Survey Point 8 – Wadhurst Tip and Station Area.....	22
Survey Point 10 – Snape Wood Car Park Area.....	24
Mapped Average Readings obtained at Survey Points	25
Dark Sky Survey Readings by Location	26
Dark Sky Ranking (Darkest First)	27
What is the solution?	28
Conclusion	28

In a Nutshell

Protecting our dark sky does not mean we all have to walk around in the dark; it just means that we stop artificial light shining where it is not wanted. This can mean that more light is actually directed where it is needed, on the ground, rather than upwards where it is wasted and pollutes our dark night sky.

This survey which is explained and detailed in the following pages was carried out using a special measuring device which samples and provides an accurate numerical measurement of the darkness of the sky. The scale goes from 0 to 24 where 24 is the darkest. A significantly degraded dark sky would be measured at 16 to 18. A measurement in a city such as London would be as low as 8 or less; a reading of 24 would be the same as a photographer's dark room.

In practical terms this means that when viewing the sky with the naked eye in a light polluted city centre you would only be able to see a few of the brightest stars at best. In some areas of Wadhurst it is possible to see up to 2000 stars.

Many visitors to the area of Wadhurst are surprised with our dark sky. The average darkness of the sky over the Parish of Wadhurst has a surprisingly high measurement of 20.08 with the best area measured at 21.09. This is a very good reading for a village in the Southeast of England. However, we cannot afford to sit back and hope it stays that way or cannot be improved. It is imperative therefore that our dark sky is protected and where possible is improved for the benefit of all and for our future generations.

Wadhurst has 16 styles of street light and 163 street lights in total across the whole parish. This low density of street lighting significantly benefits the dark sky, and over recent years, the installation of some night sky friendly street lights has also helped. However, there are some parts of Wadhurst that have a disproportionately adverse effect on the dark sky because the street lights are badly adjusted, have an unsuitable lens or need to have lamps of the correct wattage fitted. Also significant savings could be made if the number of different types of street lights were reduced to allow bulk purchase of lamps and parts which may result in lower costs as well as reducing financial waste through savings in maintenance administration costs.

A Parish Policy to fit correct wattage lamps that are adequately shielded so that they do not shine upwards into the sky would protect and further improve the quality of our dark sky. This would ensure that our children grow up with an appreciation of the universe that surrounds us and a view of the sky which is denied to most of the children in the UK today. Astronomy not only encourages interest in all sciences, including engineering, mathematics and physics but also history and the arts. If you Google the subject of "Art in Astronomy" you will get many thousands of hits!

This is a description of this survey and our hopes for the future in a nutshell, for details of the survey and what needs to be done please do read on.

Introduction

This document was created by the Wadhurst & District Astronomical Society in response to an invitation by the Wadhurst Parish Council who wished to take suggestions for any ways in which the Parish Council could help the various groups and societies of the parish. The Wadhurst & District Astronomical Society's request was that the council adopts a "Dark Sky Policy" for street lighting. We also volunteered to perform a "Dark Sky Survey" in order to set a baseline so that the sky quality of Wadhurst can be recorded and monitored over time. The society also sought the help of the Campaign for Dark Skies (CfDS) a campaign to discourage the use of inefficient artificial outdoor lighting that works alongside the Campaign to Protect Rural England, and we thank them for their input into this document.

Purpose of the Document

This document has several purposes; primarily it is to provide the results of a Dark Sky Survey that was carried out during the first half of 2012. It is hoped that the findings of the survey can be used to assist the Parish Council in protecting the intrinsically dark sky in the area, by introducing policies to ensure that future street lighting fixtures known as "Dark Sky Friendly" lights are used whenever possible. It is also hoped that others including public, commercial and residential users of outdoor lighting will find this document of use in minimising light pollution.

The document refers to the various types of lamps available and what the characteristics of those lamps are with regards to light pollution. The document also explains what light pollution is and demonstrates the benefits of adopting a policy to protect the rural nature of Wadhurst by saving wasted energy costs and preventing light pollution.

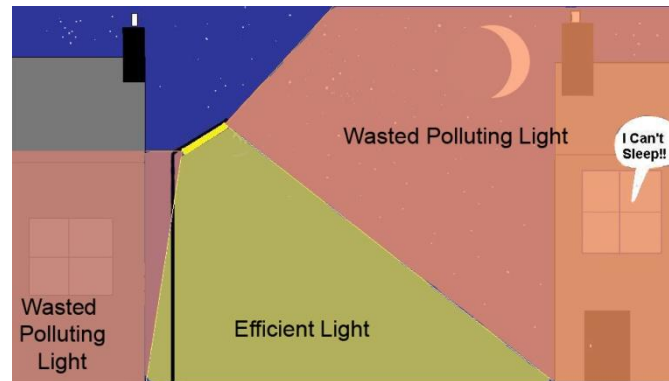
Finally, it is hoped that should the recommendations in this document be brought to fruition, it will bring to the younger members of society the many benefits of preventing light pollution, and instill in them an interest not only in astronomy but also physics, science and the arts that will last them all their lives.

Wadhurst & District Astronomical Society

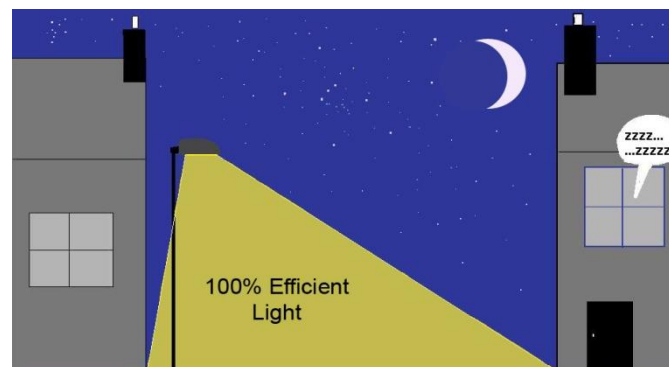
The society was founded in 1997 by a group of adult students together with the then Head of Science and Physics from the Uplands Community College who taught them. Following the successful attainment of their Astronomy GCSE certificates the group decided it would be a shame to just all go their different ways. As a result this friendly society now has around 40 members and continues to invite speakers both locally and from around the country to talk on all things astronomical. Many of these speakers and other visitors to our meetings have commented on the dark sky over Wadhurst compared with many other areas in the UK.

What is Light Pollution?

Put simply, it is excessive, inefficient and sometimes irresponsible lighting that shines where it is not needed nor wanted. Our aim is the same as that of the CfDS. We are not anti-lighting but anti-bad lighting. Outdoor lighting does not necessarily need to be turned off to reduce light pollution – it just needs to be directed to where it is needed.



Poorly designed street lights can cause significant waste and light pollution.



Full cut-off street lights save energy and beam the light to where it is needed.

Light that is directed into the sky illuminates tiny particles of dust and moisture floating in the atmosphere and it is the illumination of these particles that causes a loss of contrast, and tends to wash out the fainter stars from view in an orange or grey glow.

UK street lights alone waste over £100 million a year; that money is spent generating light that is wasted directly into the sky. Diverting light away from the street and towards the sky also results in our streets sometimes being unnecessarily dim. Research has also shown that excessive lighting can cause medical health problems, ranging from stress to cancer. In addition bad lighting can be a security risk and encourage crime and has a detrimental effect on wildlife.

The smog of night-time light pollution prevents 90% of the UK population from seeing the natural spectacle of a sky full of stars (which is why the Campaign for Dark Skies was set up by astronomers).



Image Copyright S. Barnes

The constellation of Orion in clear, then light polluted sky.

In general, the design of the street lighting needs to be such that it does not allow the light to pass in an upwards direction. The light cut-off should not be above the horizontal or this may allow light to trespass into the sky or surrounding area. In Wadhurst many street lights have over the years been replaced with the new Cobra design street light with the drop down lens. Whilst these are an improvement over the lamps they have replaced, they can allow light to refract in many directions and cause problems. For this reason the Cobra street lights with the flat lens rather than the drop down lens is recommended in these street lights. A great improvement can be obtained by simply replacing the lens for a flat design.



Comparison of identical luminaires at Durgates.

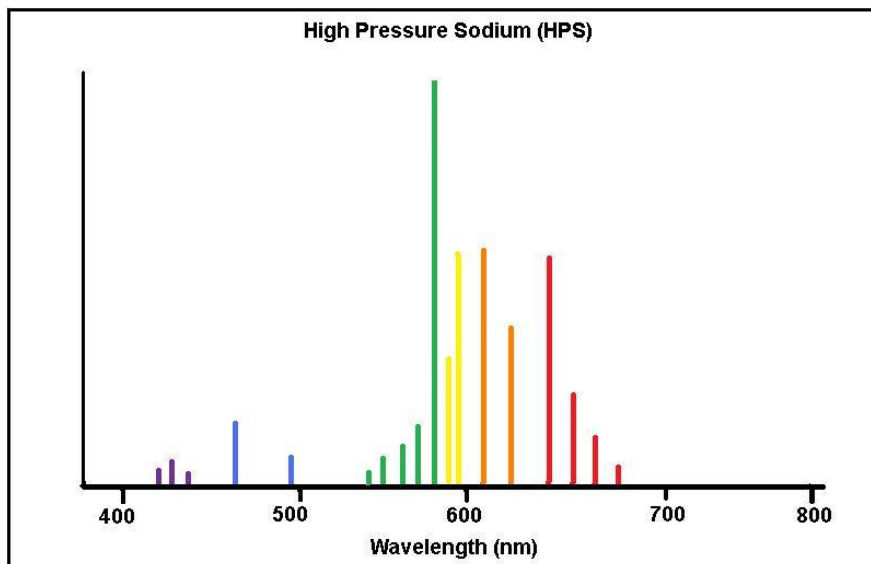
This shows the drop down lens on the left side of the road has significantly greater light pollution than the flat full cut-off lens on the right.

With street lighting, the problem is not always the luminaire (the complete lighting fixture) but can also be the lamp which provides the source of light. The lamp needs to be of the minimum wattage for the purpose in hand, as light is reflected into the sky by reflecting off the ground. It has been found that 8 to 11% of the light gets reflected into the sky, but providing the lamp light output is suitable for purpose this will be minimised, as will the running costs.

High Pressure or Low Pressure Sodium – Which is Best?

The Campaign for Dark Skies (CfDS) recommends low pressure sodium lighting. This is because low pressure sodium emits light in a specific waveband of light. High pressure sodium and metal halide lamps emit light in many wavelengths and are seen as a much brighter light. The same is true of mercury vapour lamps. Low pressure sodium light is easier to filter out of any astronomical data than that of high pressure sodium, mercury vapour or halide light. Over recent years smart street lighting has enabled programmable dimming to be used which is now being adopted as it saves 50% of energy.

High Pressure Sodium Spectrum



High Pressure Sodium emits light on a wide bandwidth

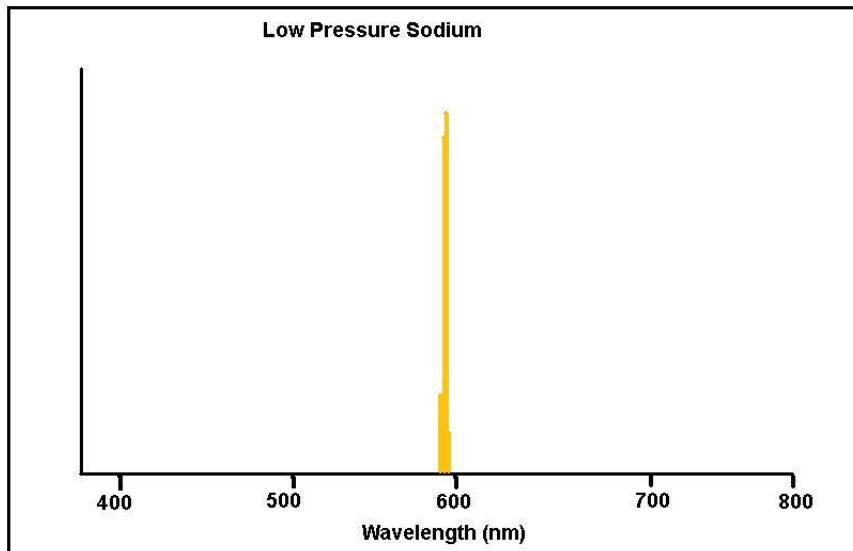
It can be seen from the above graph that light from a High Pressure Sodium (HPS) lamp is emitted on many wavelengths. This can have a wider detrimental effect on wildlife by attracting a greater number of species sensitive to the wide range of wavelengths. This increased disturbance to wildlife can have many side effects including upsetting the food chain by disturbing feeding patterns.

If what is required is an efficient light, adequate to provide a safe level of illumination in an energy efficient manner, then there is an alternative that ticks all the boxes and also has the added benefit of illuminating without the high level of uncomfortable glare that so often accompanies the high pressure lamps.

Low Pressure Sodium (LPS) Lighting

There are several reasons to choose LPS lighting. The first becomes obvious when you look at the spectrum emitted by this type of lamp.

Low Pressure Sodium Spectrum



Low Pressure Sodium Lamps emit in a very narrow band.

This second graph shows that the preferred low pressure sodium lamps only emit light in a very narrow band of the spectrum. This graph demonstrates that LPS is extremely good at providing energy efficient illumination whilst maintaining a narrow bandwidth. The light emitted being very efficient in mist or foggy conditions, is also ideal for rural areas and has the benefit of not becoming dim with age.

In addition to this, from an astronomical perspective, with the LPS type of lighting, it is possible to filter out any light pollution that would otherwise spoil any long exposure photographs of faint astronomical objects. This is of great assistance to colleges and universities that are now often involved in astronomical spectroscopy and deep sky photography.

Some older designs of LPS lighting are often bulky and are so poor that they can only be improved by replacement. However, on others, retro fitting of reflectors that direct their light to where it is needed can be fitted saving the cost of replacement.

In conclusion, the low pressure sodium lamps, by emitting light in a specific narrow wavelength, minimise damage to the environment, wildlife and the dark sky and are energy efficient. They do have the downside though in that because they tend to be larger in size the light emitted tends to be more difficult to control.

What Type of Street Light is Best?

There are several factors that need to be considered when assessing what a good street light is. If the best dark sky friendly street light was badly adjusted so that the light was directed upwards above the horizontal or too bright for the purpose intended it could easily cause significant light pollution.



Full cut-off designs mean light is directed towards the area needed.

The “Cobra” style of street light (middle and left above) is becoming the most popular as the basic design, when correctly installed, directs all light towards the ground where it is needed. However, care is needed when selecting the lens for these street lights. The drop-down lens design that can be fitted allows light to be refracted back up above the horizontal plane towards the sky. The flat lens is therefore recommended to be fitted to “Cobra” designs in order to retain the full cut-off feature of these street lights. These street lights when correctly installed and fitted with low pressure sodium lamps are the recommended luminaire to protect dark skies.

The box style luminaire on the right is another example of an excellent dark sky friendly street light.

Manufacturers of street lighting are very aware of the growing concerns of light pollution and they are improving the performance and reducing the pollution from them all the time. The latest types of street lights use LED lighting which is both programmable and dimmable with excellent cut-off. They use a fraction of the power of conventional street lighting. Although these lamps emit many wavelengths of light they do have a significantly improved control over the light emitted and together with the dimmable features reduce light pollution by emitting the correct level of light to where it is needed.

Examples of Poor Street Lighting Design in Wadhurst

Any street light that allows its beam to shine above the horizontal is a poor design as far as light pollution is concerned.



A sample of street lights around Wadhurst that shine & waste much of the light into the sky.

Whilst in some cases an ideal solution would be to replace these street lights, in other cases a significant cost effective improvement can be achieved by changing the lamp to a lower wattage, the lens to a full cut-off flat design or just re-directing the luminaire through simple adjustment.

When a lower wattage more efficient design is installed, the savings in running costs rapidly mount up and the pay back can be significant over just one year.

Wadhurst already has a practice of switching off many lights after midnight when there is very little need for any lighting and this is to be applauded and where possible expanded to bring further environmental and economical savings. However, this is not the only approach needed as most people are in bed after midnight. It is important therefore that the benefits of any improvements in our sky quality affect the majority of people. Only by ensuring that any street lighting installed is dark-sky friendly will the true benefits of a dark-sky be realised.

A programme focused on the areas that have the worst pollution first will bring significantly greater savings and faster improvement. The areas needing focus are identified later in this document.

The Parish of Wadhurst

Wadhurst is situated on the Kent-Sussex border seven miles east of Crowborough and seven miles south of Tunbridge Wells. It resides in an E1 classified Area of Outstanding Natural Beauty (AONB) on the High Weald.



The Parish of Wadhurst is about 6.3 miles in width and 6.7 miles in length, the red box indicates the Wadhurst village centre. There are approximately 2000 households in the Wadhurst parish. The parish is crossed by two main roads the B2100 from the Northeast to the Southwest and the B2099 from the Northwest to the Southeast. Both these roads have street lighting but this is mainly limited to where it passes through the more built up areas. All other roads are mostly minor country lanes with very little street lighting. The lack of any brightly lit “A Class” roads in the parish is another fortunate factor. To the Northwest is Royal Tunbridge Wells, the outskirts of which are approximately 5 miles away from the centre of Wadhurst. Unfortunately, Royal Tunbridge Wells has a serious light pollution problem and this has an adverse effect on the horizon in that direction.

The Survey

In order to access the current darkness of the sky over Wadhurst it was necessary to take readings at 10 specified locations across the Parish. This would enable a baseline to be created and set for future monitoring of the sky quality.

Many measurements were taken between the hours of 11pm and 2 am in order that the differences could be measured between the periods where some residential area street lights were turned off at midnight.

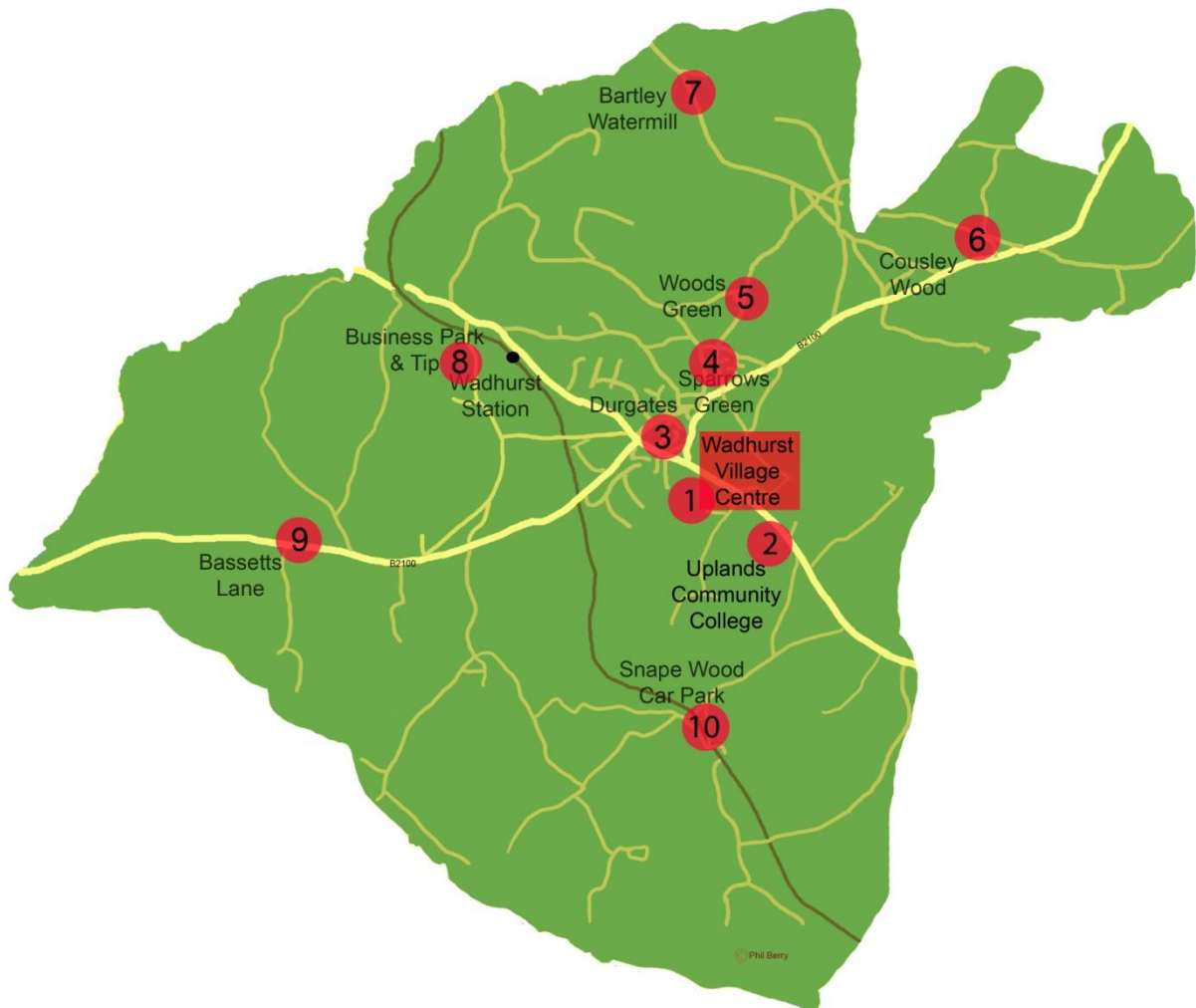
In addition it was necessary to take readings when there were different degrees of cloud cover with cloud at various altitudes, this was because light pollution will show up to a greater degree if the illumination of cloud is measured. If there was varying cloud the number of spot readings was increased at each sampling point so that all readings were averaged at a higher rate for accuracy. Finally the survey was unable to proceed in the rain or in twilight or if the Moon was above or near the horizon as this would also contaminate the readings.

The measurements were taken using a Unihedron SQM MkII Sky Quality Meter. This device measures very low levels of light in units of magnitudes per square arcsecond (mags/arcsec²) of the sky. An arcsecond is 1/3600th of a degree. The sample area is a cone of the sky approximately 80 degrees across. So what we are measuring is the background light in many tiny areas across the sky.

A magnitude is a scientific term used to measure the brightness of stars. The faintest stars that can be seen by the human eye in the UK are about magnitude 6. Children have a particular ability to see fainter stars than adults can see. A brighter star such as Polaris (North Star) is approximately magnitude 2. The brighter a star, the lower is its magnitude. Due to the way a magnitude is perceived each magnitude lower is approximately 2.5 times brighter. So a 2 magnitude star is 6.25 times brighter than a 4 magnitude star. For example: $2.5 \times 2.5 = 6.25$.

A National Dark Sky Park would boast dark skies of up to 24 mags/arcsec² all the way down to the horizon. However, the practical limit of darkness measurement in most clear and dark sky areas is nearer 22 as the light given off by the background light of the stars then starts to affect the readings. For our purposes the readings are always taken at the zenith (directly overhead) which is the accepted method for surveys as this then measures pollution, in the main, from the actual area being surveyed.

The Sample Locations



The survey points numbered above are used in all future measurements

There are ten survey points. The survey was carried out in four central areas of the village and then an additional six at various locations were chosen around the outlying areas of the parish. These were chosen as they were not close enough to the centre to be affected by the concentration of light from the centre, and not too close to the parish boundary to be affected too much by lighting outside the parish. In this way any increase in light pollution created in the central areas that affects outlying areas can be monitored over time. Conversely, the affect of any pollution encroaching on the parish from outside its boundaries can also be monitored.

Survey Point 1 - Village Centre and Washwell Car Park

The surveys carried out in the village centre at point [1] showed an average reading of 19.80 mags/arcsec². The predominant luminaires in the village centre are of the vintage “gas-light” design. Whilst these street lights are not ideal, it would be wrong to suggest that these should be replaced as the design is in character with the “old world charm” of the village centre. There has been some recent replacement of the vintage style, these newer versions have the added advantage of the lamp being recessed to a great degree into the top of the luminaire which improves the light cut-off compared to the older model of these luminaires.

The type of lamps used in these vintage street lights would benefit both the aesthetic as well as the dark sky aspects for very little cost. The lamps in these newer versions are of a brilliant halide type. These lamps emit a glare which whilst somewhat uncomfortable to look at also cause significant light pollution. If these lamps were converted in due course to those of a low pressure sodium type it is possible they would be more visually appealing and in keeping with the “vintage feel” of the village centre during the hours of darkness.



These “Vintage Luminaires” would benefit from conversion to LPS lamps

Due to the brightness and close proximity of these street lights the measurements were shaded from the direct light of these lamps as this would have contaminated the readings.



The Washwell Road Car Park Luminaire at the rear of the One Stop Outlet

A perfect example of dark sky friendly street light with a low pressure sodium lamp in a full cut-off luminaire.

Survey Point 2 - Uplands College and Main Car Park Area



The entrance to Uplands College at 2am showing the detrimental effect of the poorly designed lighting which is left on all night.

The lighting in the Uplands College is not under the control of the Wadhurst Parish Council. However, it has a detrimental effect on the rest of the village centre as does the adjacent main village car park which also has a serious pollution problem. It was not therefore possible to separate these two locations as far as the issue of light pollution goes and it was decided to take a reading of the general area and deal with the causes separately.

The observations at the Uplands Community College and the car park at point [2] showed an average reading of $18.72 \text{ mags/arcsec}^2$. This was a very disappointing result and was due in the main to legacy luminaires of very poor design which appear to send more light into the sky than to where it is actually needed. Added to this is the fact that these luminaires double up as security lights to provide illumination for an old style security CCTV system which requires them to be left on all night. As vehicles and pedestrians share the same areas the glare and shadowing from poorly directed lighting can dazzle drivers and be hazardous.

The Wadhurst Astronomical Society has previously contacted the Uplands College regarding the outside lighting and we are assured that the Uplands College are very concerned with the amount of light pollution they cause and the message it gives to their students. They have promised that this situation will be improved in due course when funds to upgrade the outside lighting and CCTV system will be made available. The college is very aware of their responsibility to set a good example to their students and to create a sense of appreciation of good dark sky practice for future generations. In the meantime it is unfortunate that the level of light pollution in this area of Wadhurst is approximately 13 times worse than the best area in the parish.

Wadhurst Main Car Park



Left - the main car park floodlight and **Right** - the beam shines high into the sky and trees.

The lighting of the adjoining main Wadhurst car park is under the control of the Wadhurst Parish Council. The main luminaire is a massive 250 Watt high pressure sodium floodlight which is mounted high and directed at an elevation above the horizontal across the main car park. As this floodlight is so badly adjusted it not only lights up the car park but also the playing fields behind the Commemoration Hall. A reduction in wattage and adjustment of this floodlight would significantly reduce the level of light pollution across a large area of the town centre.

A reduction in the hours of illumination would not only reduce the cost of energy but comply with the latest police recommendations regarding permanently illuminated security lighting being used by criminals to assist in car theft. There have also been several cases of vandalism at the rear of the Commemoration Hall and it is quite possible that this floodlight has provided more than adequate illumination for the various nefarious activities of the vandals. As there is very little use for this floodlight once the local hostelry is closed, significant financial savings could be made by reducing the time it is activated.

Together with the poor quality lighting at the Uplands College this light pollution has a significant impact on the quality of the sky over Wadhurst and it is hoped that this car park lighting will be made a high priority.

Survey Point 3 – Durgates and Jonas Lane Area

The observations at Durgates and Jonas Lane area at point [3] showed an average reading of 19.39 mags/arcsec². The predominant luminaires in the residential area of the Mayfield Lane and B2099 road junction are of poor design for the purposes of controlling light pollution. They have a number of different lamps fitted including mercury vapour and high pressure sodium. The topology of the Jonas Lane area helps contain the light pollution to a degree due to the estate being within a steep sided valley.



Typical street lights found in the Durgates area.

The luminaires were designed when light pollution was not a consideration and unfortunately this shows in the poor readings taken in the Durgates area.

The existing street lights in this area are very inefficient and much of the light they emit is wasted either into the sky or to light up the houses. The replacement of the street light luminaires with full cut-off fittings would bring a significant improvement to the quality of the dark sky over this location, and create a more efficient lighting installation which would direct the light towards the pavement rather than light up the houses, windows and sky. This would over time provide significant savings in energy costs and minimise the detrimental effect of night-time lighting on people's health.

Survey Point 4 – Sparrows Green, Turners Green Area

The observations at Sparrows Green, Turners Green area at point [4] showed an average reading of 20.42 mags/arcsec². This is significantly better than the readings taken towards the town centre and demonstrates the advantages brought by the higher percentage of the newer “Cobra” type street lighting luminaires in this area.

The area has also benefitted over the last few years from the good practices of companies such as KHL Ltd. This company has responded to a request from residents to alter the outside lighting to come on only when required rather than all night. The whole area of Sparrows Green and Turners Green is at the highest elevation in the parish and as a result KHL Ltd. have significantly benefitted the quality of the dark sky over this and surrounding areas. It is hoped this will continue with their current premises expansion.

There are still some improvements that can be made to the area in general. Several of the Cobra design street lights have drop down lenses rather than flat lenses, and therefore the light cut-off could be improved further by replacing these with flat lenses.

Sparrows Green Recreation Ground

The security lights at the Recreation Ground Pavilion would benefit greatly by being directed down towards the ground. The security lights also have excessively high wattage lamps, which when activated shine light right across the recreation grounds. As this location is at one of the highest points in the parish, any light pollution in this area contaminates a much greater area of the parish than would otherwise be the case.

The latest police advice is that poorly installed security lighting can provide cover and assistance for criminals through glare and that reduced levels of lighting correctly directed can prevent criminals from using the security lighting to their own ends.



An example of glare from the Pavilion security light hiding a man at the door.

Survey Point 5 – Woods Green Area

The observations at Woods Green area at point [5] showed an average reading of 20.32 mags/arcsec². The sky quality in Woods Green is good due to the low number of street lights in the area but it does suffer to a certain extent in that the two street lights in the hamlet are not dark sky friendly.

The street light at the top of the hamlet is of a poor design which would ideally need to be shielded or replaced, but to its credit it is fitted with an LPS lamp.

An improvement could also be made to the second street light, a vintage luminaire at the bottom of the hamlet. The vintage design of this street light would probably need to be maintained to preserve its old world charm, but should this require replacing at some time, the new style vintage street light would bring the advantage of a recessed lamp feature, and therefore have improved cut-off of stray light, especially if converted to a lower wattage to reduce the uncomfortably bright glare.



The vintage luminaire in Woods Green would benefit from a lower wattage or LPS lamp.

Survey Point 6 – Cousley Wood - Sleepers Stile Road Area

The observations at the Sleepers Stile Road area at point [6] showed an average reading of 20.48 mags/arcsec². The sky quality in this area is good due only to the low number of street lights in the area.

The sample site was Sleepers Stile lane out of Cousley Wood towards Lamberhurst as direct light pollution from the street lights in Cousley Wood was affecting the accuracy of the readings.

This survey point was also chosen as it could then be used to monitor any encroaching light pollution from the Lamberhurst area.



The street lighting within Cousley Wood along the B2100

The street lighting along the B2100 is of poor design similar to that in Durgates and would benefit from retro-fitted shielding or replacement with a full cut-off design.

Survey Point 7 – Bartley Mill Road Area

The observations at the Bartley Mill Road area at point [7] showed an average reading of 20.42 mags/arcsec². The area has almost no street lights there being just one in a private residence which unfortunately is of ancient design similar to that at the Best Beech Hill crossroads; however, being only one in number, the light pollution from this must be slight.

This area should have been a prime dark sky location in the parish given the lack of lighting. However, this is the closest location in the parish to Royal Tunbridge Wells.

This location would have been as dark as Snape Wood, the darkest in the survey, were it not for the poor sky quality to the north horizon of this area which is severely degraded by the light pollution from Royal Tunbridge Wells.

Fortunately the sky quality is measured at the zenith in this area and the pollution from Royal Tunbridge Wells is reduced to some degree as the sample area does not go down to the horizon.

The dark sky is however still of good quality. There being no official street lights in this area no action is necessary at this location.

It is interesting to note that the average readings for this location exactly match those of Sparrows Green / Turners Green. This is surprising when you consider the greater number of street lights in Sparrows Green and the denser population compared to the Bartley Mill area.

It is a demonstration of how effective good quality street lighting can be in limiting light pollution and how distant light pollution from Royal Tunbridge Wells can affect a potentially prime dark sky such as the Bartley Mill area.

If Wadhurst Parish Council were to be granted an award for its work in protecting our dark sky by means of a policy, it would be interesting to see if the ensuing publicity associated with the award being granted were to cause Royal Tunbridge Wells to adopt their own dark sky policy. If so, it would be interesting to see how this might improve the situation at Bartley Mill.

Survey Point 8 – Wadhurst Tip and Station Area

The observations at the Wadhurst Tip and Station area at point [8] showed an average reading of 19.99 mags/arcsec². The street lights in this area along the B2099 are generally of a good design. Some are fitted with low pressure sodium lamps and some are full cut-off.

The station car park is lit for extended hours to accommodate late travelling passengers, and this somewhat increases the light pollution in the area. However most of the lighting at the station is of good design although very bright for safety reasons.

The council tip has some large high wattage sodium floodlights which often appear to be left on all night. It would be beneficial if these were of a passive nature that only came on when activated, and were directed to the area of refuse collection.

The Wadhurst Business Park has some poorly designed light fittings which tend to be left on for most of the time. If these were of a passive infrared design it would benefit the area if they were only to come on when activated.



Left: The full cut-off platform lighting at the station is a good example of how this style of lighting minimises light pollution, unlike the lighting at the Wadhurst Business Park (Right)

Well directed, non-glaring lighting can improve the visibility in an area for both people and CCTV as demonstrated on the left image of the station platform.

Survey Point 9 – Mayfield Lane by entry to Bassetts Area

The observations at survey point [9] showed an average reading of 20.49 mags/arcsec².

The light pollution from street lighting in this area is very low due to an absence of street lights. It should be remembered that the above reading is an average. The readings for this area have been as good as 20.93 mags/arcsec². This is still very dark indeed, and second only to Snape Wood.

Moving towards Best Beech Hill there is a very old style luminaire at the cross roads at Best Beech which has been fitted with a mercury lamp. It may well be that this street light is of historical value and that the high level of pollution is to be accepted rather than changed for a more efficient full cut-off design, however it would still benefit from conversion to LPS if possible.

At least one private/commercial residence does appear to have scant regard for light pollution as was witnessed one night at 1 am when several high power floodlight beams from a residence in the area were left pointing directly into the sky! On this isolated occasion the sky above the premises reading was only 17 mags/arcsec².

It would appear that some public awareness is needed, and the adoption of Wadhurst as a “Dark Sky Village” by the CfDS together with the acclaim that this would bring may well encourage more responsible public attitudes.

Survey Point 10 – Snape Wood Car Park Area

The observations at survey point [10] showed a reading of 20.76 mags/arcsec². This area is very dark having no street lights and very few residences.

The readings for this area were as good as 21.09 mags/arcsec². This is an amazing reading for the Southeast of England and demonstrates that the area is already intrinsically dark.

In addition, as this location is at the opposite end of the parish from Royal Tunbridge Wells it does not suffer from light pollution from the poor quality of sky over that town as is the case with the Bartley Mill area.

Any future improvements in the Wadhurst Town Centre, Uplands College and the main car park lighting would be easily observed from this point looking north, as from this car park at Snape Wood a panorama of the night sky can be seen over the Wadhurst Village Centre with Uplands in the foreground. From this point it can be seen that the extent of the light pollution from Uplands, and the adjacent car park is obviously in need of attention in order to preserve the quality of the sky over central Wadhurst.

There being no street lights in the Snape Wood car park area, no action is necessary at this location.

Mapped Average Readings obtained at Survey Points



This map shows the average sky quality at the various survey points across the parish.

There are 163 street lights and 16 different styles in the Wadhurst parish. The main concentration of street lights is as expected in the central and residential areas. However, it can be seen that the residential area of Sparrows Green with its Cobra Style street lights shows a marked improvement which is comparable with the outer reaches of the parish. This shows that significant improvements are possible even in the more central populated areas of the parish.

Dark Sky Survey Readings by Location

Survey Point	Loc.	Readings Session 1	Readings Session 2	Readings Session 3	Readings Session 4	Readings Session 5	Average	Rank	Comments
1	Town Centre	19.16	18.92	20.69	20.52	19.69	19.80	8	Due to poor cut-off accurate readings only possible with meter shaded from direct light.
2	Uplands College & Main Car Park	18.15	18.72	19.32	18.12	19.30	18.72	10	Due to poor cut-off accurate readings only possible with meter shaded from direct light.
3	Durgates & Jonas Lane	19.19	19.55	19.44	19.29	19.49	19.39	9	Due to poor cut-off accurate readings only possible with meter shaded from direct light.
4	Rec. Ground Sparrows Green	20.55	20.15	20.91	20.65	19.85	20.42	4	Equal rank 4 th with Bartley Mill.
5	Woods Green	20.32	20.33	20.84	20.32	19.80	20.32	6	Meter readings taken shaded from vintage lights with poor cut-off.
6	Cousley Wood Sleepers Stile Road	20.25	20.83	20.80	20.48	20.06	20.48	3	This area benefits from a low street light population. However, the street lights in this area are of poor design and need shielding or replacement.
7	Bartley Mill	20.56	20.75	20.80	20.42	19.57	20.42	4	This area would be darker if it were not for the light pollution from Tunbridge Wells.
8	Wadhurst Tip & Station	19.45	19.80	20.30	20.85	19.55	19.99	7	Darkest readings obtained when security lighting was switched off at the tip.
9	Mayfield Lane Bassetts	19.82	20.65	20.93	20.93	20.11	20.49	2	1 st reading session degraded by light pollution from a commercial residence in Best Beech Hill area.
10	Snape Wood Car Park	20.45	21.09	20.93	20.95	20.36	20.76	1	Darkest readings in the Parish. Some distant light pollution evident from Uplands College and Town Centre Car Park
Session Averages	All Locations	19.79	20.08	20.50	20.25	19.78	20.08		Red figure is an average of readings taken across the Parish and a baseline for future measurements.

Dark Sky Ranking (Darkest First)

Rank	Location	Average Reading	Survey Point	Comments & Possible Improvements
1	Snape Wood	20.76	10	The darkest location in the parish. No Action Required
2	Mayfield lane, Bassetts	20.49	9	Very dark but residential lighting a concern in Beech Hill area on occasions. Low Priority
3	Cousley Wood Area	20.48	6	Good reading due to low light population though of poor quality. Low Priority.
4	Sparrows Green	20.42	4	Very Dark. Full Cut-off lighting would improve further. Medium Priority.
4	Bartley Mill	20.42	7	Very Dark. Slight pollution from Tun. Wells. No Action Required
6	Woods Green	20.32	5	Dark. Could be improved with low wattage or LPS conversion in Vintage street light. Top light needs action. Medium Priority.
7	Wadhurst Tip & Station	19.99	8	Dark. Could be improved with lower wattage or LPS with restricted use. Medium Priority
8	Town Centre	19.80	1	Medium Dark. Vintage fittings with low wattage or LPS would improve rating. Medium Priority.
9	Durgates & Jonas Lane	19.39	3	Polluted Sky. Replacement of luminaires with full cut-off type necessary. High Priority
10	Uplands College & Main Car Park	18.72	2	Severe Pollution. Replacement with full cut-off type necessary. Reduced hours and adjustment in car park. High Priority

The priorities are based on the effect on the sky quality of proposed improvements together with the amount of light pollution in the area and the number of street lights.

What is the solution?

The cost of replacing all unsuitable street lighting across the parish immediately would be prohibitive. However, the cost of replacement will be recouped in reduced electricity and maintenance costs. If the Parish Council were to consider adopting a policy of gradually addressing the worst cases in line with the ranking shown in this document, the poorest street lights would be addressed first and this would bring the largest benefits. The baseline figure of 20.08 mags/arcsec² is the average score for the whole parish and this can also be used to decide what locations to improve first by addressing any locations with a score below 20.08 mags/arcsec².

Conclusion

The dark sky of Wadhurst is an important asset, and both visitors and many residents who witnessed the dark sky survey taking place have remarked on how much they value the quality of our dark sky and the work being done, hopefully to ensure that it is protected for future generations. This could be achieved if the amount of energy and light was reduced by eliminating the waste directed into the sky. When people think of the difference between cities and rural villages, often the thing that comes to mind is the bright city lights. Unfortunately, as the bright city lights wash out all but the brightest stars it is becoming increasingly rare to see dark skies in the UK. Surveys have shown that 50% of British citizens have never even seen the Milky Way. This is hardly surprising when you consider that from 95% of the cities and populated areas in the UK it is not even possible to see the Milky Way.

With rural areas constantly under threat, the aim is to protect our dark sky. It is therefore of the utmost importance that we do everything we can to keep Wadhurst rural and our children appreciative of the night sky, by minimising light pollution and saving wasted energy that pollutes our night sky wherever possible.

Wadhurst is very fortunate in that the low density of street lights in conjunction with an increasing trend of sympathetic street lighting has resulted in most areas in Wadhurst retaining a very good sky quality. Wadhurst is also fortunate compared to many towns and villages that have, through high population density or lack of consideration of light pollution, not only lost their dark skies but have put them financially out of reach for many years into the future.

As our population increases and night time lighting expands to accommodate future needs, it becomes all the more important that any lighting installations are mindful of the impact of light pollution in order that future generations are able to enjoy to the same, or to even a better degree, the dark sky over Wadhurst.

The Wadhurst Astronomical Society will continue with the aid of the Campaign for Dark Skies to monitor the sky quality of Wadhurst and perform a detailed sky quality survey at various times in the future.

It is hoped that the information in this survey is of use to the Parish Council and that a policy putting the considerations of light pollution and the importance of protecting our dark sky is added to the lighting policies for the parish. This will echo the government's new National Planning Policy Framework 2012 (NPPF), which states on the subject of lighting in paragraph 125: *"By encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

It is also hoped that this survey can, through distribution and publicity, be used to expand dark sky awareness to residents and the commercial sector in Wadhurst in order that everyone in Wadhurst values and protects this great asset we are so fortunate to enjoy.

There is no doubt that recognition of the Wadhurst Parish Council by the CfDS, by making an award for Wadhurst Parish Council's work in protecting our dark sky will bring significant prestige and publicity. In addition, it will also be in line with the government's new National Planning Policy Framework 2012.

Here, we have put forward a proposal to request that the street lights and outdoor lights of Wadhurst do not waste their light into the sky, nor into people's homes.

This will...

- Ensure beautiful, natural dark skies of Wadhurst for future generations.
- Save money.
- Minimise the detrimental effect of night-time lighting on wildlife.
- Minimise the detrimental effect of night-time lighting on people's health.

Making Wadhurst a Dark Sky Friendly Village is a great opportunity to make Wadhurst a "Shining" example to other Councils and towns in the area...in the best possible sense of the word of course.

Phil Berry

Secretary, Wadhurst & District Astronomical Society

November 2012

wadhurstastro@gmail.com

www.wadhurstastro.co.uk



