

# Claverton Neighbourhood Plan

## TRANQUILLITY

### Noise and Speed Reduction; Safety

### A few thoughts...

The purpose of this presentation is to show current thinking on the issues and how other communities deal with the issue of speed reduction and road safety.

# CONTENTS

- A. Noise Reduction :
  - 1. A36
  - 2. Helicopters and microlights
  - 3. Drones
  
- B. Speed Reduction :
  - 1. A36
  - 2. Claverton Hill
  - 3. School Place
  
- C. Pedestrian and Cycle Safety
  
- D. Visual intrusion and enhancement

# A. NOISE REDUCTION

## Noise in Claverton comes principally from traffic

“TRAFFIC NOISE IN RURAL AREAS ...  
has become a big problem in rural areas  
due to the large rise in the amount of traffic  
on rural roads in recent years”

(TRANSPORT FOR QUALITY OF LIFE 2008)



TRAFFIC NOISE is created by a combination of :

- vehicle weight and power
- rolling noise (from tyres interacting with the road)
- propulsion noise (comprising engine noise, exhaust systems, transmissions and brakes)

# TRAFFIC NOISE ...

... triggers a complex chain of responses affecting human health and well-being (DEN BOER and SCHROTEN 2007)

which can result in :

- heart disease
- high blood pressure; and
- mental illness

# A. 1. SOLUTIONS : A36 SPEED REDUCTION = NOISE REDUCTION

Noise from traffic on the A36 can be reduced by:

- reducing the speed limit to



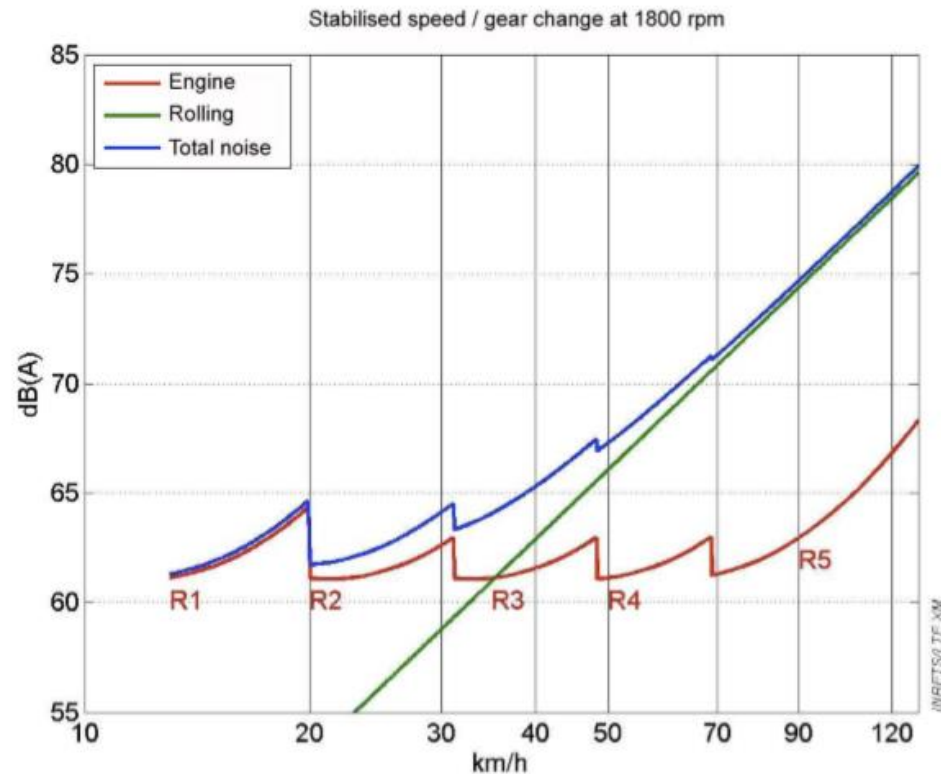
“Cutting speeds is the most immediate, the most cost-effective and most equitable way of reducing traffic noise” (PAIGE MITCHELL 2009)

There is a measurable link between traffic noise and speed (PAIGE MITCHELL 2009) :

- Reducing speeds of 20 and 35mph by 6mph would cut noise levels by up to 40%
- Reducing 70mph and 60mph speeds would cut noise by up to 50%

# TABLE showing a generalised relationship between propulsion and rolling noise and the way both change with vehicle speed

Figure 3: A generalised relationship between propulsion and rolling noise and the way both change with vehicle speed.



(Source: ECMT/OECD 2006:45, Figure 2.8)

# A REDUCTION OF SPEED FROM 50mph TO 40mph would further reduce...

- noise from **DECELERATION** into and **ACCELERATION** out of the bends to the north and south of the village
- **VIBRATION** from traffic

N.B. REDUCING THE SPEED LIMIT FROM 50mph to 40mph ...would only add approximately 20-30 seconds to the journey time (Bathampton to Watership Farm is approximately 2 miles)

## NOISE CAN BE FURTHER REDUCED BY ...

- **LAYING QUIET ROAD SURFACES:** These can reduce noise levels by up to 5db. Some more specialised surfaces can achieve greater reductions.
- **ENCOURAGING ALTERNATIVE AND COLLECTIVE MODES OF TRANSPORT** (walking, cycling, bus, train, car share) to **REDUCE TRAFFIC**

## A. 2. HELICOPTERS AND MICROLIGHTS

- “Whilst the private use of aircraft, microlights etc., are not subject to planning control, the land used as landing fields and storage does require planning permission” (CCB Position Statement)
- “The Board (CCB) will oppose any change of use of land for private aircraft use unless suitable conditions can be imposed to mitigate the impact of the use on tranquillity. “
- Are helicopter companies etc entitled to fly commercial sight-seeing flights over the AONB?





## A. 3. DRONES

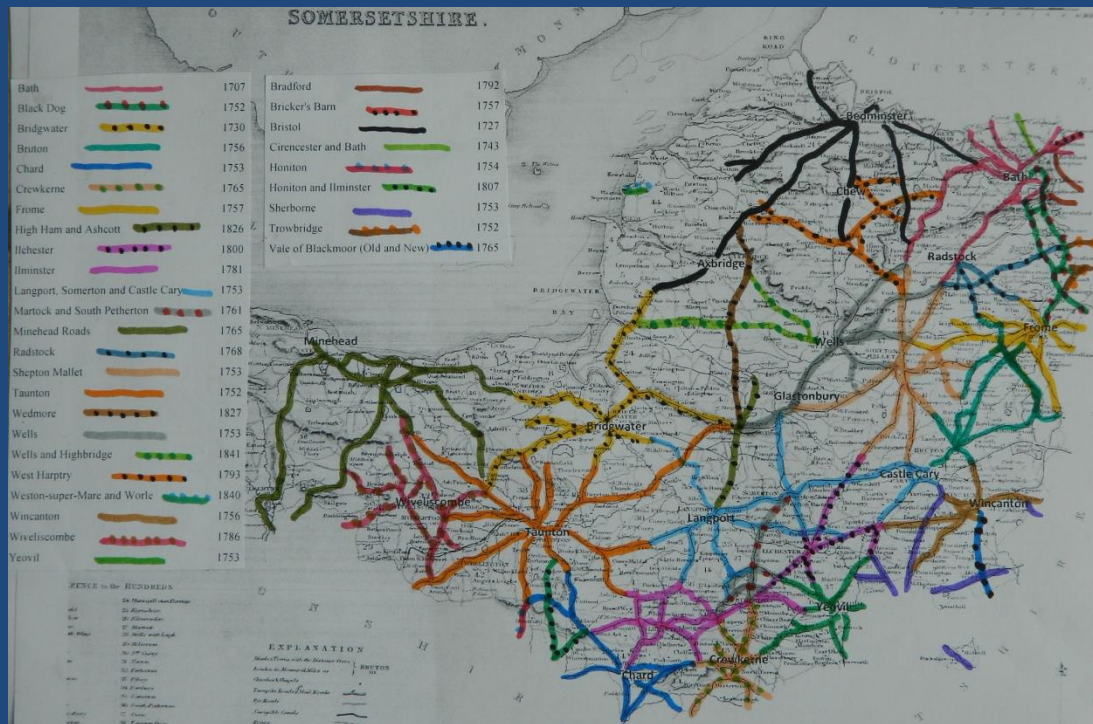
- Drones are discouraged.
- The laws governing drone use can be found: [www.caa.co.uk/Blog-Posts/Guidance-for-flying-drones/](http://www.caa.co.uk/Blog-Posts/Guidance-for-flying-drones/) and
- further information on drone safety can be found : [dronesafe.uk/](http://dronesafe.uk/)



# B. SPEED REDUCTION

## 1. A36 : BLACK DOG TURNPIKE ROAD

The A36 is a former turnpike road established in 1752



# DEPARTMENT FOR TRANSPORT GUIDANCE ON RURAL SPEED LIMITS (2006) RECOMMENDS ...



“for roads with a high number of bends, junctions or accesses...or (and) where there is a strong environmental landscape reason”. (DfT 2006: 42, TABLE 2)

## B. 1 A36

From Bathampton to Watership Farm (40mph zone), a distance of approximately 1.75 miles, there are :

- 3 footpath crossings
- 7 field entrances
- 2 bus stops
- 3 home entrances
- 5 blind bends
- 2 lay-bys
- 3 lane turnings
- 2 farm entrances

# A REDUCTION FROM 50mph TO 40mph WOULD ...

- improve safety for pedestrians crossing the A36
- improve safety of cyclists on the A36
- improve safety for drivers and cyclists turning into and out of the A36 from the numerous accesses along the road (lanes, fields, homes, lay-bys, bus stops and farms *(see Slide 12 above)*)

# TRAFFIC AND SPEED ...

... also contribute to air pollution



## B. 2. CLAVERTON HILL

- Claverton Hill is de-controlled. Theoretically that means the speed limit is 60mph!
- University of Bath advice to staff and students states :“can all staff and students using this route ensure that they maintain a sensible speed (i.e. well below 30mph) and are in a position to stop safely should the need arise.” (UNIVERSITY NEWS 7.10.2010)



- ...IS PLENTY FOR CLAVERTON HILL

# CLAVERTON HILL ...

- varies in width from 3m80 to 5m
- is 4m30 for most of its length ...
- although the pillars by the American Museum are just 3m40 apart. The pillars are Grade II listed.
- The 5m stretches in the middle section are effectively passing places
- There are several blind bends.
- N.B. Claverton Hill is open to traffic weighing less than 7.5t- approx overall dimensions Length 8.3m / Height 3.5m / Width 2.5m (inc. mirrors)

BEING LESS THAN 5m WIDE,  
CLAVERTON HILL COULD BE ELIGIBLE  
FOR ...‘QUIET LANE’ STATUS



*Department for*  
**Transport**



# 'QUIET LANES' ARE ...

- ... a Countryside Agency initiative which has the support of the Department for Transport

and are ...

- supported by CPRE

The aim of quiet lanes is to maintain the character of minor rural roads by seeking to contain rising traffic growth that is widespread in rural areas.

Claverton Hill is historic, existing long before the university was established

# QUIET LANES ATTRACT LOWER SPEED LIMITS

- a viable option for Claverton Hill and Ferry Lane?

THIS WOULD BENEFIT...

- Walkers
- Dog walkers
- Students
- Visitors to the American Museum
- Cyclists
- Riders



# THE QUIET LANE CONCEPT INVOLVES...

three key elements :

- Local community involvement to encourage a change in user behaviour;
- Area-wide direction signing strategy to re-route traffic;
- Quiet Lane network signing

n.b. Public Rights of Way should be included in the network.

As well as pursuing 'Quiet Lane' status there are a number of 'Shared Use' and speed limitation options that could be considered such as....

# SHARED USE

painted pavement– in need of repair!? (A36 to Freshford lane)



# VILLAGE ENTRANCES

speed signs, road narrowing and cobbles (Wellow)



# ...and important junctions

Rumble strips (Wellow)



Cobbles at each 'entry point'  
and junction (Wellow)



# SPEED REDUCTION

low-rise speed signs (Acton Turville)



combined name and speed sign (SHOSCOMBE)





# Respect our Community

Please drive carefully (Gloucestershire)



# Please watch your speed (Gloucestershire)



# COMMUNITY SPEED WATCH :

these can operate on roads with limits up to 40mph



# PASSING SPACES :

an unobtrusive option for Claverton Hill, 'formalising' the 5m passing spaces (B road, Wales)



## B. 3. SCHOOL PLACE IS ...

a shared use road by definition: children play, people walk their dogs and pass the time of day, homes give directly onto the street...



speed limit should apply

20 is more than plenty

## C. PEDESTRIAN AND CYCLE SAFETY

MUCH IS COVERED ON PEDESTRIAN AND CYCLE SAFETY UNDER 'SPEED REDUCTION'

However, the safety of walkers crossing the A36 on the various footpaths could be addressed ...



This sign indicates the footpath crossing on the A36 near the Freshford turn

# D. VISUAL INTRUSION AND ENHANCEMENT

## A36: VISUAL INTRUSION



Ever-increasing signage :

- Is unaesthetic
- creates visual 'clutter'
- is confusing and difficult to read
- 'urbanises' an otherwise rural environment

# CREATIVE SOLUTIONS ...



- need to be found that respect the conservation and rural character of the area.



# TRADITIONAL FINGERPOSTS ...



are :

- part of our heritage
- redolent of the countryside

## REMOVE ...

Right/Left turn signs to Claverton Down on green 'A' Road signs to discourage through traffic and/or add weight and width restriction

## REPLACE...

- White 'Claverton Down' sign (*right*) with a traditional fingerpost.

This would :

- slow traffic (harder to read)
- reduce the perceived importance of the road
- create a more rural feel



# ENHANCE

- In addition to reducing visual clutter, verges can be enhanced by sowing wildflower verges



## ROADSIDE VERGES...

- ... offer a vital wildlife corridor ...
- ... are a vital refuge for wild flowers driven out of our farmland by agricultural practices. Flowers and grasses...
- ... support our birds, bees and other wildlife

## ALL ROAD VERGES ...

- can be better managed while remaining safe for motorists

The logo for Plantlife, featuring the word "Plantlife" in a bold, green, sans-serif font. The letters are filled with a pattern of green leaves and stems, giving it a natural, organic feel.

**ROAD VERGES AND WILDLIFE  
MANAGEMENT GUIDELINES**

**April 2015**

## SOME COUNCILS...

- are looking after their road verges in a way that benefits nature...
- they are in a minority but should become the norm.



**MONMOUTHSHIRE COUNTY COUNCIL VERGE SPONSORSHIP POLICY**

# SOURCES

- BRAKE/TRL
- Cotswold Conservation Board : Position Statement on Tranquillity and Dark Skies
- Department for Transport
- Highway Code
- Noise Association : Transport for Quality of Life - Traffic Noise in Rural Areas: personal experiences of people affected (2008)
- Paige and Mitchell Report (2009)
- Plantlife
- Transport for Quality of Life

# Claverton Neighbourhood Plan

## Dark Skies Light Pollution

Controlling light spill for the benefit of the environment,  
the economy and health

Claverton does not have any street lights and therefore  
enjoys a good view of the night sky.

# A. INTRODUCTION : Cotswold AONB

- Claverton is in the Cotswold Area of Natural Beauty (AONB)
- The AONB forms the setting to the World Heritage City of Bath
- The City of Bath forms the setting to the AONB
- 50% of the AONB is in the sky



# Supporting the Cotswold Conservation Board (CCB)

As part of the CAONB, Claverton aims to support the CCB in:

- Conserving and enhancing the natural beauty of the AONB
- Increasing understanding and enjoyment of the special qualities of the AONB

# Loss of the night sky

Our ability to see the stars is affected by sky glow from:

- surrounding towns and villages
- lights at the university (campus and sports fields)
- Warleigh Manor
- outdoor domestic lighting
- skylights

# Cumulative impact of lighting

**“The cumulative impact of local lighting schemes ... i.e. security, leisure activities, street lighting, floodlighting, ... can lead to the loss of dark skies”**

**N.B. :** Light emitted from buildings also contributes to ambient lighting

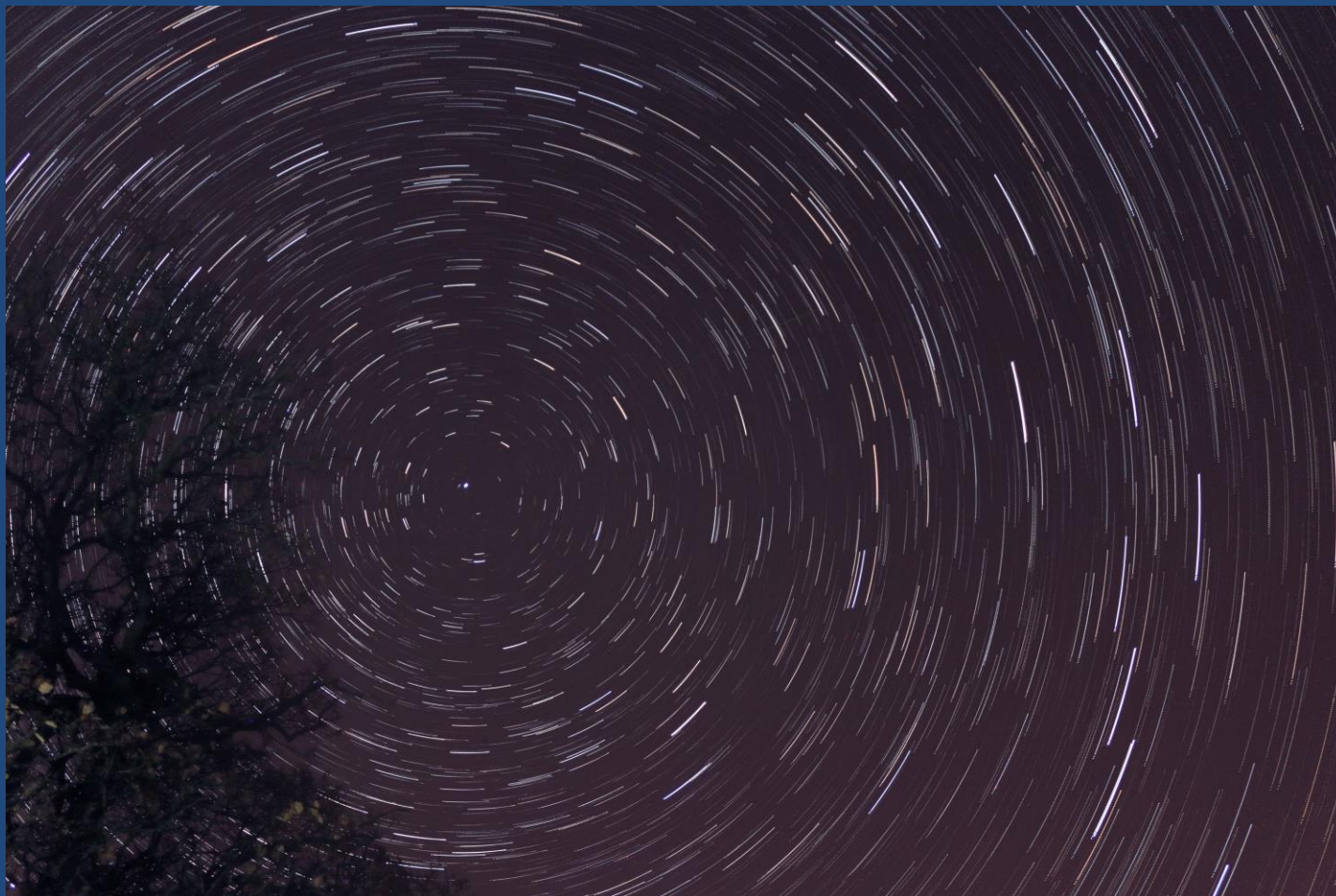
# Lighting & Environmental Zones

**Table 1 – Environmental Zones**

<b>Zone</b>	<b>Surrounding</b>	<b>Lighting Environment</b>	<b>Examples</b>
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

The parish is in E1/E2 and aims to be in E1.

# The Night Sky above Claverton



# Darkness and Night-time Ecology

**THE NIGHT SKY IS VITAL TO THE ECOLOGY OF THE AREA.  
LIGHT AFFECTS :**

- **MOTHS AND INSECTS**

loss of and impact on insectivorous birds, amphibians and mammals i.e. bats etc

- **NIGHT-TIME FEEDING BIRDS AND MAMMALS i.e. Owls and Bats** (delayed feeding and change in foraging habits; vulnerability to predators)

- **SLUGS AND SNAILS**

increase in numbers

- **TREES AND OTHER FLORA**

dependence on nocturnal creatures; early bud break, late Autumn

# Darkness, Human Health and Melatonin

Light at night (particularly blue-rich lighting) can harm health by suppressing melatonin.

**MELATONIN** has antioxidant properties and :

- Induces sleep
- Boosts the immune system
- Lowers cholesterol
- Helps the functioning of the thyroid, pancreas, ovaries, testes and adrenal glands

**SUPPRESSION OF MELATONIN** can increase the risk for *inter alia*

- Obesity
- Depression
- Sleep disorders
- Diabetes
- Breast and prostate cancer

# Key to CPRE Night Blight Map

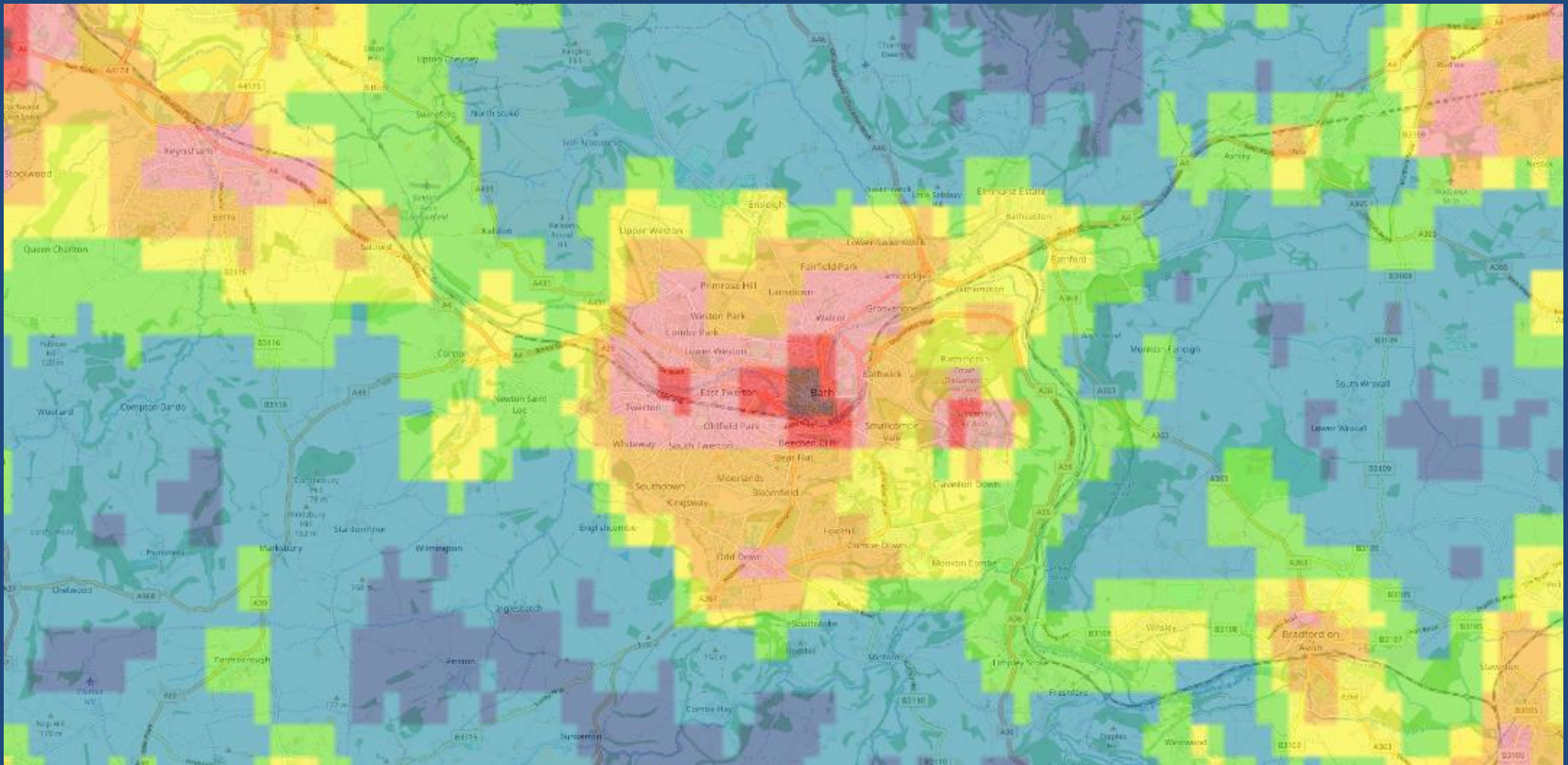
measured in NanoWatts/cm<sup>2</sup>/sr

Categories	Brightness values (In mW/cm <sup>2</sup> /sr) <sup>17</sup>
Colour band 1 (Darkest)	<0.25
Colour band 2	0.25-0.5
Colour band 3	0.5-1
Colour band 4	1-2
Colour band 5	2-4
Colour band 6	4-8
Colour band 7	8-16
Colour band 8	16-32
Colour band 9 (Brightest)	>32

The map is a composite of photographs taken over several nights in September 2015 at 1.30 a.m. Sports field lights are consequently not on.



# Light pollution in and around Bath



# Acting to protect the night sky

for present and future generations by :

- working with the university
- working with the owners of Warleigh Manor
- opposing inappropriate lighting in new developments in the parish
- encouraging 'starlit sky' lighting within the parish
- working with the Bath Starlit Skies Conference which aims to reduce light pollution in and around Bath

# Principles of good external lighting

Starlit Skies Alliance

The 5-Star principles of good external lighting are :

1. DESIGN EXCELLENCE :   
seek innovative lighting design solutions to light responsibly
2. DOWNWARD AND SHIELDED :   
light only when and where it is needed
3. USE WARM LIGHTING HUES :   
be good to ourselves and the rich biodiversity around us
4. LIMIT BRIGHTNESS :   
dazzle is detrimental to safety, health, and our environment
5. ACTIVELY MANAGE:   
sign up to a culture of continuous improvement in environmental management.

## B. BATH UNIVERSITY

- lighting on the campus is not just the result of lighting from the sports fields
- there are problems, but there are also solutions

For more background and supporting evidence please refer to the evidence base

# C. DOMESTIC LIGHTING

## The Good Neighbour Principle

A significant amount of light pollution comes from the University of Bath, Warleigh Manor and surrounding towns and villages.

These are options

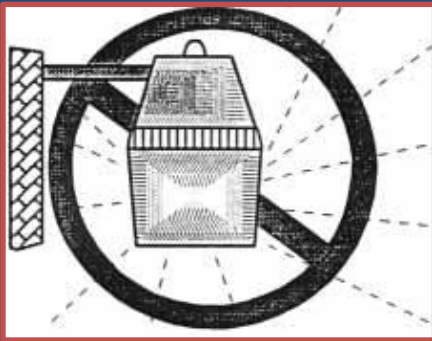
However, the cumulative effect of domestic lighting, however, can also take away our view of the stars.

There are options which can be used to retain our dark skies.

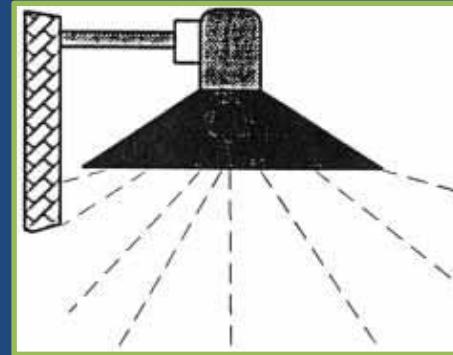
# Good and Bad Light Fixtures (1)

Diagrams : NELPAG (New England Light Pollution Advisory Group)

**BAD : Yard Light**  
waste light goes up and sideways



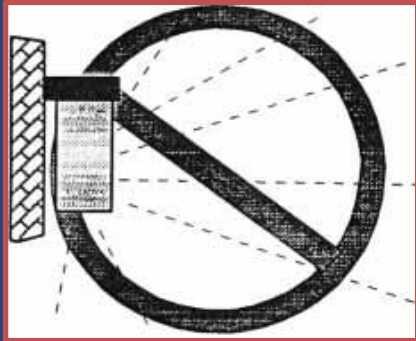
**GOOD : Opaque Reflector (light inside)**  
directs all light down



# Good and Bad Light Fixtures (2)

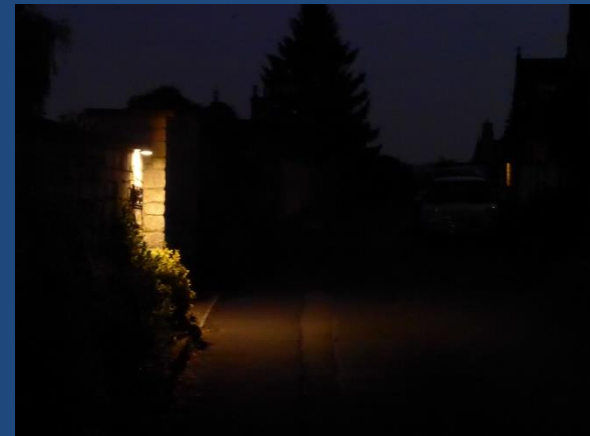
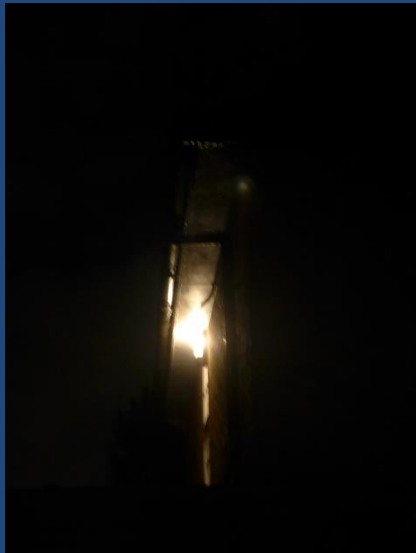
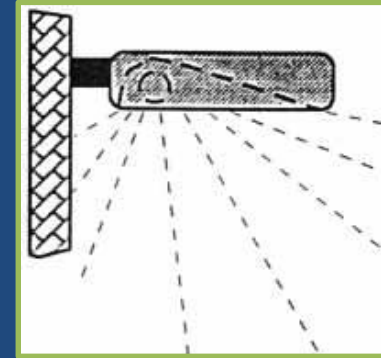
## **BAD : Wall Pack**

**waste light goes up and sideways**



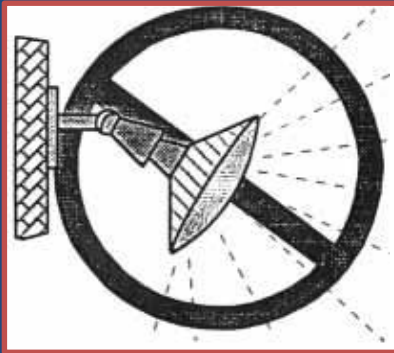
## **GOOD : Shoe Box (forward throw)**

**directs all light down**

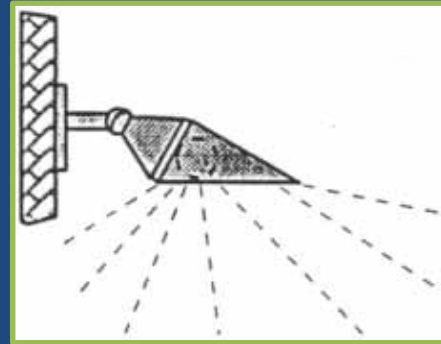


# Good and Bad Light Fixtures (3)

**BAD : Area Floodlight**  
waste light goes up and sideways



**GOOD : Area Floodlight with Hood**  
directs all light down





# Good and Bad Light Fixtures (4)

unshielded uplighters send light up into the night sky and into the eyes of passers-by

**BAD : Uplighter**

**Unshielded, sends light up**

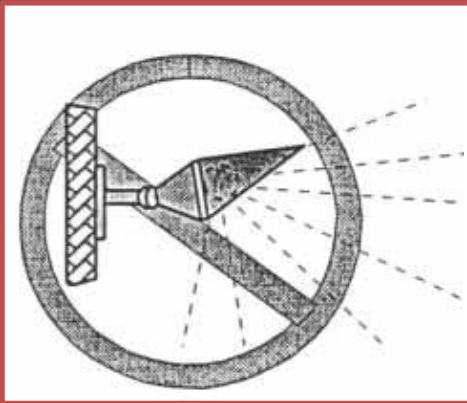
**GOOD : Remove!**

**These lights are not necessary!**

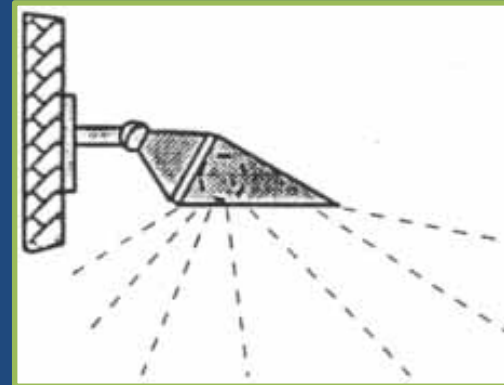


# Modifying existing fittings (1)

Change this...

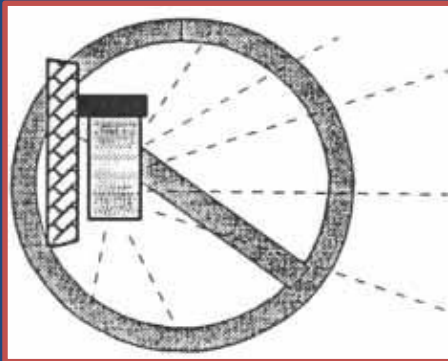


To this (aim downward)

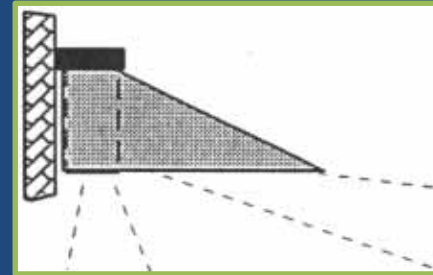


# Modifying existing fittings (2)

Change this...

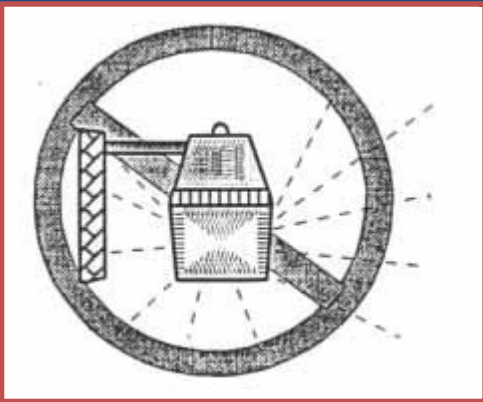


to this (install visor)

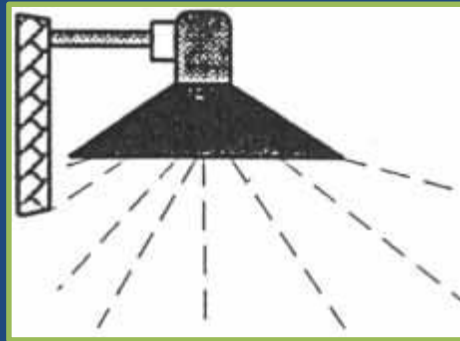


# Modifying existing fixtures

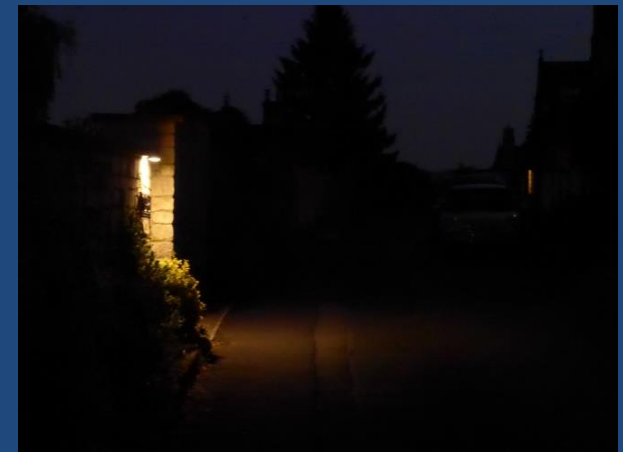
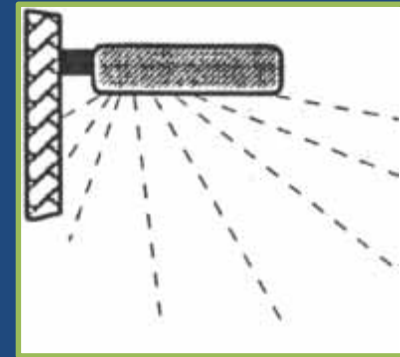
Change this...



to this...



or this



# Skylights and Blinds

- Left to right : (1) no blind; (2) internal venetian blind; (3) internal venetian blind and external blind



# Light Pollution and the Law

- Exterior lighting is subject to the same criminal law as noise and smells. (Environmental Protection Act 1990)
- It applies to “artificial light emitted from premises so as to be prejudicial to health or a nuisance.”

# D. LEDs

## Advantages

LEDs are :

- energy efficient
- cost less
- last longer
- easily remotely controlled
- switch on instantly

In addition, they

- come in a wide range of colours and colour temperatures
- are dimmable
- do not produce noxious substances when discarded

# LEDs : Disadvantages

Often blue-rich and brighter than needed (ie > 3000K).

This is:

- harmful to flora and fauna
- harmful to human health

and has led to :

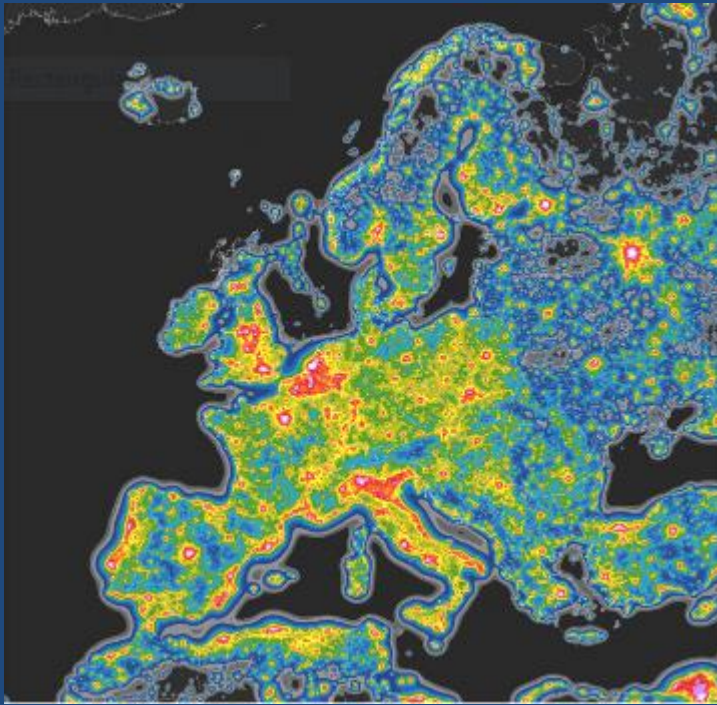
- a 2.2% p.a. increase in light pollution globally between 2012 and 2016



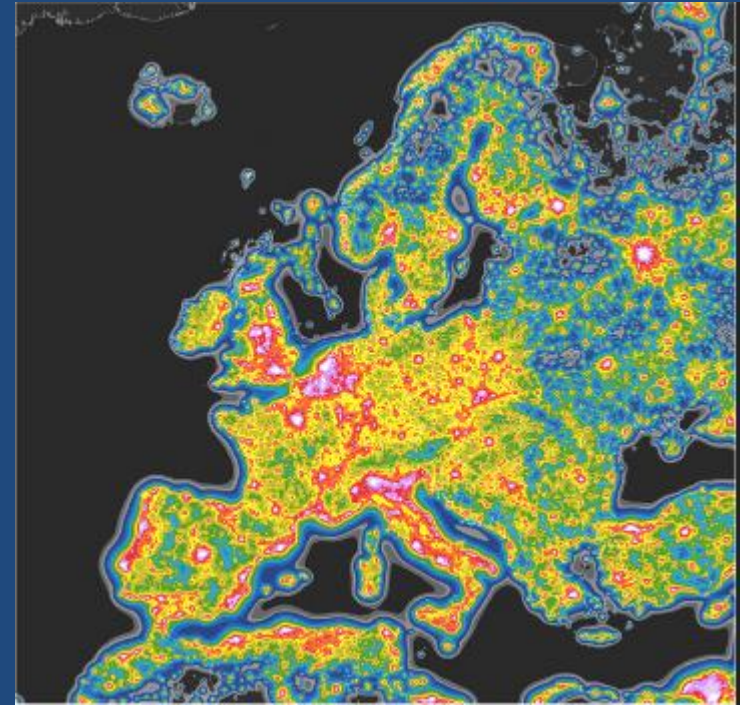
# Increase in light pollution 2012-2016

(Light pollution increased at a rate of 2.2% per annum) (Science Advances, Vol. 3, No. 11, 22.11.17 Falchi et al)

**Pre-4000K LEDs**



**Post-4000K LEDs**



# Watts, Lumens and Kelvins

- **Watts** = measure of power consumption (W)
- **Lumens** = measure of total light output (L)
- **Kelvins** = measure of colour temperature (K)

Outdoor lighting should not exceed 3000K. Blue-rich lighting is bad for health and the environment

# Think lumens and kelvins not Watts!

**18W, 4000K**

**Brighter than is needed for the task**

**18W, 2700K :**

**Choose less than 3000K**



# Watt and Lumens

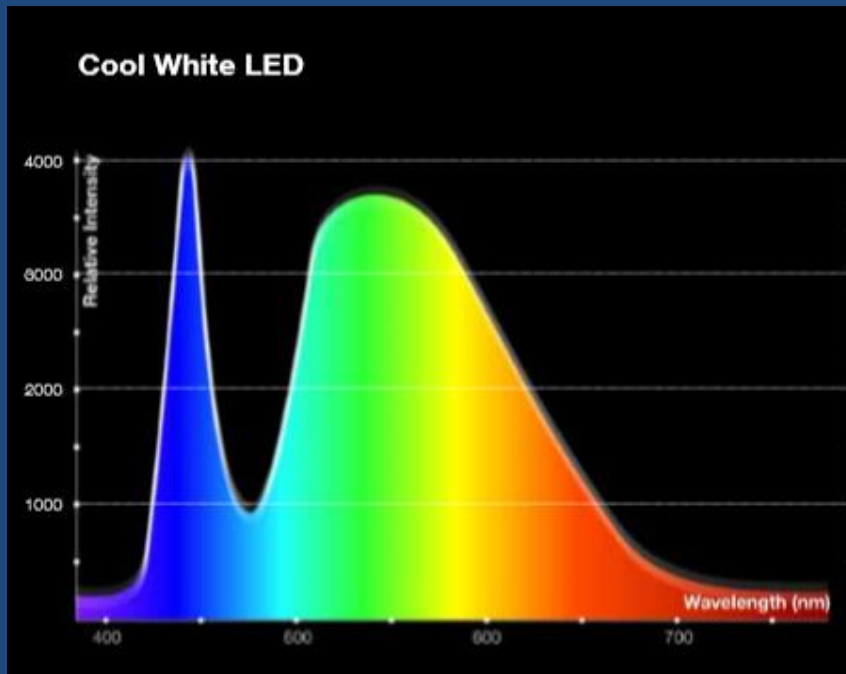
aka Watt equivalence

Old Watts	Approx Lumens
<u>25 W</u>	230 - 270 lamp
<u>35 W</u>	250 - 280 spotlight 200-300 Useful Lumens (spotlight) • Rectangular 390 - 410 lamp
<u>40 W</u>	440 - 460 lamp
<u>50 W</u>	330 - 400 spotlight 350-450 Useful Lumens (spotlight)
<u>60 W</u>	800 - 850 lamp
<u>75W</u>	1000-1100 lamp
<u>100W</u>	1500-1600 lamp

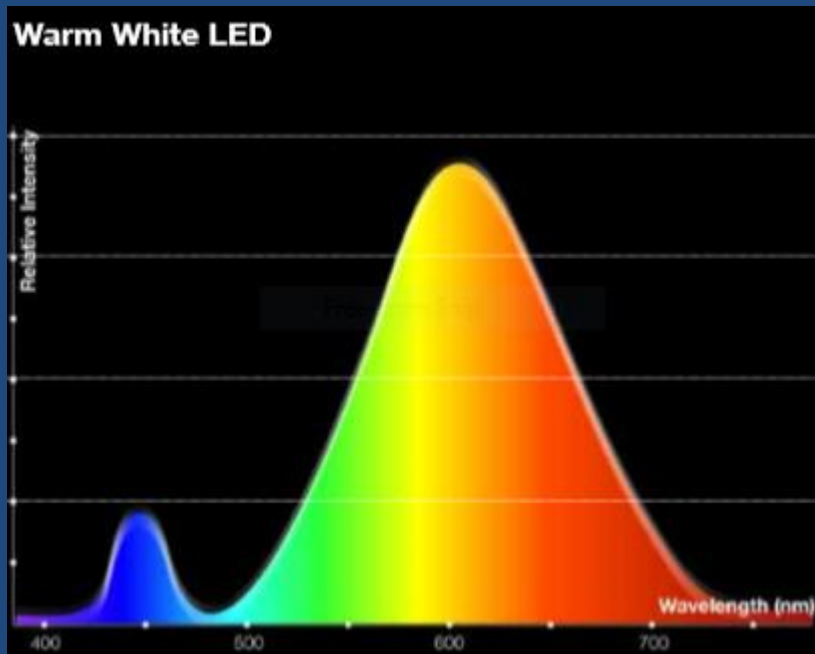
# Colour temperature (Kelvins)



# Cool White



# Warm White



# Potential Custom 'Bath' LED





# Cool, warm and custom LEDs



Let's do it!



# Claverton Neighbourhood Plan

## Dark Skies Light Pollution and Bath University

Controlling light spill for the benefit of the environment,  
the economy and health

Isabelle Flicker

# Cumulative impact of lighting

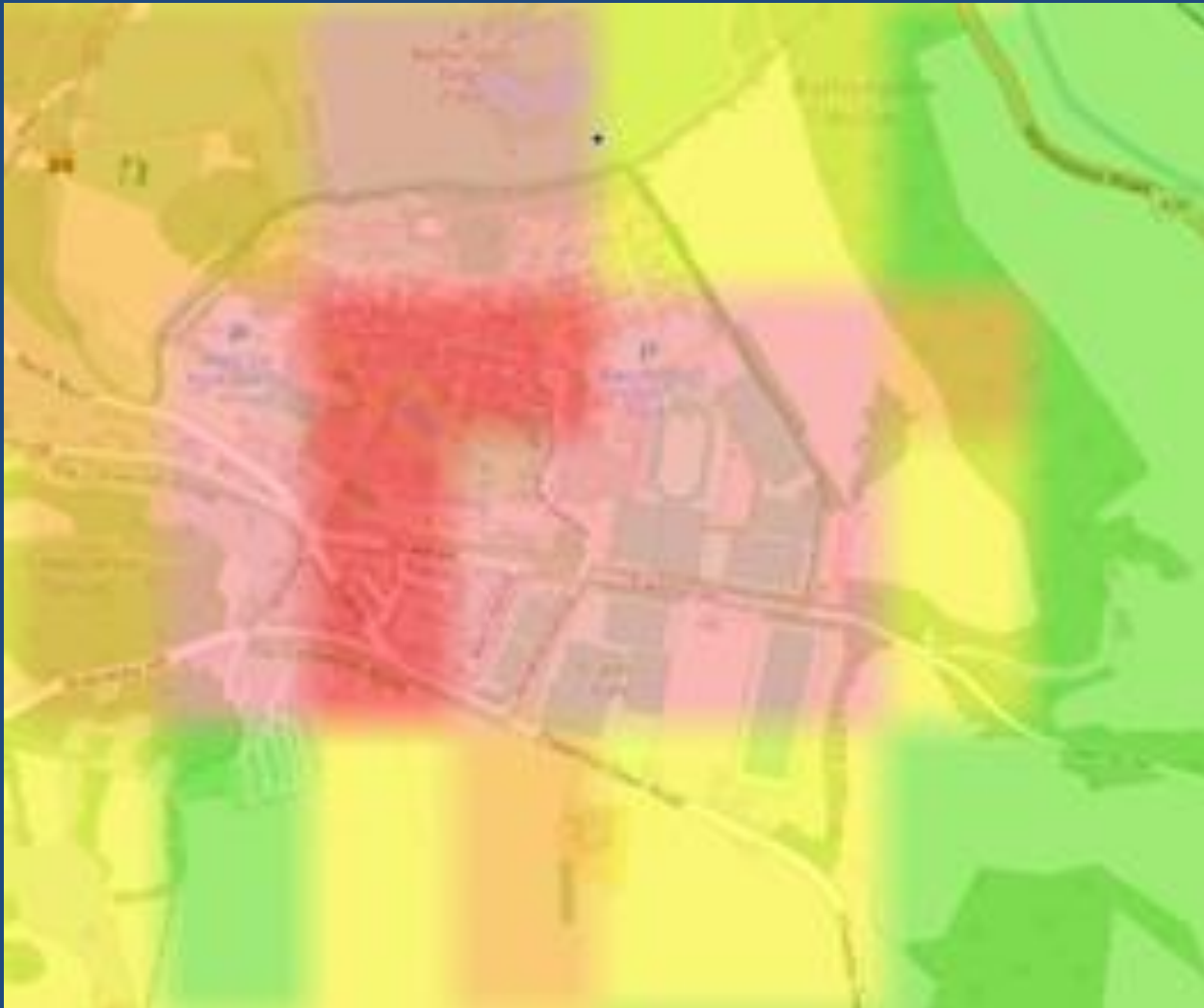
**“The cumulative impact of local lighting schemes ... i.e. security, leisure activities, street lighting, floodlighting, ... can lead to the loss of dark skies”**

**N.B. :** Light emitted from buildings also contributes to ambient lighting

# BATH UNIVERSITY

- lighting on the campus is not just the result of lighting from the sports fields
- there are problems, but there are also solutions

# Bath University Campus and surrounding area CPRE Night Blight map (1.30 a.m. Sept. 2015)



# 1. The Campus

Lighting on the campus comes from :

- streetlamps
- the bus yard
- car parks
- walkways and
- buildings

which contribute to a background level of lighting ...

Any new development or sports field will add to that existing level of lighting

# Neon strip lights in the university bus shelter

**PROBLEM** : the strip lights scatter blue-rich light and can dazzle drivers and pedestrians

**SOLUTION** : shield lights and reduce lumens, and kelvins to  $> 3000\text{K}$





# Street lights and car park lights

**PROBLEM :** the number of streetlamps and translucent lampshades



**SOLUTION :** switch off one in two streetlamps and paint the shades black



# Uplighters in the bus yard

unshielded uplighters send light up into the night sky and into the eyes of passers-by

**PROBLEM :**  
**Unshielded**

**SOLUTION :**  
**Remove !** these lights are not necessary



# Wall-mounted floodlight in the bus yard

**PROBLEM** : dazzles passersby;  
brighter than needed; badly angled

**SOLUTION** : install lower level, warm  
white lighting, downward facing



# Floodlight alternative



# Column lights

**PROBLEM** : no light control, bright and dazzling

**SOLUTION** : change the light fittings – getting things wrong is expensive!



# Light emanating from buildings



## 2. Sports Fields

Light from the sports fields :

- 'trespasses' on the American Museum
- affects the setting of the parish and AONB
- is made worse by the university's hill-top location
- Is made worse by cloud cover

# Methodology

full text available on request

## PURPOSE

- To show the **differential** in light levels between a dark sky using only “natural” ambient light” and “Flood Lighting”.

## METHODOLOGY

- The colour temperature (°K) was set to show the most natural appearance under the flood lighting, in this case 4000°K.
- The ASA (ISO) was set to allow some visible data to be recorded under “natural” light while at the same time controlling electronic digital noise which is present in higher ASA ratings. In this case 6400 ASA.
- The perspective has been maintained across all the photographs using a 24mm lens for all the photographs.
- Original files were recorded in a “RAW” format. De-mosaicing used identical software and identical software settings. While no additional manual adjustments have been made to any of the photographs, software developers default settings made during any of the processes will be consistent across each image.
- The Photographs have been taken in location groups of three, one under “flood lights” a second in “natural ambient light”, the third picture is a “reference” to enable the viewer to identify a virtually black image taken at that location, apart from showing the viewer that the camera positions for the “flood lighting and natural light are similar, it has no other purpose and should not be taken in to account regarding any contrast differentials.
- Core Exif Data has been included for reference. Although the Exif data for the “reference” photograph is identical to the other two in a location, it has not been shown to assist with clarity.
- The same camera body and lens was used for all the photographs. The photographs (with and without floodlights) were taken at a date as close together as possible. The weather conditions were similar.

## ADVISORY

- There is a very slight adjustment to the shutter speed between each group of three photographs; therefore the viewer should take care if comparing one location group directly to another, although in practice any difference, if one exists, will be very small.
- RAW file size is dependent on the picture complexity and will not affect the final photographs.



# Location map of photographs



# Bath University Sports Floodlights

NOTE : Sports clubs can be served with an abatement notice

If they have used the best practicable means to stop or reduce light nuisance, they may be able to use this as one of the following:

- a) grounds for appeal against the abatement notice
- b) a defence, if prosecuted for not complying with the abatement notice



# Bath University : Location 1 Reference



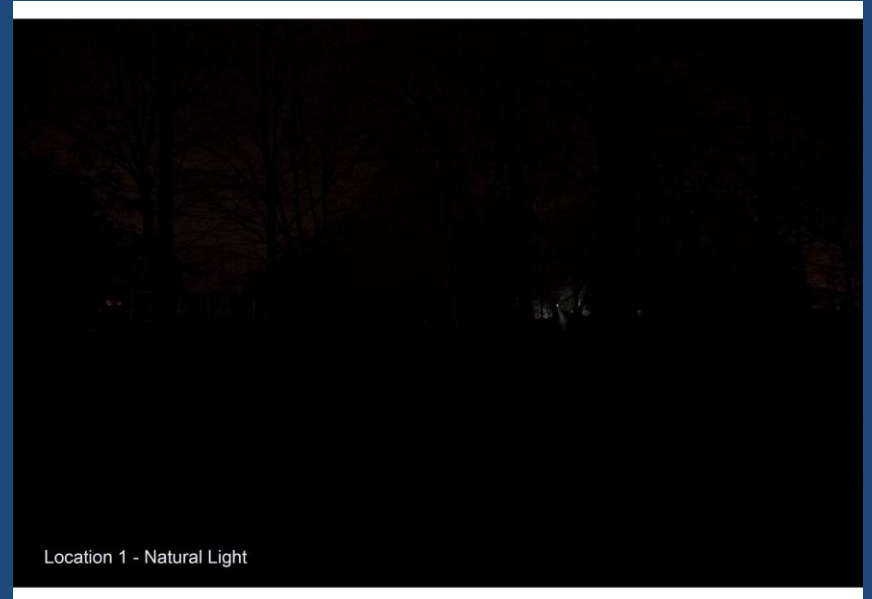
Location 1 - Reference

# Bath University Location 1

**Floodlighting : ON**



**Floodlighting : OFF**



# Bath University : Location 1

## Exif\* Data

\* Exchangeable Image File

Location 1 - Flood Lights On

Tag name	Value
File Name	--- System --- _DSC1849.NEF
File Size	28 MB --- File ---
File Type	NEF --- IFD0 ---
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	Alex Hansen
DateTimeOriginal	2018:03:05 20:39:18
TIFF-EPSStandardID	1 0 0 0 --- SubIFD1 ---
BitsPerSample	14
SamplesPerPixel	1 --- XMP.xmp ---
CreateDate	2018:03:05 20:39:18.78 --- ExifIFD ---
ExposureTime	0.3
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIn	6400
DateTimeOriginal	2018:03:05 20:39:18
CreateDate	2018:03:05 20:39:18
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmForm	24 mm
Contrast	Normal
Saturation	Normal
Quality	--- Nikon --- RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
CFAPattern	--- Composite --- [Red,Green][Green,Blue]

Location 1 - Natural Light

Tag name	Value
File Name	--- System --- _DSC1945.NEF
File Size	22 MB --- File ---
File Type	NEF --- IFD0 ---
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	
DateTimeOriginal	2018:03:10 22:10:40
TIFF-EPSStandardID	1 0 0 0 --- SubIFD1 ---
BitsPerSample	14
SamplesPerPixel	1 --- XMP.xmp ---
CreateDate	2018:03:10 22:10:40.92 --- ExifIFD ---
ExposureTime	0.3
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIn	6400
DateTimeOriginal	2018:03:10 22:10:40
CreateDate	2018:03:10 22:10:40
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmForm	24 mm
Contrast	Normal
Saturation	Normal
Quality	--- Nikon --- RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
CFAPattern	--- Composite --- [Red,Green][Green,Blue]

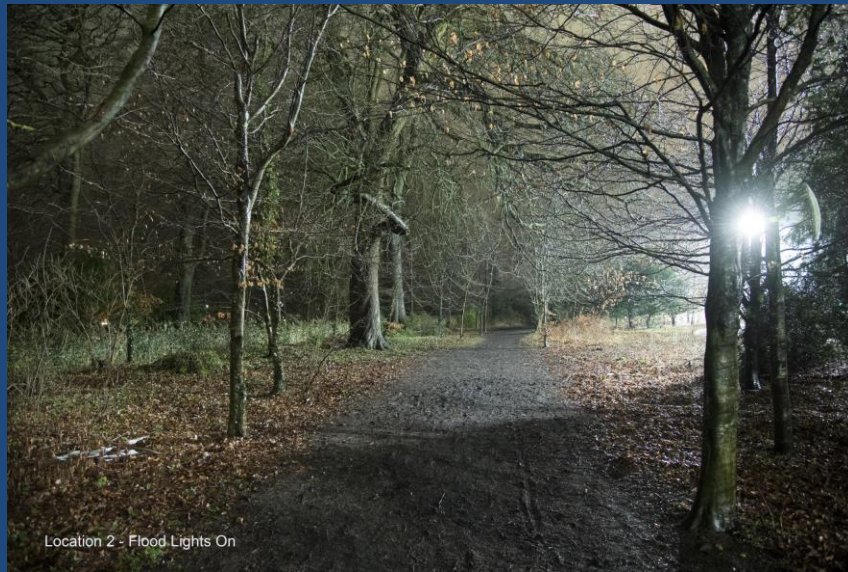
# Bath University : Location 2 Reference



Location 2 - Reference

# Bath University Location 2

**Floodlighting: ON**



**Floodlighting: OFF**



# Bath University : Location 2

## Exif Data

Location 2 - Flood Lights On

Tag name	Value
----	---- System ----
FileName	_DSC362.NEF
FileSize	29 MB
----	---- File ----
FileType	NEF
----	---- IFD0 ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	Alan Hansen
DateTimeOriginal	2018:03:05 20:44:30
TIFF-EPStandardID	1 0 0 0
----	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
----	---- XMP-xmp ----
CreateDate	2018:03:05 20:44:30.14
----	---- ExifIFD ----
ExposureTime	1/4
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIndex	6400
DateTimeOriginal	2018:03:05 20:44:30
CreateDate	2018:03:05 20:44:30
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmFormat	24 mm
Contrast	Normal
Saturation	Normal
----	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HeadAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
----	---- Composite ----
CFAPattern	[Red,Green][Green,Blue]

Location 2 - Natural Light

Tag name	Value
----	---- System ----
FileName	_DSC3941.NEF
FileSize	22 MB
----	---- File ----
FileType	NEF
----	---- IFD0 ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	
DateTimeOriginal	2018:03:10 22:08:49
TIFF-EPStandardID	1 0 0 0
----	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
----	---- XMP-xmp ----
CreateDate	2018:03:10 22:08:49.20
----	---- ExifIFD ----
ExposureTime	1/4
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIndex	6400
DateTimeOriginal	2018:03:10 22:08:49
CreateDate	2018:03:10 22:08:49
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmFormat	24 mm
Contrast	Normal
Saturation	Normal
----	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HeadAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
----	---- Composite ----
CFAPattern	[Red,Green][Green,Blue]



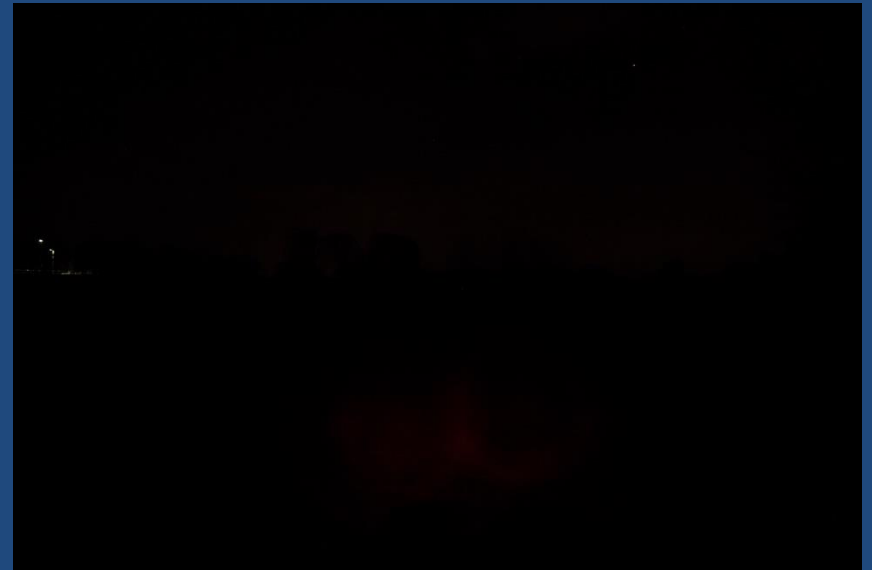
# Bath University : Location 3 Reference



# Bath University : Location 3

**Floodlighting : ON**

**Floodlighting : OFF**



# Bath University : Location 3

## Exif Data

Location 3 - Flood Lights On

Tag name	Value
----	---- System ----
FileName	_DSC3864.NEF
FileSize	28 MB
FileType	---- File ----
	NEF
	---- IFD0 ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	Alex Hansen
DateTimeOriginal	2018:03:05 20:46:48
TIFF-EPStandardID	1 0 0 0
	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
CreateDate	2018:03:05 20:46:48.35
	---- XMP-xmp ----
	---- ExifIFD ----
ExposureTime	1/15
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIn	6400
DateTimeOriginal	2018:03:05 20:46:48
CreateDate	2018:03:05 20:46:48
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmForm	24 mm
Contrast	Normal
Saturation	Normal
	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
	---- Composite ----
CFAPattern	[Red,Green][Green,Blue]

Location 3 - Natural Light

Tag name	Value
----	---- System ----
FileName	_DSC3916.NEF
FileSize	22 MB
FileType	---- File ----
	NEF
	---- IFD0 ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	
DateTimeOriginal	2018:03:10 21:48:04
TIFF-EPStandardID	1 0 0 0
	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
CreateDate	2018:03:10 21:48:04.39
	---- XMP-xmp ----
	---- ExifIFD ----
ExposureTime	1/6
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIn	6400
DateTimeOriginal	2018:03:10 21:48:04
CreateDate	2018:03:10 21:48:04
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmForm	24 mm
Contrast	Normal
Saturation	Normal
	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
	---- Composite ----
CFAPattern	[Red,Green][Green,Blue]

# Bath University : Location 4 Reference



Location 4 - Reference

# Bath University Location 4

**Floodlighting : ON**



**Floodlighting : OFF**



# Bath University : Location 4

## Exif Data

Location 4 - Flood Lights On

Tag name	Value
----	---- System ----
FileName	_DSC3869.NEF
FileSize	28 MB
----	---- File ----
FileType	NEF
----	---- IFD0 ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	Alex Hansen
DateTimeOriginal	2018:03:05 20:48:31
TIFF-EPStandardID	1 0 0 0
----	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
----	---- XMP-xmp ----
CreateDate	2018:03:05 20:48:31.47
----	---- ExifIFD ----
ExposureTime	1/6
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIn	6400
DateTimeOriginal	2018:03:05 20:48:31
CreateDate	2018:03:05 20:48:31
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmFormat	24 mm
Contrast	Normal
Saturation	Normal
----	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
----	---- Composite ----
CFAPattern	[Red,Green][Green,Blue]

Location 4 - Natural Light

Tag name	Value
----	---- System ----
FileName	_DSC3921.NEF
FileSize	22 MB
----	---- File ----
FileType	NEF
----	---- IFD0 ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	
DateTimeOriginal	2018:03:10 21:49:56
TIFF-EPStandardID	1 0 0 0
----	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
----	---- XMP-xmp ----
CreateDate	2018:03:10 21:49:56.62
----	---- ExifIFD ----
ExposureTime	1/6
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIn	6400
DateTimeOriginal	2018:03:10 21:49:56
CreateDate	2018:03:10 21:49:56
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmFormat	24 mm
Contrast	Normal
Saturation	Normal
----	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
----	---- Composite ----
CFAPattern	[Red,Green][Green,Blue]

# Bath University : Location 5 Reference



Location 5 - Reference

# Bath University Location 5

**Floodlighting : ON**

**Floodlighting : OFF**





# Bath University : Location 5

## Exif Data

Location 5 - Flood Lights On

Tag name	Value
File Name	---- System ----
FileName	_DSC3872.NEF
FileSize	25 MB
FileType	---- File ----
FileType	NEF
BitsPerSample	---- IFDD ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0.255 0.255 0.255
Copyright	Alex Hanson
DateTimeOriginal	2018:03:05 20:53:18
TIFF-EPStandardID	1 0 0 0
BitsPerSample	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
CreateDate	2018:03:05 20:53:18.83
ExposureTime	1/15
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIndex	6400
DateTimeOriginal	2018:03:05 20:53:18
CreateDate	2018:03:05 20:53:18
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmFormat	24 mm
Contrast	Normal
Saturation	Normal
Quality	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
CFAPattern	---- Composite ---- [Red,Green][Green,Blue]

Location 5 - Natural Light

Tag name	Value
File Name	---- System ----
FileName	_DSC3926.NEF
FileSize	22 MB
FileType	---- File ----
FileType	NEF
BitsPerSample	---- IFDD ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0.255 0.255 0.255
Copyright	
DateTimeOriginal	2018:03:10 21:54:12
TIFF-EPStandardID	1 0 0 0
BitsPerSample	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
CreateDate	2018:03:10 21:54:12.32
ExposureTime	1/15
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIndex	6400
DateTimeOriginal	2018:03:10 21:54:12
CreateDate	2018:03:10 21:54:12
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmFormat	24 mm
Contrast	Normal
Saturation	Normal
Quality	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
CFAPattern	---- Composite ---- [Red,Green][Green,Blue]

# Bath University : Location 6 Reference



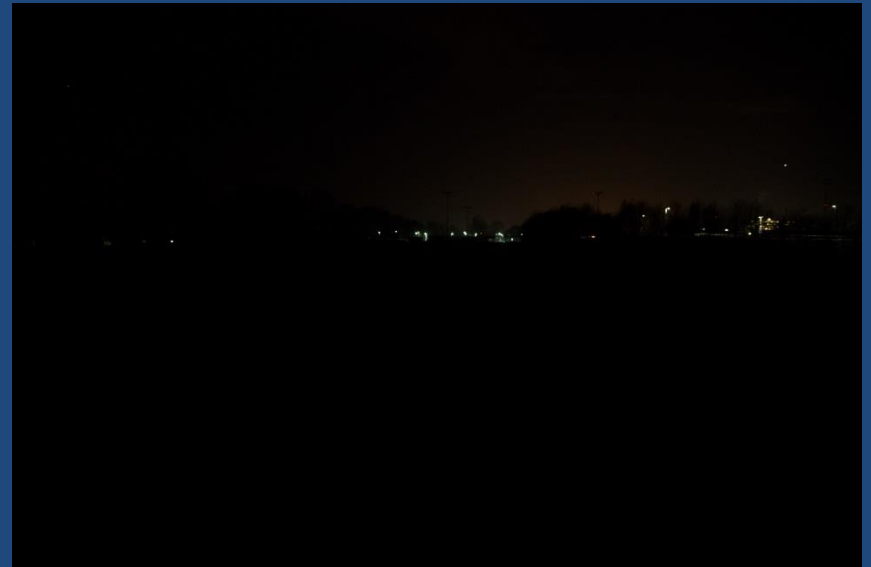
Location 6 - Reference

# Bath University Location 6

**Floodlighting : ON**



**Floodlighting : OFF**



# Bath University : Location 6 Exif Data

Location 6 - Flood Lights On

Tag name	Value
System	----
FileName	_DSC3875.NEF
FileSize	25 MB
File	----
FileType	NEF
IFD0	----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	Alex Hansen
DateTimeOriginal	2018:03:05 20:54:44
TIFF-EPStandardID	1 0 0 0
SubIFD1	----
BitsPerSample	14
SamplesPerPixel	1
XMP-xmp	----
CreateDate	2018:03:05 20:54:44.27
ExifIFD	----
ExposureTime	1/13
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIndex	6400
DateTimeOriginal	2018:03:05 20:54:44
CreateDate	2018:03:05 20:54:44
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmFormat	24 mm
Contrast	Normal
Saturation	Normal
Nikon	----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
Composite	----
CFAPattern	[Red,Green][Green,Blue]

Location 6 - Natural Light

Tag name	Value
System	----
FileName	_DSC3930.NEF
FileSize	22 MB
File	----
FileType	NEF
IFD0	----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	
DateTimeOriginal	2018:03:10 21:56:14
TIFF-EPStandardID	1 0 0 0
SubIFD1	----
BitsPerSample	14
SamplesPerPixel	1
XMP-xmp	----
CreateDate	2018:03:10 21:56:14.79
ExifIFD	----
ExposureTime	1/13
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIndex	6400
DateTimeOriginal	2018:03:10 21:56:14
CreateDate	2018:03:10 21:56:14
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmFormat	24 mm
Contrast	Normal
Saturation	Normal
Nikon	----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
Composite	----
CFAPattern	[Red,Green][Green,Blue]

# Bath University : Location 7 Reference



# Bath University Location 7

**Floodlighting : ON**  
**(Orion not visible)**



**Floodlighting : OFF**  
**(Orion visible centre left)**



# Bath University : Location 7

## Exif Data

Location 7 - Flood Lights On

Tag name	Value
----	---- System ----
FileName	_DSC3885.NEF
FileSize	27 MB
----	---- File ----
FileType	NEF
----	---- IFDD ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	Alex Hansen
DateTimeOriginal	2018:03:05 21:00:10
TIFF-EPSStandardID	1 0 0 0
----	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
----	---- XMP-xmp ----
CreateDate	2018:03:05 21:00:10.52
----	---- ExifIFD ----
ExposureTime	0.6
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIn	6400
DateTimeOriginal	2018:03:05 21:00:10
CreateDate	2018:03:05 21:00:10
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmForm	24 mm
Contrast	Normal
Saturation	Normal
----	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
----	---- Composite ----
CFAPattern	[Red,Green][Green,Blue]

Location 7 - Natural Light

Tag name	Value
----	---- System ----
FileName	_DSC3936.NEF
FileSize	22 MB
----	---- File ----
FileType	NEF
----	---- IFDD ----
BitsPerSample	8 8 8
Make	NIKON CORPORATION
Model	NIKON D5
SamplesPerPixel	3
Artist	
ReferenceBlackWhite	0 255 0 255 0 255
Copyright	
DateTimeOriginal	2018:03:10 21:59:52
TIFF-EPSStandardID	1 0 0 0
----	---- SubIFD1 ----
BitsPerSample	14
SamplesPerPixel	1
----	---- XMP-xmp ----
CreateDate	2018:03:10 21:59:52.50
----	---- ExifIFD ----
ExposureTime	0.6
FNumber	4.0
ExposureProgram	Manual
ISO	6400
SensitivityType	Recommended Exposure Index
RecommendedExposureIn	6400
DateTimeOriginal	2018:03:10 21:59:52
CreateDate	2018:03:10 21:59:52
Flash	No Flash
FileSource	Digital Camera
SceneType	Directly photographed
CFAPattern	[Red,Green][Green,Blue]
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
FocalLengthIn35mmForm	24 mm
Contrast	Normal
Saturation	Normal
----	---- Nikon ----
Quality	RAW
WhiteBalance	4000K
WhiteBalanceFineTune	0 0
SerialNumber	6005233
ColorSpace	Adobe RGB
Contrast	+8
Brightness	-124
Saturation	Normal
HueAdjustment	-124
ISO	6400
BlackLevel	400 400 400 400
Lens	24-120mm f/4
ContrastCurve	(Binary data 578 bytes, use -b option to extract)
FirmwareVersion	1.20c
NoiseReduction	Off
LensDataVersion	0204
LensIDNumber	170
----	---- Composite ----
CFAPattern	[Red,Green][Green,Blue]

# New floodlighting technology

- DTU Fotonik in Denmark has developed a new type of lens that focuses light just on the field
- To the left, the old halogen lights
- To the right, the new LED lights
- Perhaps difficult to appreciate the difference... Watch this space nonetheless!
- **N.B.** Lights can usually be easily directed using correct mounting angle – usually horizontal – and especially shielding





# Looking west from Claverton Village Reference



# Looking west from Claverton Village

**Uni Floodlighting ON :**  
**cloud and mist spread light**



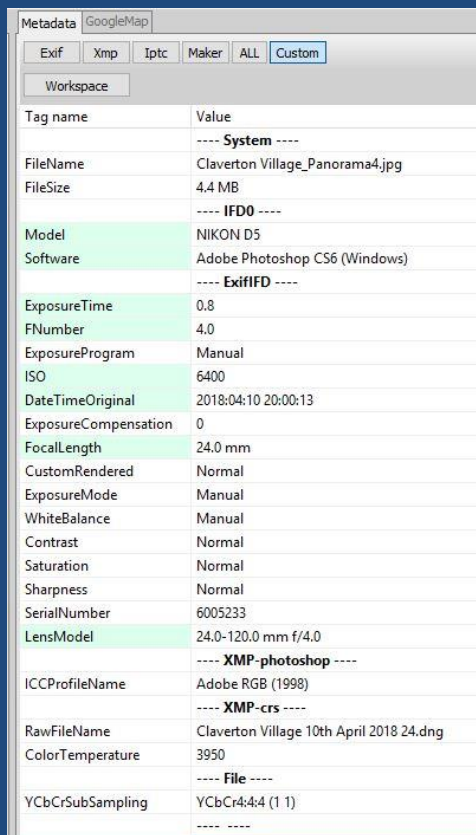
**Uni Floodlighting OFF :**  
**cloud and mist spread light**



# Bath University from Claverton Village

## Exif Data

ON



Metadata GoogleMap

Exif Xmp Iptc Maker ALL Custom

Workspace

Tag name	Value
	---- System ----
FileName	Claverton Village_Panorama4.jpg
FileSize	4.4 MB
	---- IFD0 ----
Model	NIKON D5
Software	Adobe Photoshop CS6 (Windows)
	---- ExifIFD ----
ExposureTime	0.8
FNumber	4.0
ExposureProgram	Manual
ISO	6400
DateTimeOriginal	2018:04:10 20:00:13
ExposureCompensation	0
FocalLength	24.0 mm
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
Contrast	Normal
Saturation	Normal
Sharpness	Normal
SerialNumber	6005233
LensModel	24.0-120.0 mm f/4.0
	---- XMP-photoshop ----
ICCProfileName	Adobe RGB (1998)
	---- XMP-crs ----
RawFileName	Claverton Village 10th April 2018 24.dng
ColorTemperature	3950
	---- File ----
YCbCrSubSampling	YCbCr4:4:4 (1 1)
	---- ----

OFF



Metadata GoogleMap

Exif Xmp Iptc Maker ALL Custom

Workspace

Tag name	Value
	---- System ----
FileName	Claverton Village 15th April 2018 08 No Floodlights.jpg
FileSize	27 MB
	---- IFD0 ----
Model	NIKON D5
Software	Adobe Photoshop CS6 (Windows)
	---- ExifIFD ----
ExposureTime	0.8
FNumber	4.0
ExposureProgram	Manual
ISO	6400
DateTimeOriginal	2018:04:15 20:32:32
ExposureCompensation	0
FocalLength	24.0 mm
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
Contrast	Normal
Saturation	Normal
Sharpness	Normal
SerialNumber	6005233
LensModel	24.0-120.0 mm f/4.0
	---- XMP-photoshop ----
ICCProfileName	Adobe RGB (1998)
	---- XMP-crs ----
RawFileName	Claverton Village 15th April 2018 08.dng
ColorTemperature	3950
	---- File ----
YCbCrSubSampling	YCbCr4:4:4 (1 1)
	---- ----

# Looking south over Bath from Alexandra Park

**Uni Floodlighting : ON**

**Uni Floodlighting : OFF**



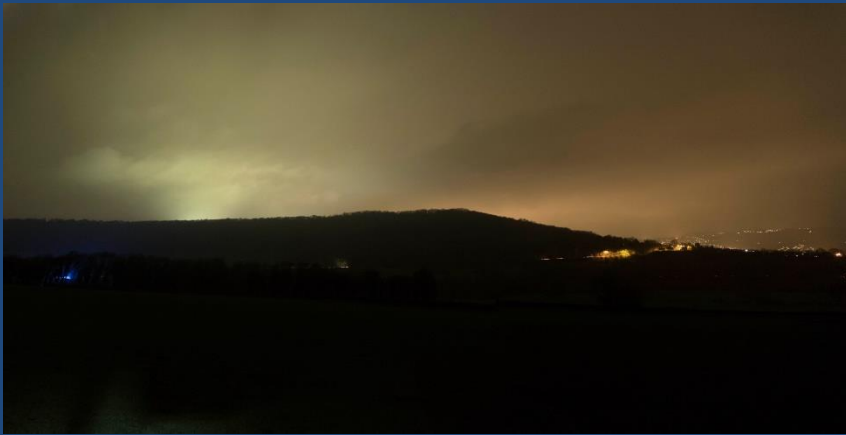
# Bath University from Sally in the Wood Reference



# Looking west from Sally in the Wood

**Uni Floodlighting : ON**

**Uni Floodlighting : OFF**



# Bath University from Sally in the Wood Exif Data

ON

Metadata GoogleMap

Exif Xmp Iptc Maker ALL Custom

Workspace

Tag name	Value
	---- System ----
FileName	Sally In The Wood_Panorama2.jpg
FileSize	2.6 MB
	---- IFD0 ----
Model	NIKON D5
Software	Adobe Photoshop CS6 (Windows)
	---- ExifIFD ----
ExposureTime	0.8
FNumber	4.0
ExposureProgram	Manual
ISO	6400
DateTimeOriginal	2018:04:10 20:30:40
ExposureCompensation	0
FocalLength	24.0 mm
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
Contrast	Normal
Saturation	Normal
Sharpness	Normal
SerialNumber	6005233
LensModel	24.0-120.0 mm f/4.0
	---- XMP-photoshop ----
ICCProfileName	Adobe RGB (1998)
	---- XMP-crs ----
RawFileName	Sally In The Woods 10th April 2018 27.dng
ColorTemperature	3950
	---- File ----
YCbCrSubSampling	YCbCr4:4:4 (1 1)
	---- ----

OFF

Metadata GoogleMap

Exif Xmp Iptc Maker ALL Custom

Workspace

Tag name	Value
	---- System ----
FileName	Sally in the Woods 15th April 2018 10- no lights.jpg
FileSize	19 MB
	---- IFD0 ----
Model	NIKON D5
Software	Adobe Photoshop CS6 (Windows)
	---- ExifIFD ----
ExposureTime	0.8
FNumber	4.0
ExposureProgram	Manual
ISO	6400
DateTimeOriginal	2018:04:15 21:03:12
ExposureCompensation	0
FocalLength	24.0 mm
CustomRendered	Normal
ExposureMode	Manual
WhiteBalance	Manual
Contrast	Normal
Saturation	Normal
Sharpness	Normal
SerialNumber	6005233
LensModel	24.0-120.0 mm f/4.0
	---- XMP-photoshop ----
ICCProfileName	Adobe RGB (1998)
	---- XMP-crs ----
RawFileName	Sally in the Woods 15th April 2018 10.dng
ColorTemperature	3950
	---- File ----
YCbCrSubSampling	YCbCr4:4:4 (1 1)
	---- ----