

International Observatory: Business Plan

Ashford Borough Council

September 2015

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Appendices

1 Executive Summary

This report provides an outline business plan for the proposed International Observatory in Ashford. It follows a number of previous reports issued at an Interim stage, including:

- Vision and Concept Paper, March 2015
- Market Analysis, March 2015
- Ashford Dark Sky Community, March 2015
- Ashford Dark Sky Community Action Plan, June 2015

For consistency and completeness, we repeat here some of the key sections and conclusions from these reports, but only insofar as they relate to the conceptual development, financial viability and delivery of the proposed observatory.

To that end:

- **Section 2** provides some introductory and background information, in particular to set the context of this work, describe the key stakeholders and their ultimate objectives. In particular, we note that the project was inspired by the Ashford Astronomical Society and has been enthusiastically championed by Ashford Borough Council. This is partly to advance the Borough and the County's tourism, education and cultural agendas, but also in view of the project's ability to communicate key signals about the Borough that reinforce its economic, housing and inward investment strategies.
- **Section 3** summarises the Market Analysis that was circulated in March 2015, describing the market context from a demand and supply perspective. It includes a brief overview of the local resident and tourist markets, as well as a closer look at the key market of amateur astronomers and the factors that influence their decisions on where and when to travel for their observation evenings and events. Having considered – at length – an appropriate 'scaling' of the observatory, we are fortunate to have – in the UK – two particularly useful and instructive comparators that: the Scottish Dark Sky Observatory (in Ayrshire) and the Kielder Forest Observatory (in the North East). As these are so close – in terms of scale, content and objectives – to the proposed Observatory in Ashford, they are described in some detail.
- In **Section 4**, we set out the suggested statement of Vision, Aims and Objectives for the project. We consider it particularly important to the successful delivery of new destinations that they are guided by a Vision that *inspires* and *reassures* in equal measure and that they are anchored in a set of clear aims and objectives that are consistent with the broader aims and objectives of their main stakeholders. Without that clarity of Vision and objectives, projects have a tendency to veer off course (often in pursuit of different funding opportunities) or they become ultimately dependent on the commitment and perseverance of individuals rather than organisations. We have therefore put considerable thought into the articulation of objectives that embrace the

wider economic and cultural strategies of the Borough; objectives that are true to the ambition of the original concept, but pragmatic enough to allow for real and rapid progress toward delivery.

- **Section 5** discusses the suggested concept in greater detail, specifying the International Observatory closely enough to allow for more specific recommendations on a spatial plan and business model. That specification has been informed, in particular, by a review of the designs for the Scottish Dark Sky Observatory and Kielder Observatory, as well as discussion with a number of architects.
- **Section 6** considers the basis Business Model for the Observatory. Put simply, the Business Model needs to consider 5 key components that must come together to deliver a viable and sustainable project: Land; Capital Funding; Operation of an Observatory; and Operation of an accommodation solution (i.e. 'glamping' or similar). We also describe – in this section – two permutations of the Business Model depending on how discussions proceed with the Forestry Commission, which presents an interesting opportunity to partner with a credible organisation with sympathetic values and objectives. Whilst preliminary and speculative discussions with the Forestry Commission provide some encouragement that a mutually beneficial deal can be struck, we are equally mindful that a 'go it alone' model is needed so that the International Observatory is not ultimately *dependent* on the decisions of third parties.
- At the centre of this Business Model is an operational financial model and a P&L forecast constructed specifically for this project but compared (for reference and reassurance) to the published accounts of the nearest comparator: Kielder Observatory. This is described at length in **Section 7**. Although Kielder has the benefit of being in a more remote location with a better quality of 'dark sky', it also faces a smaller, more static and less affluent market than a similar product would face in Ashford. On balance, we therefore consider it encouraging that our P&L forecast for a stabilised year is broadly consistent with the actual performance of Kielder Observatory.

Because of their inter-relatedness, Fourth Street has managed the visioning process for a proposed Dark Sky Community Designation application to the International Dark Sky Association (IDSA), which was led by our associate Chris Woodley-Stewart. Those reports are appended in full. It is worth noting from the outset, however, that we remain enthusiastic about the scope of a Dark Sky Community application which is worth pursuing with or without an International Observatory to anchor it.

2 Introduction

2.1 Purpose of This Report

This report sets out a *Draft* Business Plan for the proposed International Observatory in Ashford. This report is supported by previous work undertaken for this project, namely the Draft Vision and Concept paper from March 2015 and the Market Analysis from February 2015. Following on from these reports and other previous work undertaken by Fourth Street, including desk-based research and consultations, the Draft Business Plan was written for the Ashford Borough Council in order to aid the delivery of the International Observatory project.

2.2 Structure of This Report

Following an introduction summarising the project and key stakeholders in this section, the report gives an overview of the market context with a particular focus on astrotourism. The next section explores in more detail the vision, mission and aims of the International Observatory project. This is followed by a section on project details and a financial appraisal. Finally, the report concludes with an assessment of risks pertaining to the International Observatory project.

2.3 About the International Observatory Project

The International Observatory project originated with the Ashford Astronomical Society (AAS), a thriving and active amateur astronomy society led by Drew Wagar (Chairman) and Jason Hall (Secretary).

As membership of the society grew in recent years, the society experienced a need for larger and more suitable premises for hosting astronomy meetings and events. At the same time, the society identified the uniqueness of dark skies, which are particularly good for stargazing, in some areas of Ashford borough. Armed with these two premises, the society approached the Ashford Borough Council (ABC) for funding for an observatory.

The Ashford Council is keen to support this project and to position it in a way that it can bring wider benefits to Ashford borough. In November 2014, the council commissioned Fourth Street to undertake a detailed feasibility study and business plan for the International Observatory. Furthermore, the council would like to protect Ashford's dark skies, and to that end the council simultaneously appointed a suitably qualified individual/expert to support a *Dark Skies Supplementary Planning Document*, specifically for the purpose of preventing any further light pollution.

In line with the council's aims, the project is positioned as an observatory that is financially sustainable and not of large scale, but has the potential to attract a wider audience and serve as a unique destination and tourism anchor for Ashford.

2.4 Ashford Astronomical Society

The Ashford Astronomical Society was established some six years ago and grew rapidly to 200 members, with typical monthly meetings attracting between 60-100 members. The Society strives to educate, entertain and inform people about space. The society's regular meetings stand out as being particularly welcoming and engaging.

Monthly meetings generally include a presentation inside a community hall in Woodchurch followed by observations outside both with the naked eye and with members' telescopes if the weather permits. The purpose of these presentations is to familiarise the audience with scientific research by introducing some of these in-depth topics in a fun and accessible manner. Most talks are tailored to those with no prior knowledge of astronomy, with young children often attending these events.

The objectives of the society are:

- To promote a good basic understanding of key scientific topics to the general public.
- To provide practical guidance in the use, and purchase, of scientific instruments (such as telescopes) on behalf of the general public.
- To provide a competent and accurate resource to schools to allow them to correctly teach the fundamentals of astronomy (typically Year 5 for Primary and Year 9 for Secondary).
- To provide a set of society owned instruments for loan to members.

The structure of the non-profit society is based on a committee elected annually with current positions of Chairman, Vice-Chairman, General Secretary, Membership Secretary, Events Co-ordinator, and Instrument Co-ordinator.

The society aspires to have its own observatory and meeting facility to accommodate its current members and any future growth in membership.

2.5 Ashford Borough Council

Ashford Borough Council is the local authority responsible for providing services to residents in Ashford, Tenterden, and surrounding villages in the Borough.

Progress on the International Observatory and the prospect of Dark Sky Community designation has been keenly observed by the Borough's leadership and its senior management team, not least because of its clear fit with the Borough's wider economic, social, environmental and education objectives, which we understand are being re-articulated as part of the *Aspirational Ashford* corporate strategy.

Subject to demonstration of the project's value and viability, the Council continues to be highly supportive of the concept and aware of its potential contribution to Ashford's ongoing development and its competitive positioning in key markets.

Importantly, although the Observatory project was initiated by Ashford Astronomical Society or sole client for this study remains the Borough Council, where we have regularly reported directly to the Leader and Chief Executive.

2.6 Research and Consultations

Since the initial conversations about an observatory in Ashford began in 2013/2014 between the Ashford Astronomical Society and the council, the project has developed and evolved through extensive research and discussions. Other than desk-based research, Fourth Street has undertaken consultations and site visits to inform this project. The work to date is reflected in the Market Analysis, Vision & Concept paper, and this Draft Business Plan. The research for this business plan is supported by site visits to the Royal Observatory Greenwich, the Observatory Science Centre (Herstmonceux) and Winchester Science Centre, as well as attendance at a number of astronomy events, including *AstroFest*. Our conversations with individuals with specific knowledge relating to Ashford borough, astronomy, or observatories, proved invaluable in the process. Below is a list of the individuals and organisations we consulted with:

- Drew Wagar, Chairman, AAS
- Jason Hall, Secretary, AAS
- Gerry Clarkson, Leader, ABC
- John Bunnett, Chief Executive, ABC
- Clair Bell, Portfolio Holder for Tourism and Rural Focus, ABC
- Andrew Osborne, Economic Development Manager, ABC
- Richard Alderton, Head of Planning, ABC
- Simon Cole, Planning Policy Manager, ABC
- Matthew Nouch, Planning Officer, ABC
- Rob Edwards, Head of Science, Learning & Public Engagement, Royal Observatory Greenwich
- Sandra Matthews-Marsh, Chief Executive, Visit Kent
- Rob Edwards, Astronomer, Royal Museums Greenwich
- Guy Fennimore, Secretary, Society for Popular Astronomy
- Garry Gawthrop, President, Federation of Astronomical Societies
- Martin Hemsley, Chairman, South East Kent Astronomical Society
- Ian Hargraves, Chairman, Mid-Kent Astronomical Society
- Duncan Radbourne, West of London Astronomical Society
- Mike Meynell, Vice-chairman, Flamsteed Astronomy Society
- Stephen Serjeant, Head of Astronomy, Open University
- Ulrich Kolb, Senior lecturer, Astrophysics, Open University
- Johanna Jarvis, Research Fellow, Astrophysics, Open University
- Victoria Mason, Outreach Officer, SEPnet and University of Kent
- Michael Smith, School of Physical Sciences, University of Kent
- Paul Norman, Campus Director, West Kent & Ashford College
- Andy Pugh, Head of Physics & Science Coordinator, The Norton Knatchbull School
- Tim Armstead, Development Manager, McArthurGlen Designer Outlet
- Natasha Jerram, Marketing Manager, McArthurGlen Designer Outlet
- Julian Barnes, Chairman, Ashford & Tenterden Tourism Association

- Mike Bartlett, Secretary, Tenterden & District Chamber of Commerce
- Phil Burgess, Town Clerk, Tenterden Town Council
- Joanne Creighton, Chief Executive, Rare Breeds Centre
- Robert Edwards Astronomer, Science Learning and Interpretation, Royal Observatory Greenwich
- Darren Baskill, Physics (SEPnet) & Maths Outreach Officer, Dept. of Physics & Astronomy, University of Sussex
- Gary Fildes, Director, Kielder Observatory
- Mathew Maguire, Land Agent, Forestry Commission

3 Market Context

The full market appraisal undertaken for the International Observatory project is available in a separate Market Analysis document. Below are the key points gleaned from the market analysis that are in particular relevant to the International Observatory concept as described in this business plan.

3.1 Ashford Borough

The relevant residential catchment – including the whole of Kent, Sussex, Surrey and South East London – includes more than 4 million people. The dark sky area around Romney Marsh, extending into Ashford as far as Woodchurch and Tenterden, is therefore unique for being a high quality observation site so close to major population areas. Most other well-known dark sky areas in the UK are located in more remote areas with much lower population densities than Kent and its surrounding counties.

Ashford has markedly lower-than-average proportions of employees in high value added manufacturing, information, communication and financial industries – a position that the Council is actively trying to address, notably through a series of strategic infrastructure, development and housing projects, as well as a marketing strategy that seeks to position Ashford as a convenient location for businesses with a need for strong connections to London and the continent.

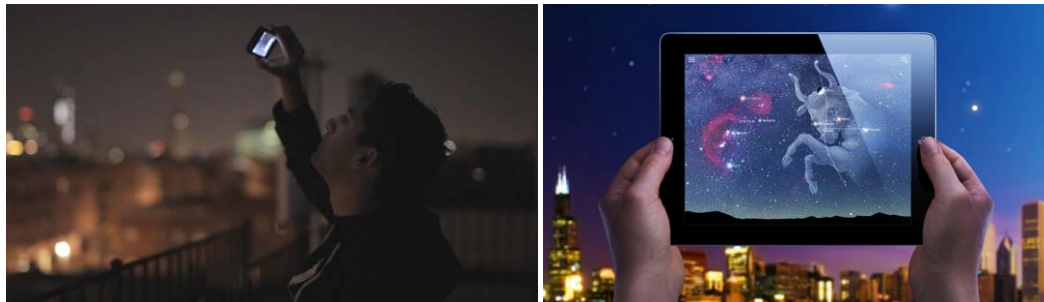
An International Observatory can make a material contribution to this strategy, if not directly then certainly by affecting market perceptions of Ashford, particularly within those key residential and investment markets. Their current understanding of Ashford is fundamentally shaped by their knowledge of the International Station, the outlet mall and the town centre; outside of Ashford there is generally limited appreciation of the Borough's size, its diversity and its many town-and-country benefits.

3.2 Astronomy Tourism

Astronomy tourism has gained popularity in the past few years as urbanisation has led to increased light pollution and half of the world's population can no longer see the stars. Popular stargazing locations in the UK include Galloway Forest Park, Exmoor National Park, Kielder Forest, and the island of Sark.

Celebrity 'stargazers' like Brian Cox and Dara O'Brian have helped to popularise astronomy through programmes such as the BBC's Stargazing LIVE. More generally, there has been an increasing interest in science driven by the proliferation of 'hands on' science centres across the country – most of them targeted at the 6-12 year-old 'family market' – as well as science fiction films and television programmes, pop culture 'phenomena' like *The Big Bang Theory* and *CSI*, and extensive factual science programming on the BBC and the Discovery Channel, amongst others.

Figure 1: An example of a stargazing app on a tablet



We consider it important that the Observatory attract the attention and custom of the amateur astronomical community. There are two reasons for this. First, amateur astronomers provide a steady core audience and one that will be more likely to make repeat and regular visits, trade-up to higher value courses and events, and make secondary purchases through the shop and ancillary facilities. More importantly, that the facility is used by enthusiastic amateur astronomers will give the Observatory greater credibility and gravitas within a wider 'leisure learning' market, differentiating it from a range of other stargazing facilities and sites (the implication being that if amateur astronomers regularly go there then it *must* be good).

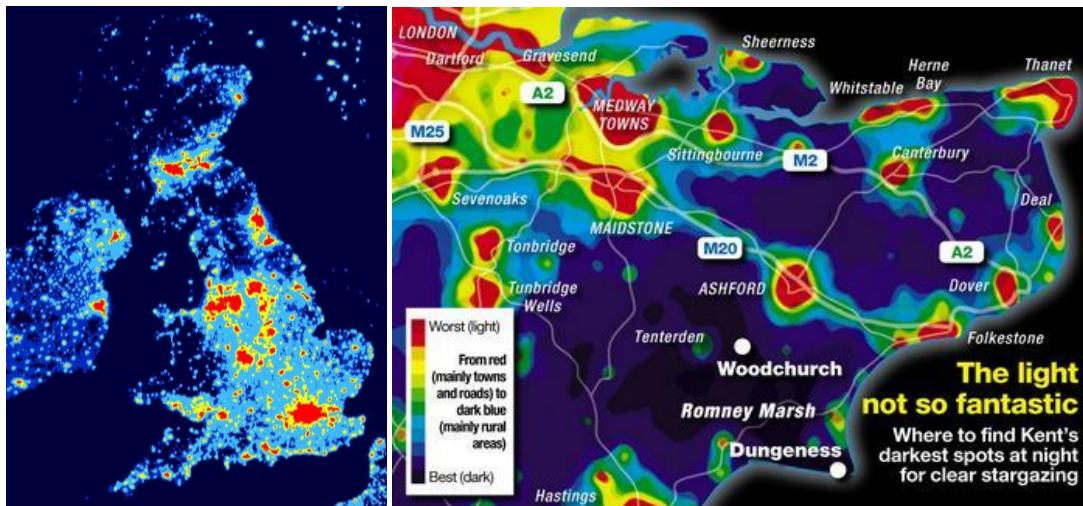
We mention this because it is important to note that focussing on the amateur astronomical community should not come at the expense of serving a wider market of newcomers and first timers. Quite the opposite: the ultimate intention is to put newcomers *alongside* amateur astronomers such that the former not only benefit from the knowledge and experience of the latter, but to encourage the transmission of that passion and enthusiasm for the night sky which is part and parcel of the 'stargazing' experience.

Interviews with astronomical societies suggest that amateur astronomers would be more willing to travel to a stargazing location beyond their local area under the following conditions:

- The sky is genuinely dark enough;
- The telescopes are of a sufficient standard;
- It is near enough, convenient, comfortable and affordable.

Significantly, most amateur astronomers to which we spoke were aware that *Kent* enjoys areas of very dark skies, but almost all of those based outside of Ashford were unaware that these patches of dark sky extend into Ashford Borough. For most people outside of Ashford – even those who regularly visit destinations like Romney Marsh – perceptions of Ashford are overwhelmingly conditioned by their knowledge of the International Station, the McArthur Glen Outlet Mall and the town centre.

Figure 2: Dark sky maps



Source: Dark Sky Discovery and Ashford Astronomical Society

There are mixed responses among amateur astronomers with regard to accommodation standards. Some amateur astronomers are keen campers, while others are discouraged from visiting dark sky sites specifically because of a lack of comfortable and convenient accommodation. Camping is not for everyone. There was therefore almost universal agreement that a dark sky observatory in Ashford would benefit from some form of affordable, but high quality glamping-style accommodation, particularly if it is specifically catered to the needs of stargazers.

3.3 The International Observatory and Astronomy Tourism

Amateur astronomers stated that they would be willing to travel to an observatory location if both the dark sky and the facilities and equipment were of sufficient quality to make the trip worthwhile.

The two key questions astronomers ask about an observing location are:

- How dark is the sky?
- How big is the telescope?

The answers to these questions will define the attractiveness of the site for amateur astronomers.

Even among amateur astronomers in Kent, Sussex and London, many are not aware that Ashford has dark skies. This often comes as a surprise to them and, indeed, the assertion was frequently challenged. This is evidently because people generally have a weak appreciation of precisely how far Ashford's borders extend. Most people's perceptions of Ashford are limited to the International Station, the town centre and the Designer Outlet, so they understandably struggle to believe that Ashford could enjoy a high quality of dark sky. When told about the area around Woodchurch and Tenterden and, in particular, its proximity to Romney Marsh (which is well known to amateur astronomers), that resistance very quickly breaks down. A second important factor is the International Dark Sky Designation, which is also an accepted measure of quality and instils a measure of confidence, particularly among those who are familiar with its demands.

Another important factor is the size / quality of the telescope. Some amateur astronomers and societies will have their own observatories with good-quality telescopes. In order to appeal to those who already have their own equipment, a telescope with at least a 20-inch lens would be desirable.

Furthermore, those involved in research and education mentioned that a lens of that size would be appealing enough for research purposes and that a remotely operated telescope would be a minimum requirement for educational use.

Consultation with amateur astronomical societies provided further evidence of the appeal of an accommodation offer. Many are accustomed to traditional camping in very remote locations and while that appeals to some, for many others it is the necessary burden of occasionally visiting some very high quality dark sky sites. In short, camping is perceived as the price they pay to indulge their interest in astronomy. Furthermore, some astronomical societies had difficulties finding accommodation for 30 people or more for the whole weekend. There was thus a noticeable enthusiasm for sites that could offer a low cost, but high 'comfort' accommodation solution.

If the International Observatory gains a reputation and credibility for having a genuinely dark sky – which can be achieved, in particular through Dark Sky Community Designation – and if the size / quality of the telescope(s) meets their expectations, then the venue stands a good chance of attracting regular visits and meetings by individual amateur astronomers in the area, as well as astronomical societies from within a reasonable South East catchment.

3.4 Astronomy Attractions

Astronomy has increasingly become an attraction in its own right. Stargazing has become more commonplace with the increased affordability of equipment. There is evidence of operators picking up on this trend and catering to astronomy enthusiasts through, for example, providing telescopes in desert hotels and proactively marketing 'dark sky' sites as stargazing destinations. Kielder Forest has been particularly successful in this regard.

Astronomy attractions vary from large scale, expensive, exhibition-based attractions such as science centres to very low key stargazing experiences with little or no equipment provided in a location where stars are visible with the naked eye. This section covers a selection of experiences.

3.4.1 International Dark Sky Places

The International Dark Sky Association (IDA) is a recognised authority on light pollution. The IDA works to promote sensitive lighting and to safeguard dark skies around the world. One of the ways that the IDA achieves its goals is through the International Dark Sky Places Program. This program designates certain locations as International Dark Sky Places thus granting them recognition of the quality of their dark skies and their commitment to minimising light pollution.

There are three types of designation within the International Dark Sky Places Program: communities, parks, and reserves.

International Dark Sky Parks and Reserves are places with exceptionally dark and pristine skies. International Dark Sky Communities also have dark skies but they need not be as dark to achieve community status since the designation is more focused on citizens' commitment to preserving dark skies in the community.

The designated Dark Sky Places in the UK are:

- Galloway Forest Dark Sky Park – International Dark Sky Park
- Sark Dark Sky Island – International Dark Sky Community
- Exmoor Dark Sky Reserve – International Dark Sky Reserve
- Brecon Beacons National Park – International Dark Sky Reserve
- Northumberland Dark Sky Park – International Dark Sky Park
- Coll Dark Sky Island – International Dark Sky Community

The map below shows the location of dark sky sites in the UK.

Figure 3: International Dark Sky Places in the UK



Source: International Dark-Sky Association

Furthermore, many remote, less densely populated areas also offer rich stargazing options in the UK. These include the North York Moors, the Lake District, Romney Marsh, the Sussex Downs, North Norfolk, Cornwall and the Isles of Scilly.

Many of these locations, including those with IDA designation as pictured on the map above, are more remote areas that are difficult to access. Of particular interest to this project is how close the dark sky areas of Ashford are to major population centres in London and the South East and, importantly, how

easy they are to reach by road and rail. This gives the Observatory in Ashford a particular distinction and represents a significant opportunity.

The International Observatory would have a key competitive advantage here as it could fill a spot on the map as a unique dark sky site in the South East region. Being so close to London and the densely populated South East, the International Observatory has the potential to attract amateur astronomers who do not have the time to frequently visit more remote dark sky sites.

As described at length in Section 8, below, it is separately recommended that (with or without an Observatory), the Borough seeks to obtain Dark Sky Community designation for the area demarcated by the parish boundaries of Woodchurch, Appledore, Kenardington and Hamstreet, with the possibility of future extension both within and outwith the Borough. A separate Vision and Action Plan for achieving this is summarised in Section 8, with detailed reports appended. Importantly, as evidenced by the map in Figure 3, a Dark Sky Community would be the first such designation in mainland UK. That it would be in the South East and so close to London would be remarkable and would almost certainly help to alert the market to the unique town-and-country benefits of the Borough.

3.4.2 Dark Sky Discovery Sites

Separately, the Dark Sky Discovery Sites is another designation in the UK recognising locations suitable for viewing the night sky. The general requirement for these sites is that they are away from the worst of any local light pollution, provide good views of the sky, and have good public access. There are two darkness ratings:

- Orion sites: At these sites, the seven main stars in the winter constellation Orion are visible to the naked eye;
- Milky Way sites: Here, the Milky Way needs to be visible to the naked eye. These are much darker sites found only in more rural areas.

The maps below show the locations of Dark Sky Discovery Sites. Of particular relevance is the map of the South East which shows the lack of Dark Sky Discovery Sites in the area. Once again, this supports the unique offer the International Observatory could provide in the area.

Figure 4: Dark Sky Discovery Sites



Source: Dark Sky Discovery

3.5 Comparators

Observatories can range from major installations such as Jodrell Bank to ‘homemade’ observatories in an individual’s back garden. In order to give a more accurate picture of the concept of the International Observatory below is a description of a number of similar publicly accessible concepts already in operation.

Kielder Observatory and the Scottish Dark Sky Observatory serve as instructive examples of the type and scale of observatory that would be suited to the opportunity in Ashford. Two other case studies include examples of the type of accommodation that would be desirable at the International Observatory, namely the Elqui Domos Hotel in Chile.

3.5.1 Kielder Observatory

Kielder Observatory is a public outreach astronomical facility in Kielder Forest, Northumberland. The observatory enjoys one of the darkest skies in Europe and is situated in the third largest protected Dark Sky reserve in the world. The location and surroundings are different to the expected environment that the International Observatory will be located in but the type and size of facility is very much alike.

The primary function of the observatory is outreach via public events. The main activities of the observatory are to engage the public in discussions and observations with astronomers, guest speakers and volunteers. The observatory hosts more than 40 public outreach events every month. Access to the observatory is only available during events and all attendees must book in advance.

Figure 5: Kielder Observatory



In terms of the design, the observatory was intentionally built so as to be in keeping with the forest in both style and environmental impact. The design of the observatory was put out to tender and 230 architectural firms around the world pitched for the international design competition. Charles Barclay Architects, based in London, won the competition to design the observatory. The building was constructed using local materials, such as Sitka spruce and Siberian larch, and it is solar and wind powered. Charles Barclay Architects won the RIBA award for architectural design of the observatory in 2009.

The observatory is run by full time staff and volunteers who have collectively created the Kielder Observatory Astronomical Society. The society hosts the Kielder Forest Star Camp each autumn, and the Sunderland Astronomical Society holds a similar star camp each spring. The observatory also offers specialist themed astronomy photography nights.

Figure 6: Kielder Forest Star Camp



Kielder Observatory is owned by the Forestry Commission and leased to Kielder Observatory Astronomical Society.

Equipment at Kielder Observatory includes:

- Meade LX200 16" ACF (Advanced Coma Free) Telescope mounted on a Paramount ME2 telescope mounting
- Full computer control of the above telescope is provided by SKY X Software
- Atik 314L+ Cooled CCD Camera controlled by Art Capture Software
- Numerous Skywatcher HEQ5 and EQ series mounts / Synscan handsets
- Astrotrac Mount
- Meade 127mm Triplet APO
- Stellavue 70mm Refractor
- 20" Split Ring Equatorial truss tube telescope with Argo Navis push to control
- Coronado Maxscope 60 (0.5A model)

The surrounding area of the Kielder Observatory, the Northumberland International Dark Sky Park, is the largest area of protected night sky in Europe at nearly 580 square miles. The IDA granted international dark status to the area in 2013. The two-year campaign to achieve the international dark status was spearheaded by Northumberland National Park Authority, Kielder Water & Forest Park Development Trust and the team at the Kielder Observatory Astronomical Society. The area was granted gold tier designation, the highest accolade that the IDA offers.

Aspects of the Kielder Observatory that are particularly relevant to the International Observatory include its public accessibility and active programming, along with its iconic design for a building of modest size. As the Observatory received a RIBA award, the building itself has become an attraction in its own right. This helps strengthen the credibility of the venue as a place to visit.

In terms of programming, the Kielder Observatory grew from three events a month to circa 40. Of particular significance is the learning process that the organisation went through in terms of engaging with a wider market of newcomers to amateur astronomy and stargazing. Shortly after launching, it was recognised that the general public was coming to the Observatory with elevated and unrealistic expectations of what would be visible through the telescopes even on a clear night – expectations fuelled by images seen on television, on-line and in films. Managing those expectations and engaging visitors on an emotional as well as an intellectual level have proved to be instrumental in establishing Kielder Observatory as a successful ‘mass market’ destination in the North East.

Kielder Observatory is evidence of the fact that astronomy venues do not need to be large in order to become popular attractions. The focus on assertive and creative programming rather than bricks-and-mortar product is an instructive model. The space is flexible and adaptable to different levels and types of demand without being too expensive to maintain and refresh.

3.5.2 Scottish Dark Sky Observatory

The Scottish Dark Sky Observatory is located in the Galloway Forest Dark Sky Park, which received a gold tier designation from the IDA in 2009. The observatory is dedicated to the promotion of public understanding of astronomy and science, as well as providing an educational resource for schools, colleges and universities. It serves as a centre of learning for science and astronomy and provides access to astronomical equipment to the general public. Access to the observatory is available if booked in advance.

The facility is made of locally sourced timber, Scottish Larch, and overall it is based on a low carbon design. The building is off-grid and therefore some of its features include sustainable surface water and waste drainage systems and a photovoltaic energy generation system with battery storage.

Figure 7: The Scottish Dark Sky Observatory



The project development was spearheaded by a Board of Trustees formed of members from community organisations, schools, businesses, East Ayrshire Council and members from the Renfrewshire Astronomical Society.

Funding for the construction was raised over a period of two years through a combination of local community grant awards and private donations. Equipment and facilities at the observatory include:

- A fully robotic 20" Corrected Dall Kirkham telescope in a 5 metre dome, which can be operated from a warm control room;
- A roll-off-roof observatory with a 14" Schmidt Cassegrain Telescope for a more hands-on, out in the open observing experience;
- A multi-purpose lecture room; and
- An elevated observing deck for naked-eye observation.

The observatory also has a mobile inflatable planetarium, which is 6 metres in diameter and can accommodate up to 40 people.

The planetarium costs £295 to use for half a day hire and £495 for a full day, including the time of an astronomer. The planetarium serves as a vital outreach and educational resource which can be taken to both primary and secondary schools, and to any interested groups or clubs throughout the region.

Figure 8: Ground floor plan of the Scottish Dark Sky Observatory



Source: Architecture and Design Scotland

Evening sessions at the observatory last for about 90 minutes and include an introductory presentation, followed by a tour of the facility and the telescopes as well as observing on a clear night.

Adult tickets for an evening session cost £10 and concession tickets cost £6. The observatory is also available for group bookings, private events, and daytime visits. Telescope hire costs £50 per hour, while use of personal scopes on site is possible for a £5 fee.

Since Galloway Forest received international dark sky designation, astronomy tourism has become an increasingly important part of the local economy. The observatory, which is run as a charitable organisation, helps to fuel astronomy tourism to the area as well as more broadly stimulating an interest in astronomy and science.

Although the Scottish Dark Sky Observatory is relatively small and does not include many ancillary facilities, it has two telescopes, a 20-inch one and a 14-inch one, allowing for more use when the observatory gets busy.

3.5.3 Hotel Astronomico Elqui Domos

Elqui Domos is an astronomical hotel located in a remote valley in Chile between Santiago and Atacama. It is only relevant in this case as an illustration of the type and quality of accommodation that could be

achieved. Indeed, the destination is as well-known as a ‘destination glamping’ experience in the travel trade as it is within astronomical circles.

The offer consists of a series of geodesic domes and log cabins, all designed specifically for stargazing. The domes are tent-like structures that rest on a stilted platform. They have a metallic frame and are covered with a white canvas and can accommodate up to four people over two levels. The ground floor functions as a living area, and the upper level is the bedroom, with a detachable roof to allow ‘sleeping under the stars’.

Figure 9: Hotel Elqui Domos – Domes



The four cabin lodges are timber structures that provide a more luxury accommodation in comparison to the domes. Like the domes, these lodges are formed if two floors and the bedroom is located under a removable roof.

Figure 10: Hotel Elqui Domos – Cabin lodges



All rooms in the domes and lodges have a terrace with a personal telescope set up and ready to use. Rates for both the domes and lodges range from £101 to £123 per room per night based on 2 people sharing.

Other services offered at the hotel include specialised astronomic tours and night time horse rides. Astronomy tours last one hour and cost £24 per room for a Spanish tour or £39 for a bilingual tour.

4 Vision, Mission, and Strategic Aims

4.1 Introduction

In order to give direction and purpose to the project, the section below describes the vision, mission, and strategic aims of the International Observatory, for the consideration of Ashford Borough Council.

4.2 Vision

A key challenge is to forge a vision that is capable of advancing the complementary but distinct objectives of multiple stakeholders while remaining deliverable in practice. To that end, the vision statement for the International Observatory is as follows:

The Ashford International Observatory will be the best destination in the South East for celestial observation by amateur astronomers and stargazing by a wider public. Its core 'attractor' will be the Dark Sky itself, along with the facilities and services needed for people of varying levels of interest and aptitude to fully appreciate what they are seeing.

It will be an education and learning platform for partner institutions and clients, including schools, universities and colleges, other astronomical societies and other science centres. As such, it will have more in common with observatories found in destinations like Kielder Forest (Northumberland) and Galloway Forest (Scotland) than it does with conventional hands-on science centres. It will bring the stargazing experience – more commonly associated with remote and peripheral destinations – within easy reach of the London, South East and continental market.

The International Observatory will be accessible, but not trivial – a smarter science centre for a smaller, but more dedicated and more inquisitive audience. More than a 'fun night out' it will provide a memorable and awe-inspiring experience – providing enhanced facilities for seasoned astronomers and a programme that aids the initiation of newcomers and the progression of those that develop an interest in the subject matter. As such, the Observatory will act as signal of Ashford's emerging identity as the 'smart' location in the South East.

4.3 Mission

To realise this Vision, the Ashford International Observatory will do all of the following:

- *Develop a high quality **observatory**, competently equipped with the requisite 'hardware', including at least two 'teaching' telescopes and associated facilities (e.g. rotating, weather-sensitive dome)*
- *Provide **new product and programmes** to fill an evident gap in the market between 'mass market' hands-on science centres (that focus overwhelmingly on simple exposure to science), and professional/academic observatories that are inaccessible or too 'highbrow' for the general public*

- *Develop a quality **learning** and **education** programme that reaches out to schools, colleges, universities and astronomical societies, as well as interested enthusiasts and the general public*
- *Create a fit-for-purpose **governance** and **management** structure that is capable of delivering the capital project, in the first instance, and manage the facility, in the second*
- *Strike meaningful, ongoing **partnerships** with key organisations, including Visit Kent, local attractions and accommodation providers, other science centres and a wide range of formal and informal educational establishments*
- *Define and advance a specific agenda to champion the Borough's and the County's **education, skills** and **STEM** objectives, notably by targeting 12-16 year-olds who have already demonstrated an interest or an aptitude in science and providing them with a deeper and more meaningful experience*
- *Provide a unique and engaging leisure and educational experience, including opportunities for **overnight stays** and **residential programmes** facilitated by a high quality 'glamping' offer*
- *Champion the cause of **Dark Sky protection** in Ashford and act as a hub and 'anchor' for a formally recognised Dark Sky Community in Ashford – the first in England*

4.4 Strategic Aims

Cascading from this Vision and Mission is a set of Strategic Aims for the Observatory. Strategic Aims are a more specific and measurable expression of the *Mission*. In this case, we have distilled what we believe to be a manageable and deliverable set of Strategic Aims for the Ashford International Observatory into 4 key strands:

1. ASTRONOMY

- a. Provide a distinctive and fit-for-purpose observatory, with a technical specification that is consistent with the needs and expectations of active amateur astronomers and imagers
- b. Improve awareness about astronomy beyond the academic and the amateur astronomical community, through initiation of newcomers and – critically – *progression* for those visitors looking to learn more
- c. Provide a better platform for the interaction of amateur and professional astronomers and the engagement of amateur astronomers in 'citizen science' research projects

2. EDUCATION

- a. Provide a platform for the delivery of formal astronomy education in partnership with other organisations, including primary and secondary schools, colleges and universities
- b. Provide a programme of informal education and learning in astronomy that reaches out to both the amateur astronomical community and the wider public
- c. Provide a facility for developing *residential* (i.e. overnight) astronomy courses and events

- d. Be the leading destination for teacher training, particularly at the GCSE level
- e. Advance national, regional and local STEM objectives, notably by targeting the hard-to-reach 12-16 year-old bracket that is under-served by existing science centres

3. ECONOMY AND MARKETING

- a. Change/improve the perception of Ashford held by different markets (residents, investors and visitors), notably by:
 - i. Signalling the multifaceted town-and-country nature of Ashford, especially among those residential/commuter markets whose perceptions are conditioned solely by their limited knowledge of Ashford town centre
 - ii. Reinforcing the 'smart location' inward investment branding of Ashford by being the 'destination of choice' for amateur astronomers and stargazers from London, the South East and the continent
 - iii. Reinforcing Ashford's 'international' brand and reputation
 - iv. Adding to the growing number of diverse arts, cultural and leisure attractions that enhance the quality of life of Ashford residents and workers

4. TOURISM

- a. Increase the number of staying and day visits to Ashford and to Kent
- b. Advance Visit Kent's strategy of focusing on 'niche, low-volume / high-value' tourism
- c. Be recognised as one of the top stargazing sites in the UK
- d. Become one of the top 'glamping' experiences within reach of the London market
- e. Communicate the breadth and depth of Ashford's offer to those leisure markets (especially in London and the Continent) whose knowledge of Ashford is limited to its town centre infrastructure and attractors

4.5 Why Ashford?

That a high quality and fit-for-purpose Observatory will help to advance the objectives of the Ashford Astronomical Society is obvious. What is less obvious and therefore worth discussing in greater detail is why Ashford Borough Council should take an interest in astronomy generally and an observatory in particular.

We have spent time reviewing the various documents that express the Borough's economic, branding, inward investment, housing and planning strategies, and discussed these at length with the relevant council officers. This is covered in a separately appended Market Analysis document, but our general conclusions are worth highlighting here.

Ashford's economic strategy is – to a large extent – predicated on its convenient location and unique transport connections, especially by road and rail to London. With constant housing pressure creating a 'push' of skilled professionals out of London, much of Ashford's positioning – as articulated, for example, in the Ashford Model and in the 'Smart Location' marketing brochure – is about making Ashford a housing destination of choice for high skilled and educated labour. Coupled with this is the desire to position

Ashford as a business location for higher value-added businesses for whom that skilled and educated labour is a key resource.

While the 'Big Eight' projects and a large pipeline of new housing and office development will advance the infrastructure and property requirements of this economic strategy, a key challenge remains the *demand* for property in Ashford (either as a place to live or as a place to work) and Ashford's competitiveness relative to alternative locations in Kent (or indeed anywhere within a similar commuting distance). *Affecting that demand is as much about the market's perception of a place as it is about its reality.*

This is where the 'signalling', symbolic or branding benefits of an International Observatory can make a material contribution that goes far beyond the measurable economic impact of visitor spend. A key obstacle to this strategy, in our view, is the fact that perceptions of Ashford are overwhelmingly conditioned by the extraordinarily high profile of the International Station and the McArthur Glen Outlet Mall. Outside of Ashford that is what Ashford is known for.

This hypothesis was reinforced by our consultations. Told that Ashford had a patch of dark sky, most consultees expressed a sense of disbelief. This was not because they did not believe there were dark skies in Kent. Most were familiar with the dark skies of Romney Marsh. It was because few people were aware that Ashford extends almost as far as Romney Marsh. Their knowledge of Ashford is mostly limited to the town centre.

To the extent that an Ashford International Observatory in a Dark Sky Community can help to alter those perceptions and reinforce a better knowledge of Ashford as a more diverse and multifaceted town-and-country environment, then it will make a material contribution to advancing the demand side of this economic strategy.

Moreover, to the extent that the International Observatory – alongside new cinemas, arts centres, dance academies, model railway attractions, etc. – adds to the overall product offer and provides more to see and do for Ashford residents, then it will serve another important long term function.

Residents' quality of life is important in any town, but it is particularly important to rapidly growing towns in the London commuter belt. Quality of life and sense of place are typically the difference between transitory, dormitory towns like Redhill, Slough, Surbiton and other towns like Chelmsford, St Albans, Brighton and Tunbridge Wells, where incoming residents choose to *stay* even as their economic circumstances improve. In previous studies we have looked at these alternative economic trajectories. What distinguishes that latter group of towns is their ability to encourage residents 'of convenience' to become long term, invested members of the community.

They first, in a sense, 'imported' skilled labour by positioning themselves as convenient commuter towns for London workers. That those residents chose to stay rather than graduating to 'better' locations as their income permitted was the critical second step in their evolution and it was largely based on the creation of a strong sense of place, based on a particularly high quality of life. It was about Brighton abandoning its ambition to be a seaside resort and transforming itself into a 'city by the sea'. The longer

people stay, the more invested they become in their community, which creates a stronger sense of place, and the beginnings of a virtuous cycle.

Whilst a small, specialist attraction in a rural part of Ashford cannot possibly achieve this effect in isolation, it can – in combination with all of the other leisure, entertainment and cultural projects in Ashford – start to address this key quality of life issue. This is particularly true if the facility is sufficiently differentiated from every other science centre and is known for being special and distinctive relative to other hands-on science centres that now have a homogenous feel to them.

4.6 International Dark Sky Community Designation

As a separate but related exercise and with the assistance of Chris Woodley-Stewart – a Fourth Street associate with experience of country park management and dark sky applications – we have considered the scope for creating a Dark Sky Community in the area around Woodchurch at the western edge of the District.

5 The Project

5.1 Introduction

Below we set out the project details for a market-driven and financially sustainable concept for the International Observatory.

5.2 Concept

Based on the work undertaken thus far, the original concept as presented by the Ashford Astronomical Society in the Business Case has evolved into a smaller venue focussed on quality over quantity. The concept, as described and agreed in the vision and concept paper, is summarised as follows:

1. A modestly sized, but well-designed and well-equipped observatory, serving – in the first instance – a smaller, but more dedicated market of amateur astronomers, hobbyists, and ‘leisure learning’ visitors with an interest in astronomy.
2. It would be specifically pitched and marketed to go beyond the trivial or ‘superficial’ nature of the larger urban science centres and planetariums, but not so ‘highbrow’ that it is inaccessible to a wider audience of non-astronomers.
3. Comparable in size and scope to those found in Northumberland and Scotland, the Observatory would bring that Dark Sky experience within easier reach of large conurbations in London, the South East and continental destinations that are connected to Ashford via the Channel Tunnel Rail Link.
4. Staffed by a maximum of five full time employees, of these two would be qualified astronomers.
5. As a key differentiator, the facility would include a ‘glamping’ site (to be sized and specified), allowing for residential courses for enthusiasts, on one hand, as well as a unique experience for casual stargazers, on the other.
6. The focus would be as much on ‘programme’ as it is on ‘product’, partnering with other academic, cultural and professional institutions to provide a platform for the delivery of courses, lectures and special events.
7. To that end, the facility would also include at least one classroom / meeting space.
8. Given the trend toward imaging as a key dimension of amateur astronomy – and the increasing ability of beginners to take part with basic and affordable equipment – we would also recommend a small gallery space in which visitors, participants and members (including those that only engage with the facility on-line) have the opportunity to share and display their images in a curated environment.
9. The facility would also include complementary F&B facilities and a specialist retailer selling astronomical equipment and paraphernalia, as well as workshop, maintenance and instructional services.

5.3 Space

It is expected the total floor space for the International Observatory will be 340 sqm. The table below details the amount of space allocated to each of the component parts, inclusive of outdoor terrace areas and cloakrooms, WCs, etc..

Figure 11: Proposed Space Allocation

Function	Area (sqm)	Percentage
Observatory 1	50	15%
Observatory 2	20	6%
Meeting room	50	15%
Gallery / Foyer	60	18%
Café	60	18%
Retail	40	12%
Back of House	60	18%
Total	340	100%

5.3.1 Observatories

The observatories will each house different telescopes in order to give users more options and to be able to accommodate more people on busy nights. This is similar to the way other observatories are structured and it appears to be a model that works well for the operation of an observatory of this size and one that is targeted at the ‘amateur astronomer’ and wider stargazing markets.

5.3.2 Meeting room

The meeting room can be used for astronomy society meetings or rented out for any other meetings – e.g. to encourage educational use by schools or to enable corporate ‘away days’ as an additional income stream. The meeting room will be able to accommodate approximately 30 people in a lecture setting. In time when the observatory is more established, the meeting room will function as a space for astronomy courses and workshops organised both by the Observatory itself and by external parties.

5.3.3 Gallery

Upon entering the observatory, there will be a reception area / foyer for welcoming guests. This will increase the capacity of the observatory and will function as overspill space on busy evenings. The foyer will be ideal for hosting more informal events. Furthermore, given the recent popularity of astro-imaging fuelled by the low cost and availability of equipment, the foyer will also double as a gallery space. Amateur astronomers will have the opportunity to exhibit their best images here and the space can be actively programmed and ‘curated’ to enhance the atmosphere and the overall experience.

5.3.4 Other

Other key components of the observatory will be a café and an astronomy shop. We assume the café to be a modest facility, serving predominantly warm drinks and snack foods. The shop will give visitors the opportunity to buy telescopes and other astronomy equipment directly onsite with the opportunity to 'try and buy' on stargazing evenings.

5.3.5 Comparators

For comparison, both the Scottish Dark Sky Observatory and the Kielder Observatory, the two observatories that most resemble the International Observatory concept, are approximately 200-250 sqm in size. The slightly larger area planned for the International Observatory is accounted for by the cafe and retail. These are both most likely to be outsourced and therefore the burden of management and staffing will not fall onto the observatory. On the contrary, the cafe and retail components are expected to bring in extra income from rent without additional risk to operations.

Below is an overview of space allocation and layout for both the Kielder Observatory and the Scottish Dark Sky Observatory, with some of these figures being estimates.

Kielder Observatory

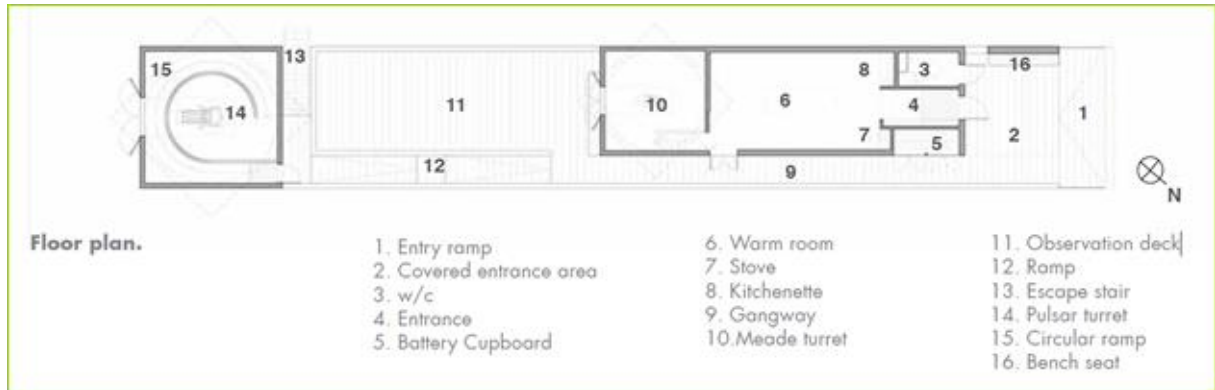
Kielder Observatory is an all-timber construction housing two permanent telescopes. The 222 sqm facility was designed specifically for amateurs and outreach work. During the day, the observatory serves as a viewing point overlooking Kielder Forest.

Figure 12: Kielder Observatory space allocation

Function	Area (sqm)	Percentage
Observatory 1	36	16%
Observatory 2	27	12%
Warm room	36	16%
Observation deck	50	23%
Other	73	33%
Total area	222	100%

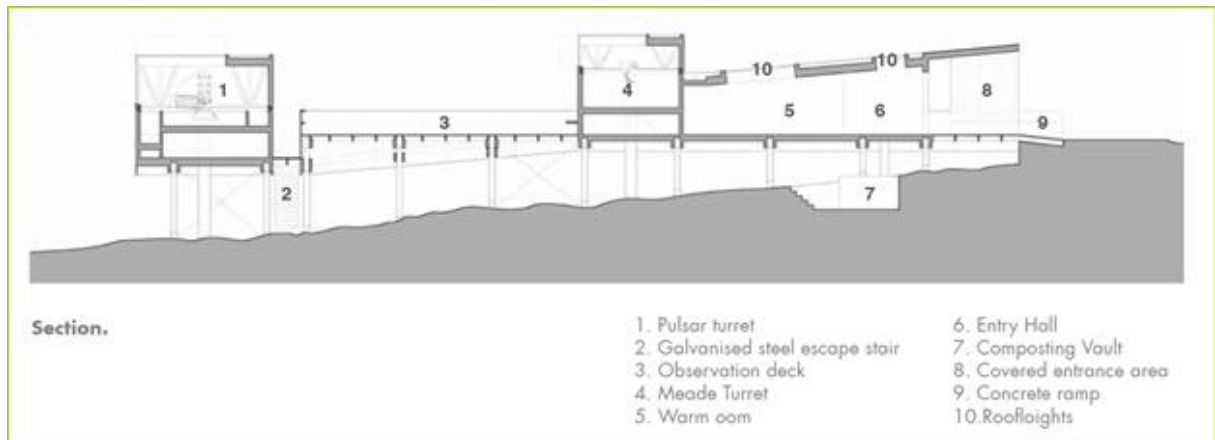
The inspiration for the scheme by Charles Barclay Architects came from home-made plywood observatories built by amateurs in their back gardens. The observatory is a sustainable building, self-powered using a 2.5kW wind turbine, roof-mounted photovoltaics and a battery storage system. It has a composting WC, a kitchenette, red lighting system and a micro-wave connection will give access to the internet. Kielder Observatory received awards from the RIBA and featured in the inaugural World Architecture Festival.

Figure 13: Kielder Observatory floor plan



Source: Charles Barclay Architects

Figure 14: Kielder Observatory section plan



Source: Charles Barclay Architects

Figure 15: Kielder Observatory – pulsar telescope, warm room and view from observation deck



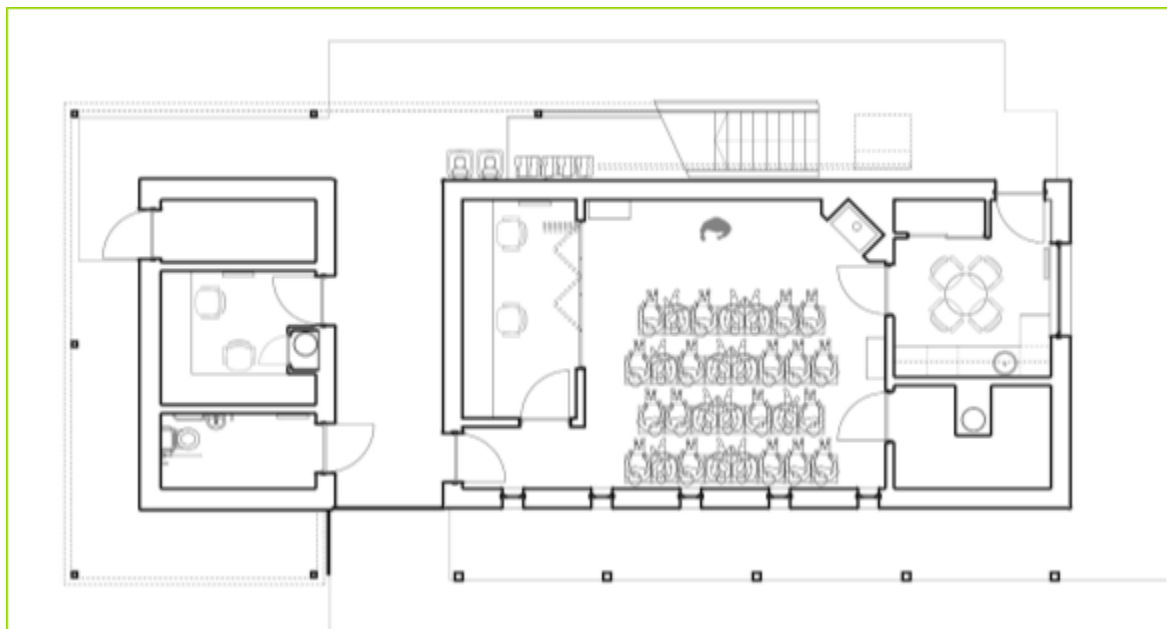
Scottish Dark Sky Observatory

The Scottish Dark Sky Observatory building comprises a telescope dome with a 20" telescope, another room with a roll-off roof with a 14" telescope, an elevated outdoor night sky observing deck, a lecture room with presentation equipment, telescope control rooms and a kitchen and associated services.

Figure 16: Scottish Dark Sky Observatory space allocation

Function	Area (sqm)	Percentage
Observatory 1	50	25%
Observatory 2	16	8%
Meeting room 1	80	40%
Meeting room 1	25	13%
Other	29	15%
Total area	200	100%

Figure 17: Scottish Dark Sky Observatory ground floor plan



Source: Architecture and Design Scotland

5.4 Governance and Management

The governance and management model will most likely be a charitable trust with a subsidiary trading company. This is the model most often seen with other similar venues.

As a charitable trust, the organisation running the International Observatory will need to have a trust board. It is expected representation on the trust board will be formed of:

- Ashford Borough Council
- Ashford Astronomical Society
- At least one professional astronomer
- At least one 'celebrity scientist' (if possible)
- Others of local or scientific prominence / pedigree

The board will meet at least quarterly and will be responsible for the overall management of the International Observatory.

By way of example, we note that Kielder Observatory is owned by the Forestry Commission but managed by the Kielder Observatory Astronomical Society (KOAS), set up specifically for the purpose of delivering and then managing the facility. KOAS is a registered charity with a Board of Trustees that meets quarterly to discuss the operation, maintenance and development of the charity's facilities and its programme of events.

The objectives of the Charity are:

- To promote interest in the science of astronomy amongst the general public;
- To facilitate education of members of the public in the science of astronomy;
- To maintain an astronomical observatory in Kielder Forest which will be used to support the preceding objectives.

Similarly, the Scottish Dark Sky Observatory is run by The Dark Sky Observatory, a registered charity with the following objectives:

- The advancement of science, education, the arts and environmental protection by the construction of an observatory to complement the Dark Sky Park in Galloway Forest Park.
- The promotion of social, economic and environmental regeneration of Dalmellington and the Upper Doon Valley in East Ayrshire.

6 Business Model

6.1 Basic Business Model

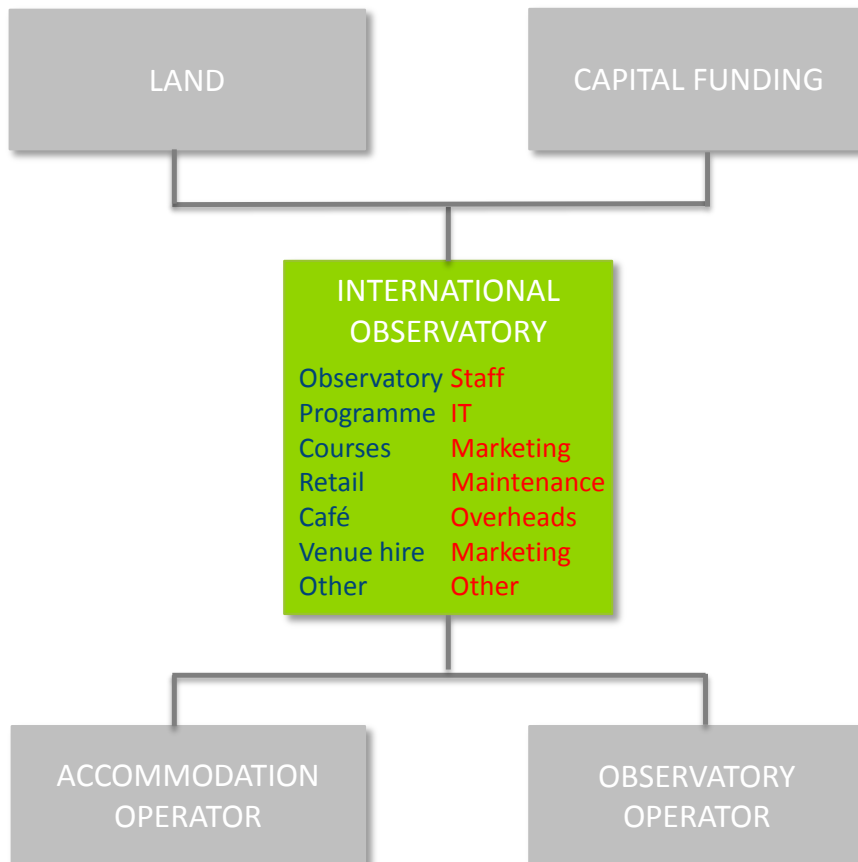
This section explores the business model that will best serve the type of destination that the International Observatory will be.

There are four main components to the suggested International Observatory model:

- Land
- Capital Funding
- Accommodation Operator
- Observatory Operator

The basic business model is depicted in the diagram below.

Figure 18: Basic business model



6.1.1 Land

Currently, the project does not have a specific site. But the concept is sufficiently developed for us to have a fairly defined idea of the site requirements. These are as follows:

- Within Ashford Borough
- Within the Dark Sky Community area (which is broadly the area at the western edge of the Borough from Tenterden to Woodchurch and its surrounding countryside)
- To enhance the likely accommodation offer and experience, a wooded area is preferable but not essential
- Although observing is possible in the daytime, stargazing is a predominantly evening activity and the best time of the year for stargazing is typically from December to March when the nights are longer – the observatory would therefore be a neat complement for other tourist or cultural destinations that attract a similar market for daytime activities
- Given the limited budget for the project, sites that minimise infrastructure costs (especially road and utility works) would have to be preferred
- As all of the above suggest the need for a countryside location, away from any significantly built-up areas, careful attention must be given to local planning requirements / constraints and, in particular, the project will need to minimise noise, traffic and disruption

A key opportunity to explore – as described in greater detail below – is to partner with another organisation (notably, the Forestry Commission) on the potential acquisition of forested sites in suitable locations. The land adjacent to the Rare Breeds Centre – which is woodland in predominantly private ownership – seems a particularly strong opportunity.

6.1.2 Capital Funding

In terms of capital funding, the aim is to minimise capitals costs in order to keep within limits of what the Ashford Council can deliver with or without additional partners. This is not to suggest that applications cannot – or should not – be made to third-party funders, including (for example) Kent County Council, the National Lottery, the Royal Astronomical Society, the Forestry Commission, the LEP, commercial sponsors or private individuals. To minimise capital funding risk, however, we have undertaken to specify a project that could be delivered within a capital budget that could realistically be met – if necessary – by the Borough Council, without any further dependence on third parties. The capital funding required for the International Observatory should thus be within a realistic and responsible limit and appropriate to the scale of the project and its measurable impact.

We have used comparators such as the Kielder Observatory and the Scottish Dark Sky Observatory as benchmarks, which – allowing for a modestly bigger observatory and construction cost inflation – would suggest a capital budget – based on basic unit cost comparisons – of between £1.2 million and £2 million. A more detailed breakdown of capital costs is available in section 7.2.

6.1.3 Accommodation Operator

The recent trend in alternative forms of accommodation, coupled with people's desire to escape the urban buzz and spend time in the country has led to a significant increase in holiday accommodation in more serene countryside and woodland environments. Examples of this type of accommodation include:

- Shepherds huts
- Yurts
- Bell tents
- Tipis
- Safari tents
- Log cabins
- Treehouses
- Camping pods

The International Observatory would work well adjacent to this type of holiday accommodation. One aspect of accommodation that needs to be considered for the International Observatory is outside space. Stargazing, if not done in an observatory, is an outdoor activity, and many astronomers like to take their telescopes with them and spend time outside looking at the night sky. Camping pods or log cabins with decked areas and convenient power outlets could work well, as could one central patio where astronomers interact.

Visit Kent's strategy is to encourage low-volume, high-value tourism that is considered niche and specific to Kent. Log cabins and other similar types of accommodation in the countryside would complement this strategy.

The majority of operators of this type of holiday accommodation tend to be independent. For example in the case of yurts, the model is often that of a farmer with spare land who puts up a few yurts as an extra source of income. It is, in effect, the traditional 'bed & breakfast' model transferred to a rural or camping setting. With log cabin accommodation and treehouses there are larger operators in the market. In summary, there are three possible options for the accommodation operator:

- 'Do it yourself'
- Third party lease
- Third party management

6.1.4 Observatory Operator

Although it is possible to simply hire a centre manger to operate the observatory, there are other options that could be more suitable for the International Observatory. An alternative option is to operate the observatory under a management contract with another organisation with prior experience of running an observatory of similar scale. In the basic model it is assumed that instead of going through the learning process alone, a relationship with an existing observatory operator will be formed in order to aid the International Observatory through its first steps as it stabilises its operation, or perhaps even in the long term if such a relationship proves mutually beneficial.

6.2 Comparison of Options

From the basic business model described in the previous section, we have distilled two options. There are of course a number of permutations to these options but to give an overview of the two different directions in which the International Observatory project can go at this stage, these options are explored in more detail below.

6.2.1 Option 1: Forestry Commission Partnership

Through the research we have done and conversations we have had to date, an interesting option has emerged which includes working with the Forestry Commission and Kielder Observatory. In this option, we have made the assumptions that Kielder Observatory is the observatory operator, Forest Holidays (a trading subsidiary of the Forestry Commission) is the accommodation provider, and the Forestry Commission is the landowner.

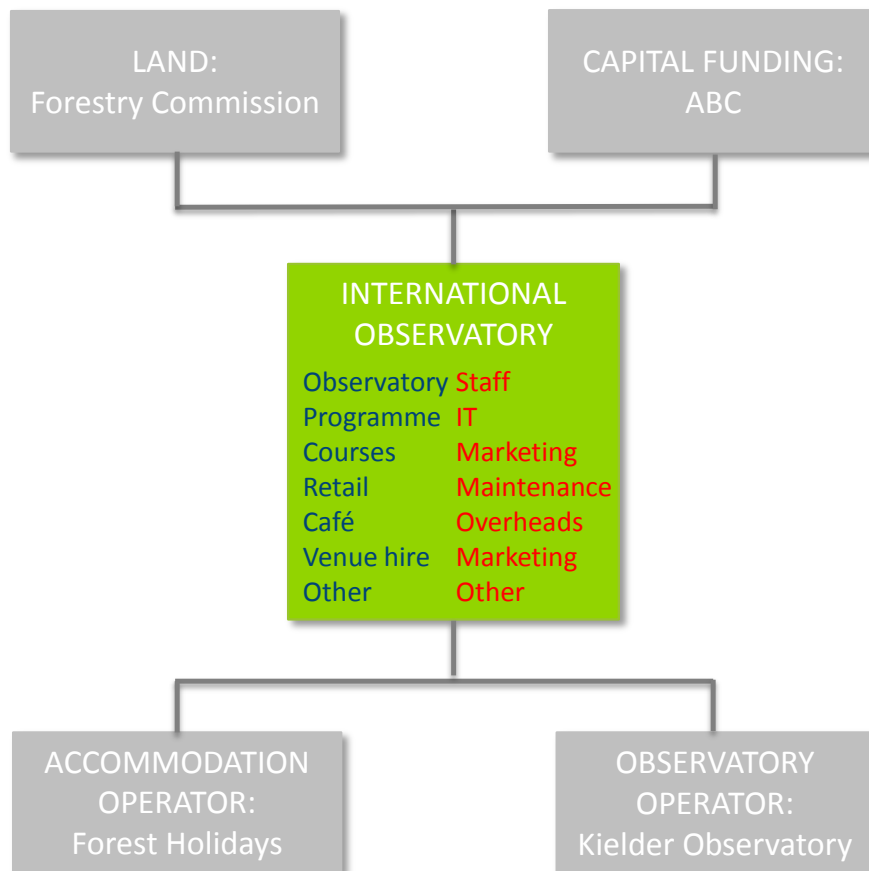
Currently, all the land the Forestry Commission owns in Kent is ancient woodland, which does not allow for any development. Nevertheless, the Forestry Commission also has a stake in Forest Holidays, a company offering luxury cabin accommodation. This type of accommodation, mostly found in serene woodland settings, could work well with the observatory.

Kielder Observatory has already successfully delivered a small scale observatory that is hugely popular with a broad audience of amateur astronomers and casual stargazers. They have the benefit of some ten years' experience of developing, launching and operating a facility that is very close to what we have described above, as well as an established and ongoing working relationship with the Forestry Commission. We therefore believe that it is worth considering a management contract with Kielder Observatory as the operational solution to the International Observatory in Ashford. Early discussions with Gary Fildes – Founder and Director of Kielder Observatory – suggest that they would be open to this opportunity. This approach would significantly 'de-risk' the project from an operational perspective, as it brings an operator into the project with a proven pedigree and track record.

It is furthermore worth emphasising that Kielder Observatory is located on Forestry Commission land and there is already an existing relationship between the two organisations. A precedent has been set and this relationship has been beneficial for both parties thus opening the doors for similar partnerships in the future. It is our understanding that the Forestry Commission is keen to explore commercial opportunities, and the observatory, along with some form of holiday accommodation, could fit this description.

The business model for Option 1 is depicted in the diagram below. In this model we have assumed that the Forestry Commission is the landowner, Forest Holidays is the accommodation provider and the International Observatory is located on Forestry Commission land, paying a peppercorn rent.

Figure 19: Option 1 - Partnership with Forestry Commission



Inasmuch as the Forestry Commission, Forest Holidays and Kielder Observatory are all inter-related or have some pre-existing relationship, there is a certain theoretical ‘elegance’ or ‘simplicity’ to this option that makes it particularly appealing. Its delivery, in practice, however, is ultimately dependent on the decisions of third parties. We would therefore recommend that a more ‘stand alone’ option remains in play at this stage. This is discussed below.

6.2.2 Option 2: “Go it Alone”

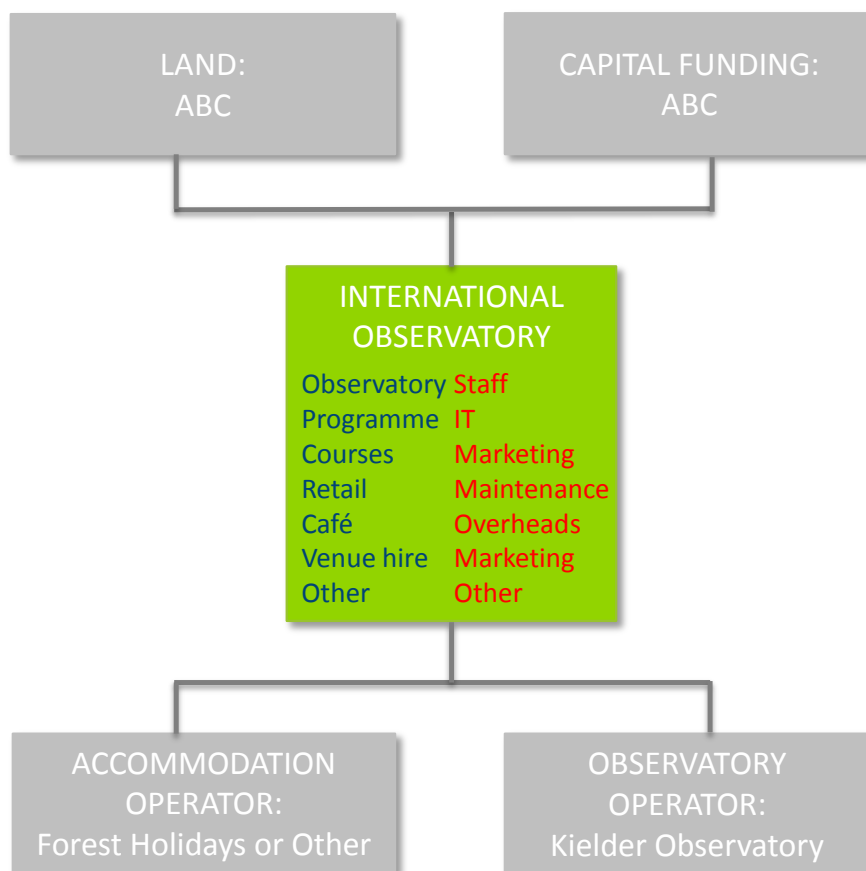
In the business model for Option 2, we are working with the assumption that there is no agreement with the Forestry Commission and that Ashford Borough Council purchases the land and funds all the capital costs.

Kielder Observatory remains as the observatory operator as that is not dependent on a deal with the Forestry Commission. It remains, in our view, the best (or least risk) operational solution, although we note that it is also possible to agree a management contract with another organisation (e.g. the Royal Observatory) or to recruit individuals and staff a whole new operating company.

Likewise, in this model, the accommodation operator may be Forest Holidays or some other operator of similar calibre and pedigree (although it is important to note that this remains an immature market with a

limited number of proven operators). The key difference, however, is not the identity of the operator but the operator’s relationship to the landowner and the Observatory. In this model, if ABC acquires and owns the land, then the Observatory would benefit from the additional stream of rental income from the accommodation provider.

Figure 20: Option 2 - ‘Go it alone’



6.3 Comparison of Options 1 and 2

As mentioned previously, there are a number of permutations of these two options. We have intentionally chosen to focus only on the two options described above as these lead to two distinct financial outcomes and at the same time appear to be the most appealing models for the International Observatory itself.

The first model is based on the assumption that the Forestry Commission acquires the land on which Forest Holidays builds and lets cabin lodges. The International Observatory would then be located adjacent to these lodges on Forestry Commission land and would most likely pay a peppercorn rent. Option 2 is based on the assumption that Ashford Borough Council acquires suitable land for the observatory and for the accommodation. In this case, it is expected that the accommodation operator would pay rent which would be used to cross-subsidise the operation of the Observatory.

Figure 21: Comparison of Options

CAPITAL COSTS	OPT 1	OPT 2
Infrastructure	£0	£0
Construction	(£952,000)	(£952,000)
Land	£0	(£1,000,000)
Professional fees	(£142,800)	(£142,800)
Contingency	(£228,500)	(£428,500)
TOTAL CAPITAL COSTS	(£1,323,300)	(£2,523,300)

P&L (Year 3)	OPT 1	OPT 2
REVENUE		
Observatory	£16,400	£15,500
Programme	£190,500	£188,100
Courses	£37,500	£37,500
Retail	£9,200	£8,600
Café	£19,100	£18,000
Glamping	£0	£32,600
Venue hire	£44,000	£41,500
Other revenue	£0	£0
TOTAL REVENUE	£316,700	£341,800
EXPENDITURE		
Permanent staff	(£142,700)	(£134,600)
Variable staff	(£16,400)	(£15,500)
Operations	(£160,400)	(£156,400)
TOTAL EXPENDITURE	(£319,500)	(£306,500)
NET SURPLUS / DEFICIT	(£2,800)	£35,300
NPV @ 6%	(£1,170,000)	(£2,012,000)

As shown in the table above, the only material differences between the two models are the assumed cost of land acquisition and the resulting revenue from accommodation. Option 2 generates a larger surplus due to additional revenue generated from the rent paid by the accommodation provider. But in Option 2, the cost of land acquisition is assumed to be borne by the Borough Council. On the other hand, in Option 1 there is no capital cost for land acquisition but – as a consequence – there is no additional rental income.

6.3.1 Recommended Option

Given the synergy that already exists between the Forestry Commission, Forest Holidays, Kielder Observatory and the proposed International Observatory, we are of the view that Option 1 is – on balance – the preferable option.

This is, however, predicated on preliminary, in-principle and generally ‘non committal’ discussions between the consultant and the organisations concerned. Everyone generally accepts the ‘logic’ and the theory of coming together to develop something new and exciting in a part of the country that currently has nothing like the proposed facility.

Further and more detailed discussion is obviously needed, however, to explore the fine detail and the commercial reality of what such a partnership would entail. At this stage, the most robust recommendation that we can make is for Ashford Borough Council to open a direct dialogue – which Fourth Street can support and facilitate – with the Forestry Commission land agent responsible for Kent.

7 Outline Financial Plan

7.1 Introduction

This section looks at the outline financial plan for the International Observatory while highlighting the different financial outcomes for Options 1 and 2.

7.2 Capital Costs

The Ashford Borough Council is keen to build the observatory in the near future without unnecessary delay. To that end, a reduced model for the observatory has been costed at approximately £1.3 million for Option 1, where the Forestry Commission acquires land and therefore land costs are excluded, and £2.5 million for Option 2 where the Ashford Council purchases land and therefore the land cost is included in capital costs. In this case, we have made – for prudence – a notional allowance of £1 million toward land acquisition, although our initial investigation of land values for forested areas in the Dark Sky zone suggest that the land could be acquired for considerably less.

The Observatory would be designed to allow for future expansion subject to its performance and popularity, for example with the potential addition of a fit-for-purpose planetarium. The capital costs are summarised in the table below.

Figure 22: Capital Costs

CAPITAL COSTS	OPT 1	OPT 2
Infrastructure	£0	£0
Construction	(£952,000)	(£952,000)
Land	£0	(£1,000,000)
Professional fees	(£142,800)	(£142,800)
Contingency	(£228,500)	(£428,500)
TOTAL CAPITAL COSTS	(£1,323,300)	(£2,523,300)

In both cases, construction costs are estimated at £2,800 per sqm, inclusive of a basic fit-out and the telescopic equipment. Professional fees are estimated at 15% of construction costs and – given the early stage of the development – the contingency is intentionally high at 20%.

So long as the site remains indeterminate, we have made no allowance for any significant infrastructure investment. Moreover, as the return on capital from the facility is invariably going to be marginal, we consider it important that the Observatory be sited such that no major infrastructure investment is needed (particularly in terms of new roads or junctions). Utility and drainage connections will almost certainly be required though.

The cost of land in Option 2 was estimated on the basis of current woodland sites being marketed for sale in Kent (averaging c.£10,000 per acre) and assuming the need for c.10 acres of land.

To put these capital costs in perspective, the Scottish Dark Sky Observatory which was completed in 2011 cost £750,000 to build while Kielder Observatory was completed in 2008 at a cost of £450,000. Adjusting for inflation, these would equate to 2015 costs of, respectively, £820,000 and £540,000.

The difference stems from the proposal for a larger and more ambitious observatory in Kent, which is better aligned to the Vision articulated above.

Figure 23: Comparison of construction costs

	International Observatory	Kielder Observatory	Scottish Dark Sky Observatory
Area (sqm)	340	222	200
Total construction cost	£952,000	£450,000	£750,000
Unit Construction Cost	£2,800	£2,027	£3,750

7.2.1 Funding

We have looked at a number of funding options for the capital costs for the International Observatory. The funding previously sought for similar destinations are not available anymore, such as the Millennium Commission or Regional Development Agencies. Likewise, Section 106 contributions might have been a possibility in the past but in the current climate this funding is usually put towards infrastructure and affordable housing as opposed to visitor attractions.

The next obvious funding mechanism would be lottery funding such as Heritage Lottery Fund or the Big Lottery. After careful scrutiny of these schemes, none seem to fit the International Observatory concept and therefore this source of funding has also been ruled out.

There is also a plethora of STEM funding available but this is mostly for programme and not capital funding. This source of funding may therefore be useful at a later stage to boost revenue but it will not help with capital costs.

In conclusion, the most likely sources of funding include:

- Ashford Borough Council
- Kent County Council
- EU (Interreg)
- Commercial Sponsorship

While all of these may offer some possibility, none provide certainty or even a very high probability. The project has thus been specified and scaled specifically to keep it within limits of what the Ashford Council and one or two sponsors could realistically fund themselves.

For comparison, below are the sources of capital funding for other observatories.

- Scottish Dark Sky Observatory:
 - East Ayrshire Council
 - Ayrshire Leader

- The Scottish Government
- The Coalfields Regeneration Trust
- The Minerals Trust
- William Grant & Sons
- The James Weir Foundation
- The Eden Charitable Trust
- The Monument Trust
- Score Environmental
- Kielder Observatory:
 - One North East via Northumberland Strategic Partnership
 - European Regional Development Fund
 - Northern Rock Foundation
 - Forestry Commission
 - Tynedale Council
 - Kielder Partnership

Of note is the fact that Kielder Observatory will be expanding in the near future. We have limited information on the details of this scheme as it is still in the pipeline but it will be a major expansion in the range of £5 million. KOAS Trustees recognise that the Kielder Observatory is currently operating at or near capacity with many events fully booked months in advance and they are keen to expand the observatory to cater to demand. This expansion is supported by a major private donor.

7.3 Profit & Loss

A preliminary operational financial model for the new visitor facilities has been forecast. The detailed financial model is available in a separate spreadsheet.

The aim is for the observatory to be self-funding. In order to achieve that aim, a number of revenue streams have been set out. The majority of revenue will come from programming. These will be regular events at the observatory that will include stargazing, lectures, workshops, etc. other revenue streams include venue hire, retail, cafe, etc. The majority of costs will be staff costs and operational expenditure.

The profit and loss model as of now does not include a particularly important stream under 'Other revenue'. This includes revenue from sponsors / partners, membership, grants, etc., and it can in the future help plug any gaps.

The two tables below show a 5-year P&L for Option 1 and 2 respectively.

Figure 24: Profit & Loss – Option 1

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
REVENUE					
Observatory	£13,020	£13,411	£16,423	£16,915	£17,423
Programme	£141,000	£155,580	£190,512	£233,206	£234,622
Courses	£30,000	£30,000	£37,500	£37,500	£45,000
Retail	£8,640	£8,899	£9,166	£9,441	£9,724
Café	£18,000	£18,540	£19,096	£19,669	£20,259
Accommodation	£0	£0	£0	£0	£0
Venue hire	£32,500	£41,200	£44,027	£51,905	£53,462
Other revenue	£0	£0	£0	£0	£0
Total revenue	£243,160	£267,630	£316,724	£368,636	£380,490
EXPENDITURE					
Permanent staff	£134,550	£138,587	£142,744	£147,026	£151,437
Variable staff	£15,488	£15,953	£16,431	£16,924	£17,432
Other	£144,571	£150,969	£160,426	£170,328	£175,533
Total Expenditure	£294,609	£305,508	£319,601	£334,279	£344,402
NET SURPLUS / DEFICIT	-£51,449	-£37,878	-£2,877	£34,357	£36,088

Figure 25: Profit & Loss – Option 2

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
REVENUE					
Observatory	£13,020	£13,020	£15,480	£15,480	£15,480
Programme	£141,000	£154,500	£188,100	£229,200	£229,200
Courses	£30,000	£30,000	£37,500	£37,500	£45,000
Retail	£8,640	£8,640	£8,640	£8,640	£8,640
Café	£18,000	£18,000	£18,000	£18,000	£18,000
Accommodation	£32,583	£32,583	£32,583	£32,583	£32,583
Venue hire	£32,500	£40,000	£41,500	£47,500	£47,500
Other revenue	£0	£0	£0	£0	£0
Total revenue	£275,743	£296,743	£341,803	£388,903	£396,403
EXPENDITURE					
Permanent staff	£134,550	£134,550	£134,550	£134,550	£134,550
Variable staff	£15,488	£15,488	£15,488	£15,488	£15,488
Other	£148,481	£151,001	£156,408	£162,060	£162,960
Total Expenditure	£298,519	£301,039	£306,446	£312,098	£312,998
NET SURPLUS / DEFICIT	-£22,776	-£4,296	£35,357	£76,805	£83,405

The model we most often look to for the International Observatory is the successful Kielder Observatory. The accounts for Kielder Observatory Astronomical Society, the charitable organisation that runs Kielder Observatory, serve as a useful point for comparison. For the financial year August 2013 to August 2014, the total income for Kielder Observatory was £240,928 while the expenditure was £202,035, giving a net income of approximately £40,000.

Given that Kielder Observatory opened in 2008, the 2013/2014 accounts provided would be Year 6 of operation. The P&L for Option 2 closely resembles this model since the profit for Year 5 is projected at £36,000. The revenue and expenditure is higher than for Kielder Observatory but this is accounted for additional components such as cafe and retail. On the other hand, the P&L for Option 2 differs from the Kielder Observatory in particular due to accommodation as an additional income stream. Analysing the accounts in more detail gives the following breakdown of income and costs.

Figure 26: KOAS accounts for financial year August 2013 – August 2014

	2013/2014
REVENUE	
Event and shop sales	£210,478
Northumberland County Council	£15,077
British Science Association	£750
Donations	£12,550
Membership fees	£2,073
Total revenue	£240,035
EXPENDITURE	
Personnel fees	£69,277
Personnel expenses	£48,523
Starcamp	£1,195
Campaign for Dark Skies	£2,000
Merchandising	£4,654
Depreciation	£8,432
Salaries & National Insurance Contributions	£25,293
Accountancy fees	£1,504
Consultancy fees	£10,260
Premises and insurance	£3,494
Telephone	£406
Printing, postage and stationery	£173
Subscriptions	£450
Repairs and renewals	£4,655
IT and website costs	£5,045
Motor expenses	£4,635
Advertising and marketing	£7,289
Bank charges	£210
PayPal fees	£4,478
Sundry expenses	£62
NET SURPLUS / DEFICIT	£38,893

7.4 Revenue Detail

The sections below provide more detail with regard to the individual component parts of revenue. Detailed models can be found in a separate spreadsheet available upon request.

7.4.1 Observatories

There will be two observatories, a large 50 sqm one and a small 20 sqm observatory. Each observatory will house a different telescope to cater to users' needs and preferences. The revenue generated from the observatory will be based on individuals or groups booking the observatory. There will be two different options for booking the observatory:

- *With a qualified astronomer* – this option will be made available to anyone including the general public. Included in the cost of booking time at the observatory will be the time of a qualified astronomer. The astronomer will be able to serve as a guide for visitors and will take charge of the telescope. This option will be suitable to those less familiar with astronomy and the equipment.
- *Without a qualified astronomer* – this option will only be available to more qualified individuals who know how to work with a telescope. Prior experience with a telescope will be a prerequisite to booking time at the observatory without a qualified astronomer.

Both these options will be available at the large and small observatory but at different prices. The breakdown of pricing for all options along with visitor projections is available below.

Figure 27: Large observatory revenue

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Hires per month	10	10	10	10	10
Proportion requiring an astronomer	50%	50%	50%	50%	50%
Charge / hour - with astronomer	£40	£41	£42	£44	£45
Charge / hour - without astronomer	£25	£26	£27	£27	£28
Length (hours)	2	2	2	2	2
Revenue - with astronomer	£4,800	£4,944	£5,092	£5,245	£5,402
Revenue - without astronomer	£3,000	£3,090	£3,183	£3,278	£3,377
Large observatory booking revenue	£7,800	£8,034	£8,275	£8,523	£8,779

Figure 28: Small observatory revenue

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Hires per month	10	10	15	15	15
Proportion requiring an astronomer	20%	20%	20%	20%	20%
Charge / hour - with astronomer	£30	£31	£32	£33	£34
Charge / hour - without astronomer	£15	£15	£16	£16	£17
Length (hours)	2	2	2	2	2
Revenue - with astronomer	£1,440	£1,483	£2,292	£2,360	£2,431
Revenue - without astronomer	£2,880	£2,966	£4,583	£4,721	£4,862
Small observatory booking revenue	£4,320	£4,450	£6,875	£7,081	£7,293

7.4.2 Programme

The programme will be the key revenue component for the observatory. Similarly to the Kielder Observatory, the International Observatory is expected to generate the majority of its revenue from organising astronomy events. Events are a popular way of enjoying astronomy as they allow participants to learn about astronomy in a fun and engaging way. Observation evenings, astronomy society meetings and astronomy camps are not only about astronomy but also about socialising with likeminded people. In order to remain true to that ethos, the International Observatory will be proactive in engaging with individuals through astronomy events.

Based on conversations with individuals and organisations that organise astronomy events, delivery is key to an astronomy event. Experience from both Kielder and Scotland shows that the bulk of the volume is generated by the general public, which is not as readily enthused by advanced ‘fact and figure’ lectures – theirs is a more emotional than intellectual experience. Events therefore need to be tailored to the audience and staff need to be appropriately recruited and trained to engage with visitors and animate the experience. Staff and volunteers at Kielder Observatory are passionate about astronomy and they are able to transmit this enthusiasm to their audience; this is the key to their success.

The type of events planned at the observatory are broken down into evening events, daytime events and special events. Evening events will follow the programme of typical observation evenings with a presentation or a bit of an introduction followed by both naked eye and telescope observations. Daytime events will need to cater to slightly different audience as most amateur astronomers have day jobs and therefore will not be attending these events. They will be geared more towards school visits and young children more generally.

Special events will be priced slightly higher than other events as they will include special guest speakers or more unusual activities such as experiment requiring more equipment. Special events can also be organised around special events such as the solar eclipse. Below is a breakdown of pricing and projected attendance for events at the observatory.

Figure 29: Events revenue

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
No. of events per annum	100	100	110	120	120
Attendance	30	30	30	30	30
Ticket price	£12	£12	£13	£13	£14
Evening events revenue	£36,000	£37,080	£42,012	£47,206	£48,622
No. of events per annum	80	80	90	100	100
Attendance	30	30	30	30	30
Ticket price	£10	£10	£10	£12	£12
Daytime events revenue	£24,000	£24,000	£27,000	£36,000	£36,000
No. of events per annum	30	35	45	50	50
Attendance	60	60	60	60	60
Ticket price	£45	£45	£45	£50	£50
Special events revenue	£81,000	£94,500	£121,500	£150,000	£150,000
TOTAL EVENTS REVENUE	£141,000	£154,500	£188,100	£229,200	£229,200

The model for the International Observatory projects some 200 events in the first year, increasing up to 250 in the third year. Although this may seem ambitious, it seems more reasonable when compared to the figures Kielder Observatory is achieving up in the Northumberland. In 2013/2014, Kielder Observatory staged 482 events attended by 14,090 people.

Arguably, Kielder Observatory already has an established reputation and it continually promotes its events through the press and broadcast media. On the other hand, Kielder Observatory is located in a sparsely populated part of the North East and some distance away from the nearest city. The International Observatory will enjoy the benefits of being located in the densely populated South East, close to London and surrounded by a number of astronomical societies. Market research undertaken thus far for the International Observatory supports these projections.

7.4.3 Courses

The International Observatory will function as an education and outreach facility. To that end, regular courses will be undertaken in the premises by third parties. Research suggests there is demand for astronomy courses as the offer outside of accredited university courses is limited. We have spoken with Joanna Jarvis who runs a communication and consultancy company in the field of astronomy in order to support our assumptions about astronomy courses.

In the first instance, we expect the observatory will not undertake its own courses but will make the premises available for a charge to universities, astronomy societies, and others.

Figure 30: Courses revenue

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
No. of courses per annum	20	20	25	25	30
Attendance	30	30	30	30	30
Ticket price	£100	£100	£100	£100	£100
Courses total	£60,000	£60,000	£75,000	£75,000	£90,000
Charge for space	50%	50%	50%	50%	50%
Courses revenue	£30,000	£30,000	£37,500	£37,500	£45,000

In support of our projections for courses, we have undertaken research on astronomy courses in offered in the UK. In light of these findings, our estimate for the price of courses is conservative as the average price in the market is considerably higher with many courses lasting several weeks or months. These projections are intentionally cautious as it is difficult to accurately predict the level of interest and commitment from providers of courses until the observatory is actually built.

7.4.4 Retail

As mentioned previously, the retail space is expected to be rented out to an established astronomy retailer such as The Widescreen Centre or similar. The revenue is coming from rent only. The rent per square metre was compared with market rents for similar commercial space in the area but was conservatively estimated to be lower than similar market rents due to the specific nature of the retail. By

choosing an astronomy shop, we are intentionally limited the market to a narrow group of astronomy enthusiasts and it is therefore expected that the rent needs to reflect this.

Figure 31: Retail revenue

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Area (sqm)	40	40	40	40	40
Rent / sqm	£18	£18	£18	£18	£18
Months	12	12	12	12	12
Retail rent revenue	£8,640	£8,640	£8,640	£8,640	£8,640

7.4.5 Cafe

The cafe model is similar to retail with revenue coming from rent. The cafe space is slightly larger than the retail space therefore the revenue will be higher. Similar to the retail space, the projected rent per square metre has been estimated in light of market research on rents in the area.

We expect the cafe will serve warm and cold drink as well as light snacks in the form of sandwiches, salads and soups. The cafe will function as a place where to socialise, mingle and meet new people. Sharing a passion for astronomy with likeminded people is an important aspect observation evenings. of Based on conversations with astronomers and attendance at observation evenings, we believe that visitors will in particular welcome soups and tea while undertaking observations late into the night often in cold weather.

Figure 32: Cafe revenue

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Area (sqm)	60	60	60	60	60
Rent / sqm	£25	£26	£27	£27	£28
Months	12	12	12	12	12
Cafe rent revenue	£18,000	£18,540	£19,096	£19,669	£20,259

7.4.6 Glamping

It is expected that the observatory will not run the accommodation as it will be outsourced to an experienced glamping operator. But the accommodation will be based on the same site as the observatory and depending on who owns the land, the accommodation operator may be paying a land lease to the observatory. This is where Options 1 and 2 differ.

In Option 1, the Forestry Commission will own the land and Forest Holidays will run the accommodation there will therefore be no revenue from accommodation for the International Observatory. In Option 2, the Ashford Council will be the landowner and the land for accommodation will be leased to a third party accommodation operator. Currently, the revenue from accommodation in Option 2 is estimated at 10% of total accommodation revenue, giving a figure of £33,000 per annum.

7.4.7 Venue Hire

The observatory building will be designed as flexible space and will therefore provide opportunities for venue hire for a number of different occasions in order to generate additional revenue.

The venue hire model is split into hire of entire venue, hire of meeting room and hire of gallery / foyer.

Figure 33: Venue hire revenue

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Hires per annum	12	15	15	18	18
Charge / day	£2,000	£2,060	£2,122	£2,185	£2,251
Length (days)	1	1	1	1	1
Entire venue hire revenue	£24,000	£30,900	£31,827	£39,338	£40,518
Hires per annum	30	40	50	50	50
Charge / day	£150	£155	£159	£164	£169
Length (days)	1	1	1	1	1
Meeting room hire revenue	£4,500	£6,180	£7,957	£8,195	£8,441
Hires per annum	20	20	20	20	20
Charge / day	£400	£412	£424	£437	£450
Length (days)	0.5	0.5	0.5	0.5	0.5
Gallery / foyer hire revenue	£4,000	£4,120	£4,244	£4,371	£4,502
TOTAL VENUE HIRE	£32,500	£40,000	£41,500	£47,500	£47,500

7.4.8 Other revenue

In the current financial appraisal, the assumption is that other revenue is £0. This is not because it is necessarily expected to be the case, but due to the fact that it is too early to be able to predict other revenue streams. Other revenue will be modelled at a later stage when the project is more developed. Other revenue includes sponsors / partners, membership, grants, etc.

As an example membership of the Kielder Observatory Astronomical Society costs £75 per year and another scheme, Friends membership, costs £25 per year. There are various benefits associated with one or both of these schemes including voting rights, newsletter, etc.

7.5 Expenditure Detail

The sections below provide more detail with regard to the individual component parts of expenditure. Detailed models can be found in a separate spreadsheet available upon request.

7.5.1 Permanent Staff

With regard to permanent staff, the financial appraisal takes into account one full time centre manager, two full time astronomers and one part-time marketing assistant.

Figure 34: Centre manager expenditure

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
FTE	1	1	1	1	1
Salary	£45,000	£46,350	£47,741	£49,173	£50,648
On-cost	15%	15%	15%	15%	15%

Centre manager expenditure	£51,750	£53,303	£54,902	£56,549	£58,245
FTE	2	2	2	2	2
Salary	£30,000	£30,900	£31,827	£32,782	£33,765
On-cost	15%	15%	15%	15%	15%
Astronomers expenditure	£69,000	£71,070	£73,202	£75,398	£77,660
FTE	0.5	0.5	0.5	0.5	0.5
Salary	£24,000	£24,720	£25,462	£26,225	£27,012
On-cost	15%	15%	15%	15%	15%
Marketing assistant expenditure	£13,800	£14,214	£14,640	£15,080	£15,532
PERMANENT STAFF TOTAL	£134,550	£134,550	£134,550	£134,550	£134,550

This staff structure is not unlike the model found at Kielder Observatory where employed staff include the following (as of August 2014):

- 1 full-time director
- 1 full-time lead astronomer
- 1 part-time lead astronomer
- 1 full-time administrator
- 1 part-time operations manager

7.5.2 Variable Staff

Given the number of events planned at the observatory, it is expected that a certain level of assistance will be needed with organising and managing events. Given the irregularity and timing of events, and the varying workload, it is not desirable to plan for permanent staff members. Volunteers are therefore expected to take some of this irregular workload. This is not an unreasonable expectation given how the Kielder Observatory is heavily dependent on volunteers who assist with running events. These volunteers tend to be united through a common interest in and passion for astronomy.

The observatory will also have the capacity to train one astronomy apprentice.

Figure 35: Apprentice astronomer expenditure

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
FTE	1	1	1	1	1
Salary	£8.00	£8.24	£8.49	£8.74	£9.00
On-cost	10%	10%	10%	10%	10%
Apprentice astronomer expenditure	£15,488	£15,953	£16,431	£16,924	£17,432

7.5.3 Management Contract

As described above, in section 6.1.4, the management contract is expected to be an agreement between the International Observatory and Kielder Observatory. This agreement would secure – for a fixed fee, albeit with some form of incentivisation – the ongoing support and advice of a proven operator of a similar and successful facility.

Figure 36: Management contract expenditure

	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Management contract expenditure	£25,000	£25,750	£26,523	£27,318	£28,138

7.5.4 Other Expenditure

Other expenditure includes all the necessary costs associated with running a venue of this size.

Figure 37: Other operational expenditure

Type of operational expenditure	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Finance & Legal	£14,000	£15,000	£17,000	£19,000	£20,000
IT	£3,000	£3,000	£3,000	£3,000	£3,000
Utilities & Services	£14,000	£14,000	£14,000	£14,000	£14,000
Admin	£8,000	£8,000	£8,000	£8,000	£8,000
Maintenance	£5,000	£5,000	£5,000	£5,000	£5,000
General overheads	£15,000	£15,000	£15,000	£15,000	£15,000
Insurance	£15,000	£15,000	£15,000	£15,000	£15,000
Marketing	£14,000	£15,000	£17,000	£19,000	£20,000
Renewal	£10,000	£10,000	£10,000	£10,000	£10,000
Cleaning contract	£6,000	£6,000	£6,000	£6,000	£6,000
Contingency	20%	20%	20%	20%	20%
Other operational expenditure	£123,000	£126,000	£131,000	£137,000	£138,000

Most building related costs are based on a rate per square metre. Marketing is pegged at 5% of turnover as is finance & legal. Renewal costs are particularly important and all too often ignored at the planning stage of a new destination. However, in a small non-renewable market like Ashford, some allowance has to be made for reinvestment / renewal. All other estimates are just allowances at this stage.

8 Dark Sky Community Designation

8.1 Introduction

Independently of whether or not to develop the International Observatory, there is value in seeking Dark Sky Community designation. Going back to the Vision statement in Section 4.2, a primary rationale for advancing the District's association with space and astronomy is precisely to communicate key signals about the identity and appeal of Ashford's unspoilt countryside hinterland. Dark Sky Community Designation is as powerful a signal, in this respect, as the International Observatory itself, not least because it would be the first and (to date) only Dark Sky Community in England.

The possibility of this has been specifically investigated by Chris Woodley-Stewart, a Fourth Street associate with rich experience of country park management and Dark Sky applications. His independent reports are appended in full. In this section we provide a short summary of that work.

8.2 What Is a Dark Sky Community?

According to the International Dark Sky Association (which confers the designation) a Dark Sky Community is: *"... a town, city or municipality that has shown dedication to the preservation of the night sky through the implementation and enforcement of quality lighting codes, dark sky education and citizen support of dark skies"*.

The benefits of achieving Dark Sky Community status include:

- International prestige and profile
- Promotion of ecotourism
- Place marketing / place branding
- Health and well-being and quality of life

In this case, we would reiterate that a large part of the rationale is to challenge the impression that the market has about Ashford which has been formed of that clutch of very high profile town centre projects and infrastructure that – while beneficial – are not wholly representative of the Borough and everything it offers (particularly to skilled workers and potential future residents). As such the Dark Sky Community designation is – together with the International Observatory – a part of a larger tourism and placemaking agenda that seeks to position Ashford where it needs to be within those key inward investment, tourism and resident markets.

Importantly, Dark Sky Community designation is patently **not** about 'turning the lights off', nor is it about stifling development or demanding a costly retrofit of existing lighting solutions. It is about recognition of the Dark Sky as an increasingly rare and consequently valuable asset and seeking to preserve and enhance that for the economic, environmental and health benefit of local stakeholders.

8.3 Achieving Dark Sky Community Designation

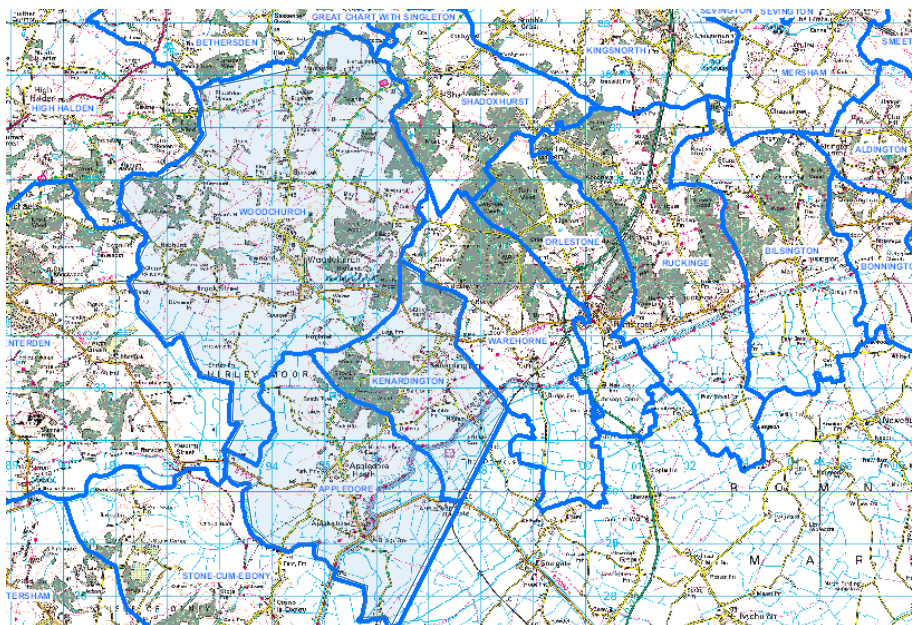
To that end, a specific Action Plan has been prepared to guide the application process. This is appended in full. In broad terms, the recommended approach is as follows:

- Build support to establish the Woodchurch area as mainland UK's first International Dark Sky Community
- As part of securing International Dark Sky Community status, provide the detailed guidance that can help public bodies, local people and businesses to preserve our dark night skies
- Create a new astronomical observatory (the International Observatory) in the area that is a place where discovering the wonders of the night sky helps to support the economy and community
- Develop events and activities focused on helping people learn more about their dark night skies
- Provide a network of Dark Sky Discovery Sites where the conditions are right for discovering and enjoying the night sky.

8.4 The Proposed Dark Sky Community Area

It is an important part of the IDSA application that the designation apply to a defined administrative boundary. Following discussion with the IDSA and the Borough planning team, it is recommended that the IDSA application focus – in the first instance – on the area defined by the following Parish boundaries: Woodchurch, Appledore and Kenardington. In future, the designation can be extended to adjacent Parishes including – if appropriate – Tenterden. This initial area is marked on the map below in Figure 38.

Figure 38: Proposed Dark Sky Community Area

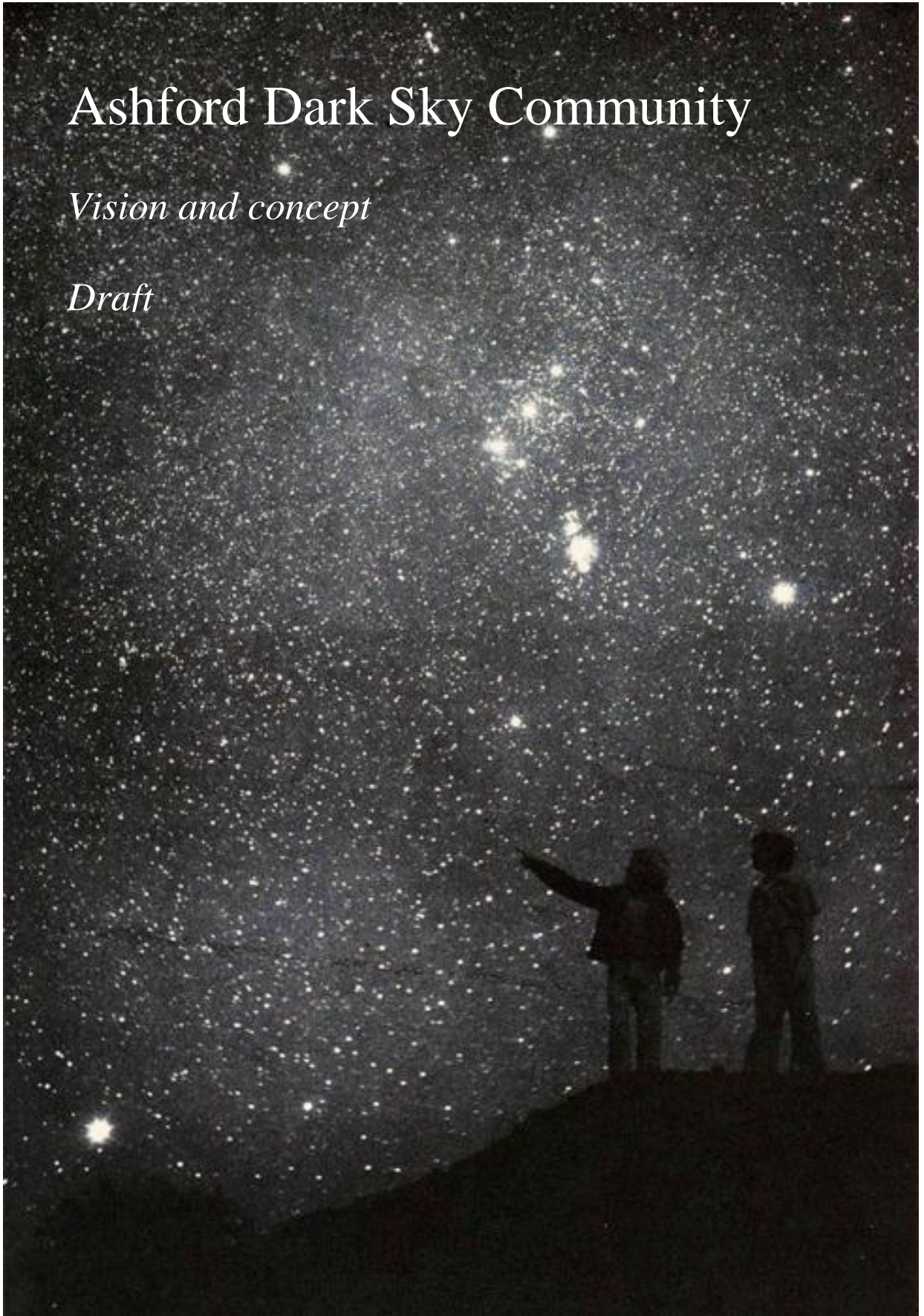


Appendices

Ashford Dark Sky Community

Vision and concept

Draft



Dark night skies

We live in an age when we know more about the universe than at any other time in our history, yet we have never been less connected to it than we are today. 80% of people around the world today are thought to have never seen the Milky Way, yet it is visible on every clear night from dark locations anywhere on Earth. So we might imagine that even fewer people in the densely populated South East of England have seen this natural wonder.

Our planet is at the heart of the Milky Way - our galaxy. Here, billions of stars fill our night sky, painting a scene almost as old as the universe itself. And beyond our galaxy, that universe stretches away over incredible time and infinite distance and is full of wonder and beauty, but all of this fantastic spectacle is largely hidden from us because of the seemingly endless growth in light pollution that prevents us enjoying something that is amazing, and yet completely free – the dark night sky.

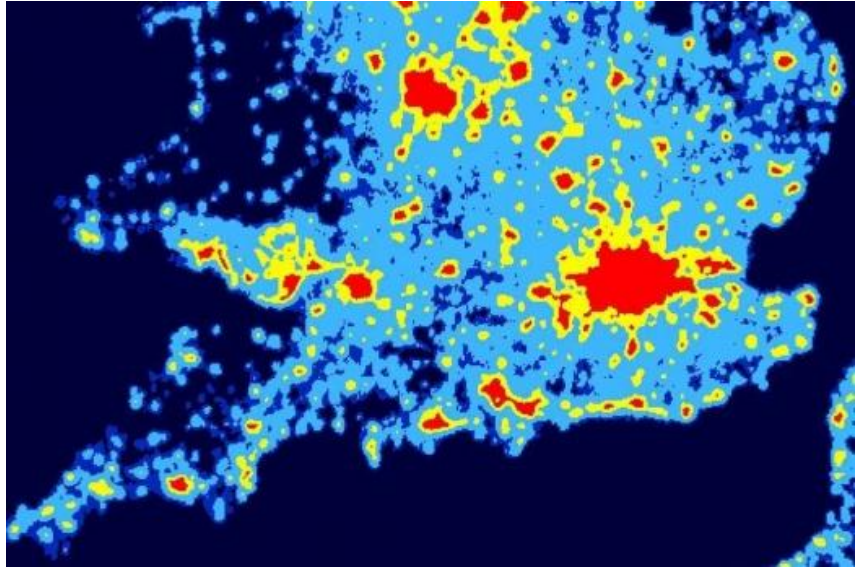
You don't need expensive equipment – in places that have held on to their special dark night skies, the naked eye can reveal wonders that more light-polluted areas hide from us. With just a pair of binoculars in a dark place, the moon, our nearest celestial neighbour, comes to life, whilst some of the planets in our solar system become visible to us for the first time – no one forgets seeing the rings of Saturn for the first time!



Levels of light pollution in Europe have continued to grow. Dark night skies are becoming ever harder to find.

The darkest skies in the south east

The area of Ashford Borough around Woodchurch and Tenterden has the darkest night skies in the South East of England. Though lost across much of the country, there are still places here where the wonders of the universe reveal themselves on every clear night – *and we'd like to keep it that way.*



CPRE mapping of light pollution in southern England – dark blue areas have darkest skies

We'd also like to make it possible for local people and visitors to understand and enjoy this fantastic spectacle, and to make sure that it can be a long term environmental, social and economic asset for the area. This needs a partnership between public bodies, householders, businesses, and local astronomy groups and others who together can preserve our dark night skies and make the most of all they have to offer.

To make the most of this special aspect of our area, we aim to:

- Build support to establish the Woodchurch and Tenterden area as mainland UK's first International Dark Sky Community
- As part of securing International Dark Sky Community status, provide the detailed guidance that can help public bodies, local people and businesses to preserve our dark night skies
- Create a brand new astronomical observatory in the area that is a place where discovering the wonders of the night sky helps to support the economy and community
- Develop events and activities focused on helping people learn more about their dark night skies
- Provide a network of Dark Sky Discovery Sites where the conditions are right for discovering and enjoying the night sky.

This is not about 'turning the lights off' – it's about the right lighting, in the right place, at the right time to meet local need, whilst looking after the environment and public health and well-being, whilst creating an educational and economic asset for the future.

The Vision

The area around Woodchurch and Tenterden has the accolade of being the first International Dark Sky Community on the UK mainland.

It is a place where local people value and celebrate their dark night skies for their wonder and beauty and for the environmental, economic and health and well-being benefits they provide for us. Regular events and activities help to bring the night skies alive for people, whilst local schoolchildren have new opportunities to understand and appreciate the universe with a focus on fun and discovery.

There are places specially set aside for sharing the wonders of the night sky: a superb new observatory is the hub of Dark Sky Community activity – a flagship astronomy venue for the south east, it provides unforgettable experiences for people from near and far and puts the area's dark skies on the astronomy map of Britain. A network of Dark Skies Discovery Sites allows for safe enjoyment of some of the darkest places and these are also a focus for sky-watching events and activities. Partnerships between public bodies, local astronomy groups, businesses and communities use these assets to unlock the economic potential of promoting and celebrating our dark night skies, as they have done elsewhere in the country, though never so close to where so many people live.

People enjoy the acknowledged health and well-being benefits that darker night skies bring, including being able to sleep better. Meanwhile the rhythms of nature are not disturbed by unnecessary light pollution, allowing them to breed, feed and navigate as nature intended.

Public authorities work together to help ensure that light pollution is minimised without compromising people's ability to move safely around their communities at night, or run their businesses efficiently. Their approach to public lighting saves money, saves energy and allows the night sky to be enjoyed by people. Clear guidance is provided on lighting which helps local communities to preserve dark skies.

At the heart of the Dark Sky Community is local people's growing appreciation of the importance and specialness of dark night skies and a shared desire to see them preserved for future generations to enjoy.

What is Dark Sky Community Status?

“An International Dark Sky Community (DSC) is a town, city or municipality that has shown dedication to the preservation of the night sky through the implementation and enforcement of quality lighting codes, dark sky education and citizen support of dark skies”

International Dark Skies Association

Dark Sky Community Status is one of a suite of ‘designations’ conferred by the International Dark Skies Association (IDA), the acknowledged authority on dark sky preservation matters. This is one of several other designations in the Dark Skies suite – Dark Sky Reserve (usually applied to large tracts of land with truly dark night skies); Dark Sky Park (a park or public land, with exceptional starry skies); Urban preserve (aimed at parks and open spaces in urban environments) – which are less appropriate to our area.

The Purpose and Benefits of Dark Sky Communities

The DSC programme was created initially to ‘identify those communities with exceptional commitment to and success in preserving or restoring their dark skies and promoting quality outdoor lighting’ (IDA).

International prestige and profile

Such acknowledgements can bring welcome international prestige and profile to an area; our proposed DSC may generate even more interest than most precisely because of its location in the densely populated South East of England. However, like many such initiatives, this can also serve not just as an award for past activity, but as a spur to help to generate and improve measures for dark sky preservation and restoration. The standards that are set by the IDA help those engaged in this work to ‘raise their game,’ perhaps achieving things they did not think possible when setting out on this road.



Promote ecotourism

A second purpose is to '*promote ecotourism*'- whilst people can argue over definitions of ecotourism, experiencing truly dark night skies and seeing their wonders is a proven attractor to visitors. An advantage in some locations is that the peak time for dark skies watching for most people is the autumn and winter; this activity can provide a boost to visitor numbers and spend in traditional shoulder months or off-season. Partnerships between landowners, public bodies, destination management organisations and skilled and enthusiastic astronomical societies are crucial to the success of making the most of our dark skies.

**Supporting the economy**

Our dark night skies are a relatively untapped economic asset. The potential tourism benefits they can bring may depend on the capacity of an area to deliver facilities, events and activities which sensitively exploit the resource, but Ashford's emerging public and voluntary sector partnerships can begin to realise the benefits. Plans for an observatory for the Borough would make an enormous contribution to raising the profile of dark skies in the south east and would generate an interest in dark sky tourism around which partners could build attractive programmes, allied to educational activities throughout the school and university sector, and opportunities for lifelong learning. Over time, getting our lighting right also saves public money and saves energy too.

Health and well-being of people and nature

A third purpose is to *'promote the protection of human health, nocturnal habitats, public enjoyment of the night sky and its heritage, and/or areas ideal for professional and amateur astronomy'*. There is a wealth of evidence linking light pollution to poor sleep patterns and the resulting health issues this can generate. With light pollution rising at 3% a year (Royal Commission on Light Pollution, 2009) this problem is worsening, with studies showing up to 44% of respondents having difficulty sleeping because of light pollution (Harris Poll, Europe Omnibus Survey, 2007). Local people stand to benefit greatly from reductions in light pollution in their streets, driven by a shared commitment to preserving dark night skies where they exist and restoring them where they have been lost.

Similarly light pollution can have significant impact on the ecology of many different kinds of species. The breeding patterns of species which respond to changes in day length (usually signified by light levels) can be affected, as can the ability to navigate by moonlight, or the ability to hunt successfully in what should be dark environments which have been polluted with artificial light. The rhythms of animals' lives have evolved in tune with natural light conditions, so it should be no surprise that dramatic alterations in the balance of these conditions will have a harmful effect on our wildlife, and, by acknowledged extension, on us.

The Observatory

At the heart of making the most of the area's dark skies is the proposed astronomical observatory, for which a business plan has been commissioned. This would be a first class venue for studying and enjoying the night sky. It would be an important educational and tourism asset for the South East, helping to further diversify the economy and ensure that the benefits realised through dark sky discovery elsewhere in the country can be enjoyed locally.





Dark Sky Discovery Sites

Finding places where the night sky can be enjoyed to the full isn't always easy. To help address this, a series of nationally designated 'Dark Skies Discovery Sites' would be established throughout the area. These are places which meet basic sky-visibility, safety and access criteria and which can be the focus of small-scale public skywatching events and educational activities.

Events and Activities

Working in partnership with local astronomy groups, a series of dark sky events and activities will be promoted across the proposed Dark Sky Community area and further afield. These will have the accent on fun and discovery and be led by people with the knowledge and passion to bring the night sky to life for people of all ages and experience.



Working Together

If the vision set out here is to be achieved, it has to be widely shared. It will require the support of many different partners, some of whom are already on board. This includes:

- The Parish Councils of the area – the Dark Sky Community needs to be based on a series of unbroken parish boundaries united in the Dark Sky Community area.
- Local astronomy groups, universities and others who can help bring the night sky alive for people, through events and activities across the area, including in local schools or through the planned observatory.
- District and county authorities who control public lighting.
- The wider community, who through carefully managing private lighting can contribute to managing light pollution.

What Next?

In order to work towards securing International Dark Sky Community status there are some clear next steps, including:

- Ensuring the potential partners are all supportive of the idea and see the benefits that can be achieved.
- Clearly defining the proposed boundary, aiming for a cluster of parishes around Woodchurch and Tenterden where dark night skies persist but effort is needed to preserve them.
- Devising a name that accurately reflects the geographical coverage of the proposed DSC.

Once this is in place:

- The Dark Sky Community Status requires a lighting code to be bespoke for the applicant area – the current Supplementary Planning Document for lighting needs to be amended as and produced as a local guidance document which provides local people and businesses with sound yet flexible guidance on outdoor lighting within the Dark Sky Community area. A draft which fulfils the basic International Dark Sky Association requirements and meets local need would be produced and consulted on.
- A series of Dark Sky Discovery Sites would be identified and consulted on locally.
- Events and activities would be planned for the coming year.
- An application would be made to the International Dark Sky Association for the Woodchurch and Tenterden area to become mainland UK's first Dark Sky Community.

Finding out more:

International Dark Sky Association www.darksky.org

International Dark Sky Community Status – Next steps

Through exploring the issues and options and in discussions with the International Darkskies Association (IDA), we have established that:

1. An International Dark Sky Community status application would be possible for an unbroken series of parishes in the Woodchurch and Tenterden area of the Borough of Ashford.
2. As the Planning Authority, the DSC applicant will be the Borough Council but the Parishes need to be fully committed and engaged .
3. It is necessary to produce a ‘model lighting code’ for the DSC area. In order to meet IDA standards this needs to be a little more demanding than the current SPD covering the whole borough. An SPD appendix should be produced and would form the Lighting Code for the DSC area; the nature and scale of the appendix has been identified.
4. There is no requirement for KCC to bring their *existing* street lighting up to compliance
5. ABC-owned lighting within the boundary will be required to be brought up to compliance within five years. What constitutes compliance will be clear in the SPD appendix.
6. Existing private lighting is unaffected until the property owner comes forward with a planning application, when lighting affected by an application would have to be brought up to compliance.
7. The creation of a series of nationally designated Dark Skies Discovery Sites has been highlighted as something which maintains momentum and adds value to the DSC process and application.
8. The other elements necessary for a successful application have been identified and are achievable.

The following table shows a **draft action plan** for the next steps. Note that the column on who takes the lead and who provides support is indicative at this stage and requires further discussion and agreement on where support is required and what it might entail.

Dates are provisional and subject to discussion with the client. All activities on the DSC application are subject to the fulfilment of objective 1 and securing Parish Council support.

Objective	Actions	Lead / Support	Timing
1.Ensuring the potential partners are all supportive of the idea and see the benefits that can be achieved	a. Create an outward facing version of the vision and concept document for the DSC	FS / ABC	June
	b. Engage with the Parish Councils and other local stakeholders (e.g. High Weald AONB) to generate support for the proposal	ABC / FS	July - Aug
	c. Engage with KCC to ensure that they will operate in the spirit of the revised SPD	ABC / FS	July- Aug
2.Define a boundary and establish a working title for the DSC	a. Through the Parish engagement process, define a boundary based on an unbroken series parishes and collectively agree a name for the DSC	ABC / FS	July - Aug
3. Fulfilling the obligation to produce an outdoor lighting code	a. Produce a locally tailored draft appendix to the lighting code which meets IDA requirements	FS / ABC	Sept - Oct
	b. Consult on the SPD Appendix	ABC / FS	Oct - Dec

4. Enable people to enjoy dark stars in a way which bolsters the DSC application and increases community awareness of dark skies issues.	a. Establish a programme of events and activities for the coming year, through contact with local astronomy groups	FS	July - Aug
	b. Identify and consult on a network of Dark Sky Discovery Sites to promote stargazing opportunities locally and add value to the DSC application. Engage with astronomy groups on selection	FS /ABC	July - Sept
	c. Complete application for DSDS	FS / ABC	Oct
	d. Identify resources needed to support events and activities (publications, materials, stargazing kits etc.) engaging with astronomy groups.	FS	July - Oct
	e. Establish the extent to which dark skies resources are currently available or desired in a sample of local schools. If desirable, identify how the materials produced under action 4d could be used to support dark skies work in schools.	ABC / FS	Sept
	f. Create a simple dark sky awareness publication and/or web resource alongside the promotion of star-gazing events and the Dark Skies Discovery Sites, highlighting opportunities to enjoy dark night skies in the DSC area.	FS / ABC	Nov (after DSDS approval)

5. Establish the support of a broad range of local groups beyond the Parishes, KCC and the astronomy groups	a. Provide an opportunity for local organisations to engage in the process with a view to providing letters of support – this could be a stargazing event targeting potential supporters	ABC / FS	July-Oct subject to obj. 1
	b. Provide guidance on potential letters of support content, without simply producing a template	FS / ABC	Jan 16 subject to obj. 1
6. Identify a night-time sky darkness baseline and monitoring programme	a. Provide guidance on undertaking a night sky darkness monitoring programme with local astronomy groups	FS / ABC	Oct
	b. Meet with the local astronomy groups, as part of the overall engagement process, to seek their support and input to monitoring. Identify repository of the records	FS	July
	c. Implement programme with local astronomy groups	Astros	tbc
7. Generate examples of a minimum of 10 projects built under the lighting code, or agreeing an alternative with IDA	a. Initial action action - Confirm with the IDA what might be acceptable in this regard, given the timing of production and the presence of the current SPD	FS	June
8. Secure the Dar Sky Community Status	a. Ongoing liaison with the IDA to ensure the process is on the right track	FS	Ongoing
	b. Gather the supporting material	FS / ABC	Ongoing
	c. Complete the application form	FS / ABC	Jan 16