APPENDIX 1

PROPOSED WINDFARM AT SPRING FARM RIDGE, HELMDON/GREATWORTH, NORTHAMPTONSHIRE (SOUTH NORTHANTS COUNCIL PLANNING APPLICATION S/2010/1437/MAF)

PUBLIC INQUIRY INTO APPEAL AGAINST REFUSAL OF PLANNING PERMISSION

APP/Z2830/A/11/2165035

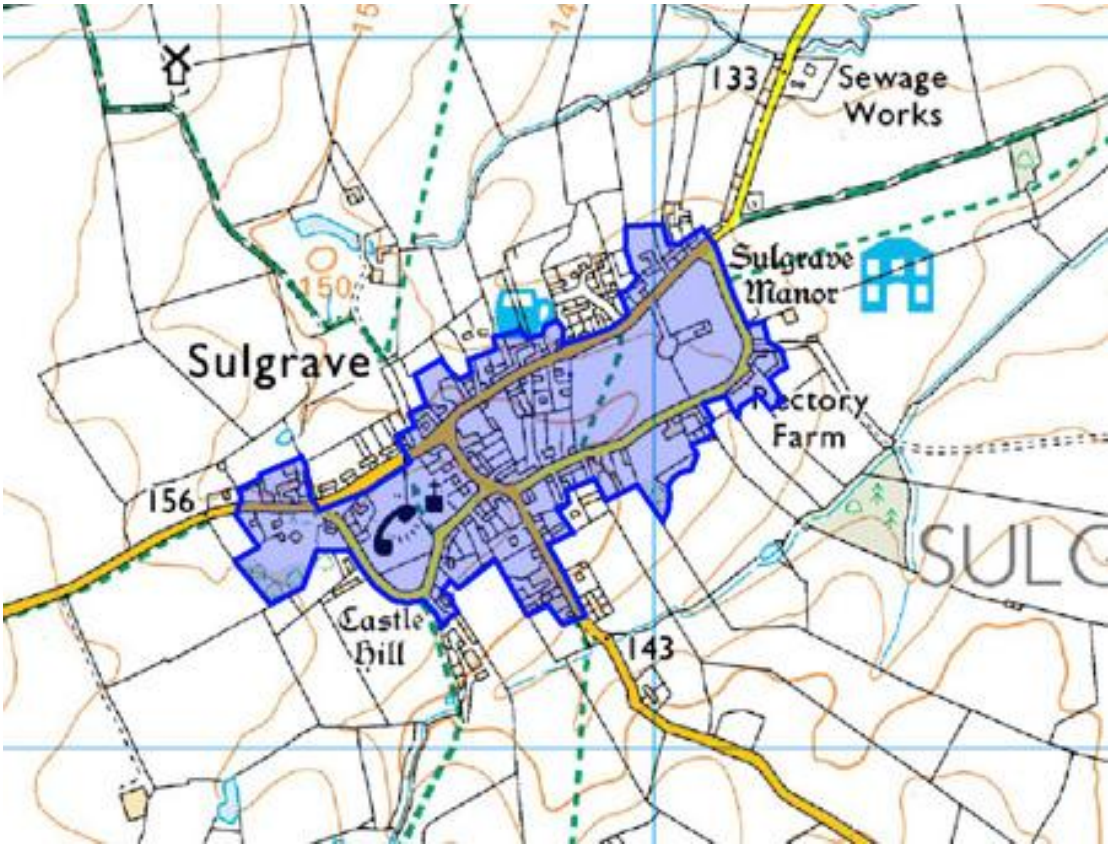
APPENDIX 1 TO STATEMENT BY COLIN WOOTTON

ON BEHALF OF

SULGRAVE PARISH COUNCIL

AN ASSESSMENT OF THE IMPLICATIONS FOR HERITAGE ASSETS AT SULGRAVE

1. SULGRAVE CONSERVATION AREA



Sulgrave Conservation Area, formally designated as an area "the character of which it is considered desirable to preserve and enhance".

It will be noted that practically the whole of the built environment of the village is contained within the designated conservation area. The landscape setting of the village and the landscape setting of the

conservation area are therefore one and the same. In geographical terms this setting comprises a shallow valley forming the uppermost reaches of the River Tove, open to the east but contained by broad ridges to the north, west and south. Within this area of visual containment the landscape comprises a pattern of mainly small fields bounded by hedgerows largely intact, interspersed with deciduous trees. There are no visual detractors (i.e. the countryside is unspoilt) and the few agricultural buildings are horizontal in character and small in scale.

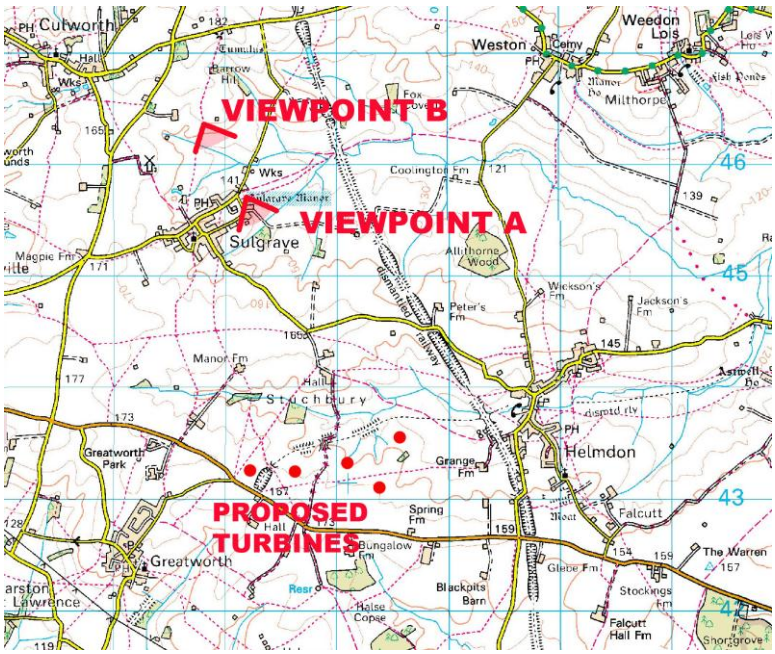
The village nestles harmoniously into this landscape setting and is inseparable from it. The enjoyment and appreciation of the conservation area both from within it and outside it from many accessible and popular viewpoints is greatly enhanced by this landscape setting, which is therefore as much to be "preserved and enhanced" as the built area itself. This is particularly important in a village such as Sulgrave which has many thousands of international visitors every year, especially from the United States, drawn by the ancient Manor which was the home of George Washington's ancestors.

The applicant states only that:…*"The southern edge of the Sulgrave Conservation Area"* is a heritage asset *"considered to be of high sensitivity where it is anticipated that the turbines would have a moderate impact resulting in an effect that is Moderate and Significant"*

However, this assessment is restricted to views ***from*** the conservation area, which the applicant originally sought to demonstrate by reference to photo montages from two viewpoints only. The first of these is from a location on the public footpath from Sulgrave to the village of Weston, thus:

One of the turbines can just be seen on the left of the photograph and a gable end of Sulgrave Manor on the right.

The location of this viewpoint is shown on the following map as "Viewpoint A":



At the pre-application stage it was suggested to the local planning authority that there were a number of viewpoints from which photo montages could be made so as to demonstrate the impact of the turbines on the ***setting*** of the village, its conservation area, listed buildings and scheduled ancient monument. Sulgrave Parish Council also specifically requested this information from the applicant. No such montage was submitted with the planning application.

In its guidance: "**The Setting of Heritage Assets**", English Heritage addresses this point as follows: *"The setting of any heritage asset is likely to include a variety of views of, across, or including that asset, and views of the surroundings from or through the asset."*

A montage made from photographs taken from Viewpoint B on the above map, also on a much used and valued public footpath, gives a very different impression of the impact of the turbines on the setting of the conservation area, thus:

This photograph basically shows the eastern half of the conservation area, centred on the internationally important Grade I listed building, Sulgrave Manor (Point "M"). Point "X" on this photograph indicates the location of the top of the meteorological mast which has already been erected on the application site. (See appendix "A" for details of the methodology used in producing this photo montage).

As we have seen, the applicant suggests that the turbines would have only a *"moderate impact"* on *"the Southern Edge of Sulgrave Conservation Area"*. This montage amply demonstrates that far from a *"moderate impact on the southern edge*" the turbines would have a major impact on ***the whole setting of the conservation area*****,** by dominating the southernmost horizon of the valley within which the village lies.

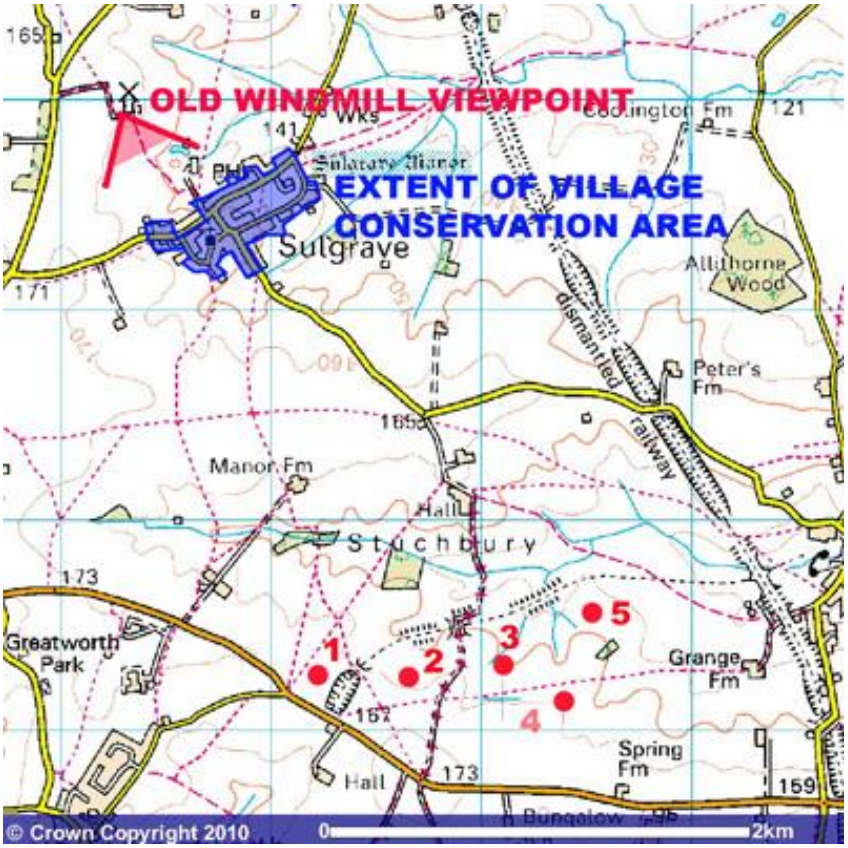
The local topography is such that this viewpoint and others to the north of the village are at the same level as the ridge upon which the turbines stand and also the intermediate ridge between the village and the windfarm site. The turbines would thus appear to stand on the very top of the near ridge which so neatly provides a visual stop to valued outward views across the whole of the conservation area.

This would completely compromise the integrity of the area which has been formally designated as being "desirable to preserve and enhance". Far from being *"just another feature in the landscape"* as stated by the applicant, in this context the five 125m high turbines, with their continuously moving blades, would totally change the perception and appreciation of this important heritage asset for residents and the many visitors to the village alike.

This impact can be further demonstrated by reference to a montage made from photographs taken at a viewpoint on the much used and valued bridleway between Sulgrave and Culworth, as follows:

Point “A” indicates the top of the meteorological mast already constructed on the application site. Point “B” indicates the location of a blimp flown at turbine height near to the proposed position of the right hand turbine.

The location of this viewpoint is indicated on the following map:



Once again, it is submitted that this montage demonstrates that far from having a moderate impact upon the southern edge of the conservation area, the turbines would dominate the horizon to the south of the village, competing with and completely overshadowing the Grade II* listed Church of St James the Less, currently and historically the most significant feature of the area.

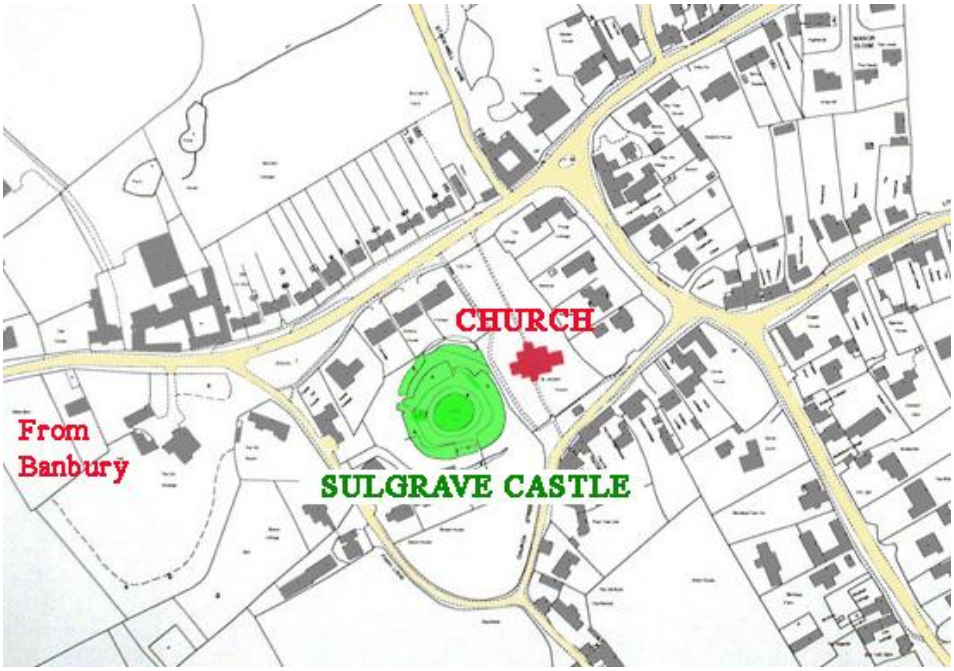
We have seen that the applicant recognises that Sulgrave Conservation Area comprises a heritage asset of the highest level of sensitivity but claims that the impact of the proposal upon it could not be assessed by reference to the relevant criteria as *“Major Adverse”* wherein the presence of the turbines *“would be intrusive within its setting, such that its integrity is compromised and appreciation and understanding is diminished…”* and therefore concludes the impact to be merely “Moderate Adverse”.

It is submitted that the alternative photo montages shown above clearly demonstrate that the integrity of the whole of the setting of the conservation area is indeed compromised in this way and the impact must be considered to be major adverse.

The accuracy of these photo montages has been verified by those professionally produced from the same viewpoints which can be seen at Viewpoints 1 and 2 in Packs “A” and “B” of HSGWAG Photomontage Packs “A” and “B”. The methodology employed in producing these montages is given in Appendix “C”.

2. SULGRAVE CASTLE SCHEDULED ANCIENT MONUMENT (The Ringwork)

Formerly known as “Castle Hill”, this prominent earthwork is situated next to the church, as shown on the map below.



Extensive excavations were carried out on this site between 1960 and 1976 by archaeologist Brian Davison, revealing the remains of substantial Saxon buildings dating from over 1000 years ago, later extended into a Norman castle. A statement of the significance of this heritage asset by Brian Davison is attached as Appendix B.

A photograph of the excavated remains taken from the nearby church.

The Sulgrave Castle Site is a Scheduled Ancient Monument of significant national importance because it is the only one of its type that has been excavated, although no results of the findings have been published.

Sulgrave History Society conceived the idea of obtaining access to the records of the archaeological excavation and, with appropriate professional assistance, analysing these with a view to making the history of the site and the artefacts found thereon available to the wider public. The Sulgrave Castle Archaeological Group was formed to undertake this work and in July 2004 was awarded a grant from the Local Heritage Initiative to carry out an assessment of the finds and catalogue the documents.

Adjoining the actual ringwork and part of the scheduled ancient monument is “Castle Green”, a field used informally as a recreation area for many years and now owned by the Parish Council. Substantial improvements to the Green have recently been completed, mainly funded by the Heritage Lottery Fund, with contributions from Northamptonshire County Council, South Northants Council, English Heritage and the Alan Evans Memorial Trust.

Unveiling the display board which explains the historical significance of the ancient monument

The display board

Both the ringwork itself and Castle Green are much used and valued local resources, as can be seen from the photograph below:

During the public consultation period which preceded the planning application, the applicant exhibited the following photo montage purporting to show the impact of the proposal on Castle Green:

With care, a turbine can just be made out through the foliage of the trees in the foreground. A different impression of the visual impact of at least two of the turbines can be gained from the following montage (prepared as set out in Appendix A), at a point a few metres from the above:

Whilst not available to the public during the consultation exercise, a photo montage from a viewpoint on the Castle Hill ringwork (Photomontage 4b in the planning application) was finally prepared and submitted with the planning application, as follows:

A montage made from the same location in accordance with Appendix A, gives a different and it is submitted, more accurate, impression of the impact of the turbines on the setting of the ancient monument:

It will be noted that a visitor examining the ancient ringwork would be continuously aware of the full circle of the moving blades of the turbines dominating the southern horizon.

The accuracy of this photo montage has been verified by that professionally produced from the same viewpoint which can be seen at Viewpoint 3 in HSGWAG Photomontage Packs “A” and “B”. The methodology employed in producing these montages is given in Appendix “C”.

The following picture illustrates how this important historical resource is used for educational purposes, with a group of children following a heritage trail around the ringwork:

A photo montage from this viewpoint illustrates the impact of the turbines on the inner part of the ancient ringwork:

The applicant admits that: *"…..the turbines will be visible in views south from the monument and its surroundings…"* but seeks to demonstrate in Photomontage 4b (see above) that the visual impact would be no more than "moderate".

In his statement of the significance of the ancient monument (See Appendix B) distinguished archaeologist Brian Davison concludes: *"The immediate landscape context of the Sulgrave earthworks, both as regards inward and outward views, is crucial for encouraging and assisting a wider and deeper public understanding of the effects on rural England of our last successful full-scale invasion by a foreign power."*

It is submitted that the dominant presence of the turbines on the southern horizon of the setting of the ancient monument would so compromise the appreciation of this important heritage asset by villagers and visitors alike as to amount to a major rather than a moderate impact.

These views are supported in a report prepared by Alison Farmer of Landscape Architects Alison Farmer Associates, commissioned by the Helmdon Stuchbury and Greatworth Windfarm Action Group. The extract below deals with the Castle Hill Ringwork:

Castle Hill Ringwork, Sulgrave

The ES acknowledges that the Castle Hill Ringwork SAM is of high sensitivity and that the magnitude of effect on views from this heritage asset would be moderate resulting in a moderate to significant effect overall. In table 8.2 pg 151 of the ES it defines the setting of the monument as *"provided by the surrounding buildings in the village".*

Castle Hill Ringwork, Sulgrave forms a local landmark feature within the village of Sulgrave and an area accessible to the public. From the top of the mound and open space to the south (known as Castle Green which formed part of the outer bailey and where local events are held e.g. Autumn Fair) there are views to the wider landscape to the south. These views are relevant to the monument's historical significance as a defence structure from which views would have been important. Although the nature of the outward views have altered over time due to development in the village and growth of tree vegetation, those which remain are of note and contribute to the perception, understanding and appreciation of this nationally valued heritage feature. In accordance with EH guidance on what constitutes a setting, the wider landscape and skyline which is visible from the monument are, in my view, part of the setting of this heritage asset. The development would have a significant effect on these views as indicated in the ES although I disagree with the conclusion in the ES that the development will *"represent a change in the wider visual context but the turbines will simply be another feature within a landscape" (Vol 2 ES, pg 125)*. The impacts relate to the breaking of the skyline by structures which are moving and would draw the eye, the turbines would appear on the skyline above trees and would appear considerably larger than the existing skyline vegetation, this in turn would give the impression that the turbines are located in the landscape surrounding the SAM and not in the landscape beyond and would affect perceptions of the distance over which there are views. There are no other similar vertical skyline features in the current landscape generally or in any of the views from this heritage asset. A large proportion of the south facing views from the monument would be affected. In my view the development would adversely affect the setting of the monument and therefore be contrary to planning policy.

3.THE VILLAGE CHURCH

The Church of St James the Less, Sulgrave, is a Grade II* listed building which is the predominant built feature in the conservation area. Its contribution to the "sense of place" of the ancient village of Sulgrave is well seen from a number of viewpoints within the landscape setting of the village, thus:

The horizon in this picture is the ridge to the south of the village upon which all five turbines would appear to stand.

We have already seen that the presence of the turbines on this horizon would so challenge the dominance of the church as the significant feature in the view as to compromise the integrity of the conservation area, as shown in this montage, repeated here with special reference to the effect on the church:

Here again, the applicant states that the visual impact would be no more than *"moderate"* but originally produced no visualisation to compare with the above so as to demonstrate why this should be the case. It is submitted that the impact would be "major and significant".

This assessment is supported by Alison Farmer in a further extract from her report prepared for the Helmdon Stuchbury and Greatworth Action Group, as follows:

Sulgrave Conservation Area

Sulgrave has a Conservation Area Appraisal although no reference of this is made in the ES. The appraisal states that:

"Immediately south of Castle Hill there is a small triangle of rough pasture...around the triangle of pasture there are views on the south side of the lane briefly to open countryside."

"Sulgrave is a relatively compact village which has mercifully escaped the intrusion of large modern housing estates....the large open pasture areas beside the Manor and Church respectively provide an attractive contrast to the built environment around them."

In table 8.2 the ES describes the setting of the Conservation Area as comprising *"surrounding buildings, fields, trees and hedgerows."* It concedes that there would be views of the turbines from within the Conservation Area to the south east. The ES acknowledges that the Sulgrave Conservation Area is of high sensitivity (page 155) and that the magnitude of effect on views from southern edge would be moderate resulting in a moderate and significant affect overall.

Views of the development from within the Conservation Area would affect one of only two opportunities to appreciate the wider rural landscape context of the settlement as set out in the CA Appraisal. These views are afforded from publically accessible land within the Conservation Area and which provide a contrast to the build character of the rest of the area. The impact of the turbines in these views would affect the character of the Conservation Area in this locality and would therefore be contrary to planning policy.

Similarly from north of the village the land rises and from an old windmill and public right of way there are elevated views back across Sulgrave village to the proposed development site. In these views the church tower and the surrounding properties nestled around the church are clearly visible and make a notable contribution to local character and sense of place. In these views the proposed development would be seen directly behind the village and church on the skyline and again would impact on the setting of the Conservation Area not to mention local landscape character

CONCLUSIONS

The applicant has sought to demonstrate that the visual impact of the turbines upon three of Sulgrave's heritage assets, namely the Conservation Area, the Scheduled Ancient Monument and the Church of St James the Less, would be moderate rather than major.

The applicant states that:

There is no standard method for the assessment of the significance of impact with regard to heritage assets. The approach that has been adopted for this assessment is based on the principle that the significance of the impact is determined by assessing the magnitude of the change and the sensitivity of the affected asset.

and

As noted above, the assessment of magnitude of change essentially relies upon a professional judgement rather than the scoring of criteria. With respect to potential impacts upon the setting of heritage assets, if the development is considered to be within that setting and is assessed as being intrusive, it has been classified as being major adverse.

There is no issue in respect of the "sensitivity of the affected assets", since the applicant accepts that they are all of the highest sensitivity.

From the above statements, it can be seen that "assessing the magnitude of the change" is a purely subjective judgement, based largely upon visualisations made from **a careful choice of appropriate viewpoints.**

It is submitted that the applicant's choice of appropriate locations from which to assess the magnitude of the change in respect of Sulgrave heritage assets was woefully inadequate. When this is coupled with an unnecessarily constrained interpretation of the best practice guidance relating to the production of photo montages, it is clear how the applicant felt able to characterise the magnitude of the impact upon the assets as moderate.

It is further submitted that if the more appropriate locations for viewpoints set out in this document had been chosen and a more sensible application of the best practice guidance adopted in the preparation of visualisations from those points, it would have led to the conclusion that the impact should be considered to be "major adverse".

The applicant fairly admits that*: "Although the design has minimised the indirect effects, the impact upon the eight identified heritage assets remain with no opportunities for effective screening."*

However, there is no detailed description of how the design has minimised the indirect effects on the Sulgrave heritage assets but merely the following statement:

Throughout the design process, landscape and visual considerations were given significant weight, including the indirect impact of the proposed development on the setting of heritage assets.

Given the constraints evidently imposed by the boundaries of the land available for this proposal, it is difficult to see how the evolving design process could in any way minimise the indirect effects on Sulgrave heritage assets. Indeed in this context the design process could only be described as moving the five turbines around the limited land area available to meet constraints other than "minimising the indirect effects on heritage assets". It is submitted that wherever they had finally ended up, the visual impact upon Sulgrave would have been exactly the same. In the case of Sulgrave heritage assets it is submitted that there is absolutely no justification for the statement that *"the design has minimised the indirect effects"*.

It is therefore submitted that:

1. The Sulgrave heritage assets considered in this submission are of the highest sensitivity.

2. The adverse effect of the proposal on these heritage assets would be major rather than moderate.

3. This adverse effect cannot be mitigated.

The appellant fairly concedes points 1 and 2 and a proper consideration of adverse effects using appropriate visualisations indicates that these must be classified as major rather than moderate.

This is important because the latest government planning policy guidance in the National Planning Policy Framework states that the significance of a heritage asset can be harmed through development within its setting. The Framework further states that: "*Substantial harm to heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional."*

It is considered that the harm to the setting of heritage assets at Sulgrave, comprising a scheduled ancient monument, grade I and II* listed buildings and a registered park and garden, would indeed be substantial and the wider environmental benefits of the proposal would not be such as to justify this as being an exceptional case where the harm should be permitted.

Colin S. Wootton MRICS MRTPI (Rtd)

28.04.2012

Appendix A.

PHOTO MONTAGES

1. Good Practice Guidance.

The applicant states that the visualisations forming part of the application are based on “Visual Representation of Wind farms: Good Practice Guidance” (SNH 2006)”

The introduction to this guidance states:

14 The Good Practice Guidance is designed to summarise and explain what is feasible, available and reasonable in terms of current good practice in the production of illustrations. However:• It is not an exhaustive guide to all possible techniques, nor does it prescribe a single method or brand of software;

• It is not intended to be highly prescriptive, nor suggest that there is a 'one size fits all' solution;

• It does not remove the need for consultation, good judgement and the adaptation of tools and techniques for different developments and different locations; and, most importantly,

• It is not intended to inhibit or stifle innovation in the development and use of new approaches, tools and techniques.

and

15 This guidance specifically applies to onshore windfarms within Scotland; however some of the principles established through this guidance may be relevant to other development types or within other locations. Additional guidance may be developed in the future that builds upon this work, exploring and/or incorporating additional aspects of windfarms, such as cumulative assessment or offshore developments.

It can thus be seen that the methodology described in the guidance has been developed to suit large scale landscapes and in the case of most proposals, large numbers of turbines spread over a wide area. In these circumstances, a panoramic representation will often be required to demonstrate the probable visual impact.

The landscape within which the present proposal would be located could hardly be more different and it is particularly noted that the applicant characterises the Spring Farm Ridge wind farm as “compact”.

In respect of photo montages, the SNH guidance states *“the recommended horizontal and vertical field of view will vary, depending on what is required to illustrate the key characteristics of the visual resource and the key components of the proposed development. In some cases, the recommended horizontal field of view may conveniently fit the dimensions of a single photographic frame (representing 39 degrees using a 50 mm lens on a 35 mm camera).”*

Nevertheless, in every one of the photo montages accompanying the planning application, the chosen horizontal field of view is 90 degrees, having the effect of a wide angle lens, forcing the turbines to recede into the distance.

The applicant states that this is necessary to illustrate *“the full extent of view experienced at the viewpoint”* and to provide *“an indication of the visual context of the development…with reference to the best practice guidance”*.

It is submitted that there is no such necessity, not least because the "*key components of the proposed development*" i.e. the five turbines, are "compact" enough conveniently to fit the dimensions of a single frame in almost every instance.

The alternative montages forming part of this submission have therefore been produced at an angle of 39 degrees or thereabouts as recommended, also using a 50 mm lens on a 35 mm camera.

I particularly note this statement from "Visualisation Standards for Wind Energy Developments" by the Highland Council.

"Single frame images, as both colour prints and as transparencies, are required for Visual Impact Assessment (VIA) by the public, non-landscape professionals and decision makers in addition to any panoramas submitted as part of a LVIA carried out by a landscape professional."

2. Methodology used in producing the alternative photo montages.

At the request of Enertrag UK Limited, who proposed the construction of nine 125m turbines in the Sulgrave/Weston area, a visit was made to their completed project in Swaffham, Norfolk. A convenient place on the map was identified at exactly 1000m from a turbine and this was photographed using a digital Single Lens Reflex camera with a 50mm lens.

From each given montage viewpoint in the Sulgrave/Helmdon/Weston area, photographs were taken of the landscape within which the turbines are proposed, using the same camera and focal length lens.

The co-ordinates of the proposed turbines as supplied by the developers were entered into a hand held gps instrument. From any given point, therefore, the positions of the turbines in the landscape could be determined using a surveyor's bearing compass. These horizontal positions were entered onto the photograph. The vertical position of the turbines within the photograph (i.e. how much of them would appear above the horizon) was determined by drawing sections through the landform from viewpoint to turbine using OS contour maps.

The size of any given turbine on the photograph was determined by scaling up or down the "Swaffham turbine" to reflect the actual distance from viewpoint to turbine relative to the 1000m example. This manipulated turbine image could then be inserted into the correct position on the photograph using "Photoshop" computer software.

Where the photographs used in making the montages included the existing meteorological masts (in the two schemes, one of which has now been removed) or the blimp flown by HSGWAG, good correlation was obtained between these points and the calculated height of the turbines using the above methods.

Where the applicant's montages have been prepared from the same viewpoint as the alternative montages, there is a good correlation between the two in respect of turbine locations and relative heights on the photograph.

It is anticipated that the turbines proposed for the Spring Farm Ridge Scheme would be of the same height as, and very similar to, those photographed at Swaffham and used in this exercise.

Colin S Wootton

APPENDIX B

CASTLE HILL, SULGRAVE

A note on its archaeological significance

The earthworks known as the Castle Hill in Sulgrave village are in the form known to archaeologists as a "ringwork." This term is usually applied to earthworks found in a village/manorial/feudal context where one might expect to find a motte-and-bailey castle, but where instead powerful earthworks follow a circular or oval plan to enclose a relatively small inner area. Some ringworks have attached outer enclosures or baileys: others do not.

Ringworks are found in pre-1066 Normandy, at a time when motte-and-baileys do not occur, and in many parts of post-1066 England. Since the early 20th century they have been considered a recognisable sub-type of early Norman castle.

The uncertainties as to what might be meant by the presence of a ringwork at the heart of a an English feudal estate, rather than a motte-and-bailey, led Professor Martyn Jope of Queens University, Belfast, to propose the excavation of a suitable example. After careful consideration, the Castle Hill in Sulgrave was selected for trial excavation in 1960. The excavation, and all subsequent excavations, were directed by Brian Davison, formerly Professor Jope's research assistant in Belfast and later an Inspector of Ancient Monuments.

The excavations showed that the ringwork was occupied from later 10th century until the early/mid-part of the 12th century, thus spanning the period of the Norman Conquest. Underneath the ringwork were the remains of earlier buildings dating from the late-10th and early 11th centuries. Some of these buildings had been built of stone, while others had been timber-framed. It seemed clear that the early Norman castle had succeded, and been imposed upon, an earlier manor house - the establishment of a Saxon *thegn.*

Known residences of *thegns* are extremely rare, perhaps half-a-dozen in England in all. Those with an early Norman castle imposed directly above, allowing a direct assessment of the effects of the Norman conquest on the governance of English village are even more rare. Sulgrave is unique in preserving at least one 10th century Saxon stone building to a height of 2 metres, embedded in the overlying Norman rampart. Sulgrave is now recognised as the type-site of this phenomenon.

So far, one half of the ringwork has been examined and work is in progress to bring the results of the excavations to publication and a more general public knowledge. The other half of the ringwork remains to be examined, as does the site of a possible outer bailey extending to the south of the ringwork. This will be work for a future generation.

We thus have an extremely rare example of what may once have been a fairly common occurrence, throwing light on the way in which Saxon thegnly lordship was replaced by the lordship of a Norman knight.

Timely efforts by the local community have resulted in the preservation of both the ringwork itself and the unbuilt-on parts of what may have been its outer bailey. As archaeological investigation is extended into this area in future, the importance of the Castle Hill earthworks at Sulgrave can only increase.

While the visual impact of these Conquest-period earthworks is modest, compared with that of the great Norman and Angevin keeps of the 12th century, it is precisely this modesty that makes Sulgrave such a useful block of evidence. This is what must have happened in countless small villages in the years following 1066, but only at Sulgrave has it been demonstrated so clearly.

The immediate landscape context of the Sulgrave earthworks, both as regards inward and outward views, is crucial for encouraging and assisting a wider and deeper public understanding of the effects on rural England of our last successful full-scale invasion by a foreign power.

Brian K Davison OBE, BA (Archaeology), FSA, MIFA (Past Chairman),
Vice President of the British Archaeological Institute.

August 2010

APPENDIX C

PHOTOGRAPHY AND PHOTOMONTAGE METHODOLOGY

PHOTOGRAPHY

Verified Photography by: Tomo Graphics Ltd, tel: 01892 770808, email: phil@cad.uk.net

Camera and lens used: Canon EOS 5D (full frame sensor) with a Canon EF f1.4 Ultrasonic 50mm prime lens

Tripod and panoramic head: Manfrotto 055ProB tripod,

Manfrott0 438 Leveller,

Manfrotto 300N Panoramic rotator head set at 20 degree shot intervals (50% overlap on a single frame shot of approx 40 degrees)

Manfrotto 454 Sliding plate to position camera over the no-parallax position

.

Camera height above ground : 1.60m

Software used: Adobe Photoshop CS4 for RAW file processing
PTGui software for splicing individual frames into panoramas
Resoft Windfarm (Visualisation Module)

Verified photography produced by Tomo Graphics Ltd follows the Guidelines for Landscape and Visual Assessment (second edition) by the Landscape Institute, the Scottish Natural Heritage Visual Representation of Windfarms Good Practice Guide (29th March 2006) and the Highland Council Visualisation Standards for Wind Energy Developments January 2010. Please refer to these documents for detailed information.

ON SITE WORK

Viewpoint locations are identified for the generation of verified view wireframe photomontages. From each tripod location a Garmin eTrex handheld GPS unit is used to record the British OS Grid co-ordinates.

A Canon 5D SLR camera (full frame sensor) is used with a fixed focal length 50mm lens (35mm film equivalent). Photographs were taken on a levelled tripod 1.60m above ground level. If panoramas are required, PTGui software is used to spice the individual frames. The software corrects the individual frames for barrel distortion and cylindrical projection. These frames are then spliced together digitally with a 50% overlap and cropped to give the required field of view.

PHOTOMONTAGE METHODOLOGY

- 10m Profile Contour DTM data was purchased and Resoft Windfarm creates a 3D digital terrain model from this data. The wind turbine proposed for this project is then modelled and turbines are placed in their correct proposed locations on the digital terrain model.

- The camera viewpoints are then created virtually within the Resoft Windfarm software using the x and y co-ordinates recorded on the Garmin eTrex handheld GPS unit and. The Z co-ordinate is automatically interpolated at that location on the digital terrain model. The camera is then rotated to the bearing recorded on site, which aligns with the centre of the spliced panoramic photograph.

- Wireframe snapshots are then taken with a horizontal field of view of 75 degrees. These are then displayed on the second A3 output sheet for each viewpoint, along with a viewpoint location map on 1:25000 OS Explorer data.

- The panoramic photograph is then imported and the wireframe is adjusted to match using the digital terrain model and locator points recorded on site, which appear in the photograph.

- The wind turbines are then rendered in Resoft Windfarm. Final masking out of feature, which would be hidden behind existing vegetation and buildings is carried out in Adobe Photoshop CS4.

- The final images are then presented on A3 sheets with horizontal fields of view of either 75 degrees (images size – 395 x 130mm) or 40 degrees (image size – 360 x 240mm).

- Photomontages and wireframes were created with a horizontal field of view of 75 degrees from each viewpoint. A selected number of just photomontages were created with a horizontal field of view of 40 degrees.