

# Stonehenge World Heritage Property, United Kingdom

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## 1. Identification of the property

1.a Country/State Party: England, United Kingdom

1.b State/Province/Region: County of Wiltshire

1.c Name: Stonehenge, Avebury and Associated Sites

1.d Location:

Monument	NGR	Latitude (N)	Longitude (W)	Elevation
Stonehenge	SU 1225 4219	51° 10' 44"	1° 49' 34"	102m
Woodhenge	SU 1505 4338	51° 11' 22"	1° 47' 10"	98m
Southern Circle, Durrington Walls	SU 1514 4366	51° 11' 31"	1° 47' 05"	88m

## 1.e Maps and plans, showing the boundaries of the Property and buffer zone

The current boundary is as shown in Map 1 in the Stonehenge WHS Management Plan 2009 (Young, Chadburn and Bedu 2009: 175) (see Fig. 4.1). There is no buffer zone but the current Stonehenge WHS Committee considers that a setting study should be carried out (Simmonds and Thomas 2015: Policy 2b/ Action 15). Earlier policies had considered that a buffer zone was not needed if current government guidance was followed (Department for Communities and Local Government and Department for Culture, Media and Sport, 2009; Department for Communities and Local Government, 2012; English Heritage, 2009).

A minor boundary review is currently under way (2015), being one of the actions recommended in the 2009 Stonehenge Management Plan (Young, Chadburn and Bedu 2009: 120).

The Avebury part of the World Heritage Property is not considered further here, as there is no secure evidence for astronomical importance, other than the general one which is noted in southern Britain, that most of its long barrows are roughly aligned towards the sun-climbing or sun-rising parts of the sky (Ruggles 2012).

## 1.f Area of the property and buffer zone

Stonehenge World Heritage Property (WHP) currently comprises an area of 2,665 hectares (26.6 km<sup>2</sup>) of land with Stonehenge at its approximate centre. There is no buffer zone.

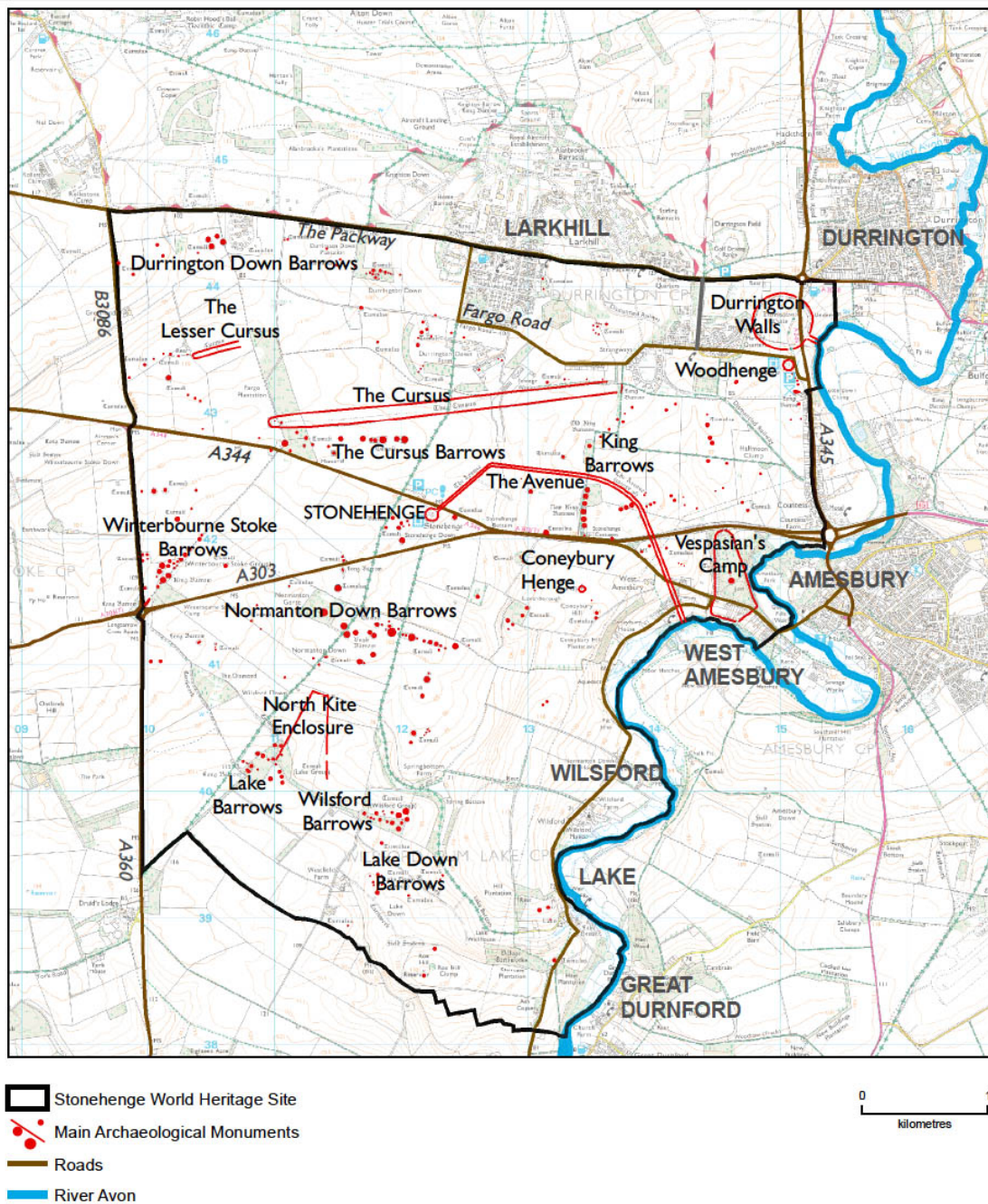
## 2. Description

### 2.a Description of the property

Stonehenge WHP is one half of the Stonehenge, Avebury and Associated Sites WHP ([whc.unesco.org/en/list/373](http://whc.unesco.org/en/list/373)), which is internationally important for its complexes of outstanding prehistoric funerary and ceremonial monuments of the Neolithic and Early Bronze Age.

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<sup>1</sup> **Note.** This case study represents the views of the authors, and not necessarily those of Historic England or its predecessor English Heritage, for whom the first author works.



**Fig. 4.1.** Map of the Stonehenge World Heritage Site. Based on scheduled monument information from the Historic England (formerly English Heritage) GIS combined with features drawn from Ordnance Survey mapping data. © Historic England

Stonehenge is the most architecturally sophisticated prehistoric stone circle in the world and, in addition, the WHS around it contains many hundreds of archaeological sites and monuments, many of which are prehistoric too. These monuments in their associated landscapes help us to understand Neolithic and Bronze Age ceremonial and mortuary practices in England and indeed in north-west Europe. They demonstrate around 2000 years of continuous use and monument building between c. 3700 BC and 1600 BC.

One of the most important features of Stonehenge – one that has been recognised since the 18th century when it was noted by the antiquarian William Stukeley – is that its

principal axis of symmetry is aligned upon winter solstice (“midwinter”) sunset in one direction and summer solstice (“midsummer”) sunrise in the other. We now know that a number of other prehistoric sites in the Stonehenge WHP also have astronomical significance, with some monuments oriented towards midwinter sunset and/or midsummer sunrise and others towards midsummer sunset or midwinter sunrise (Ruggles 2006; 2014). This contrasts with Avebury, where there are no known sites that convincingly demonstrate deliberate alignment in any of the solstitial directions.

See also the official brief description of the property that was agreed by UNESCO in July 2008 (quoted in Young, Chadburn and Bedu 2009: 21, section 3.2). A more detailed description of the Stonehenge WHP is set out in Appendix G (*ibid.*).

Six monuments in the Stonehenge WHP are considered to have significant astronomical alignments:

1. Stone settings at Stonehenge (Bluestone horseshoe, Trilithon horseshoe, Bluestone Circle, Sarsen Circle, Slaughter Stone and its companion, Heel Stone and its companion)
2. Stonehenge Avenue (straight segment closest to Stonehenge)
3. Woodhenge (timber circles rings C–F and grave)
4. Southern Circle, Durrington Walls
5. Southern Circle Avenue, Durrington Walls
6. Stonehenge Station-Stone rectangle

More details on these sites and alignments can be found in the section below and in Table 4.1.

## 2.b History and development

The first “monument” at Stonehenge WHP comprised an alignment of three Mesolithic pits (c. 8,000 BC) located just to the north-west of Stonehenge monument, which apparently contained huge timber posts. But the area became more intensively used from the early and middle Neolithic onwards (c. 4,000-3,000 BC), with the construction of a number of funerary and ceremonial monuments such as Neolithic long barrows (communal burial mounds) and a causewayed enclosure known as Robin Hood’s Ball. Two long earthwork enclosures known as Cursuses – the Greater and Lesser – were also built towards the end of this period.

The lengthy history of Stonehenge itself started around 3,000 BC with the construction of a circular enclosure formed by a bank and ditch, containing the 56 pits known as the Aubrey Holes. Later, stones were added to the monument c. 2,500 BC, culminating in the construction of the stone circle, the remains of which we see today.

This stone-circle phase of the monument is the one that has the most readily apparent astronomical importance, with the axis of symmetry through the Bluestone and Trilithon horseshoes, between the Slaughter Stone and its companion, and between the Heel Stone and its companion, being aligned towards midwinter sunset in one direction and midsummer sunrise in the other (Ruggles 2006). Additionally, it is clear that the Sarsen Circle and Bluestone Circle are not completely regular, and were arranged and worked to respect the solstitial alignment, particularly the Midwinter Sunset alignment (Abbott and Anderson-Whymark 2012; 18, 20–22, 25, 50–53). It may also have been significant that the rectangle of four Station Stones just outside the bank and ditch, which may pre-date the Sarsen Circle, is broadly aligned lengthways upon the most southerly possible rising position and the most northerly setting position of the moon, as well as following the main solstitial axis across its width in the perpendicular direction (Ruggles 1997: 219–220). It is interesting and almost certainly not a coincidence that the width of the Station-Stone rectangle just exceeds the diameter of the Sarsen Circle, so it is possible that these lunar alignments could have been viewed even with the Sarsen Circle in place (Ruggles 2014: 1235).

**Table 4.1.** Summary of significant astronomical alignments in the Stonehenge WHP, with reference to the sites and components that might carry the OUV of the WHP in relation to astronomy.

ATTRIBUTE OF OUV	COMPONENT	LIKELY ALIGNMENT AND DATE OF CONSTRUCTION
4. The design of Neolithic and Bronze Age funerary and ceremonial sites and monuments in relation to the skies and astronomy	Stone settings at Stonehenge (Bluestone and Trilithon horseshoes, Bluestone Circle, Sarsen Circle, Slaughter Stone and its companion, Heel Stone and its companion), and the relevant sightlines and horizons	Midwinter sunset (but could also be midsummer sunrise) c. 2500 BC
	Stonehenge Avenue (straight segment closest to Stonehenge) and the relevant sightlines and horizons	Midwinter sunset (but could also be midsummer sunrise) c. 2,300 BC
	Woodhenge and the relevant sightlines and horizons	Midwinter sunset (but could also be midsummer sunrise) c. 2,500 BC
	Southern Circle, Durrington Walls and the relevant sightline and horizon	Midwinter sunrise c. 2,500 BC
	Southern Circle Avenue, Durrington Walls and the relevant sightline and horizon	Midsummer sunset c. 2,500 BC
	Stonehenge Station-Stone rectangle and the relevant sightlines and horizons	Most southerly moonrise/ most northerly moonset and Midsummer sunrise/ midwinter sunset c. 2,500 BC

The builders dragged stones for Stonehenge weighing up to 40 tonnes, from distances up to 240km away. They engineered the monument exactly so that the midwinter sun set between the two largest stones (the great trilithon and its fallen companion), and probably between the Heel Stone and its now-lost companion, and the Slaughter Stone and its lost companion, if one were viewing this sunset from the Avenue (Fig. 4.2). The midsummer sunrise may also have been important to the original builders. Standing with their backs to the largest trilithon, and looking down the Stonehenge Avenue, they could have seen the sun rise over the horizon to the north-east. Although the summer solstice is the main focus for modern celebrations, most scholars consider it much more likely that the stones were originally used mainly at midwinter (Ferne 1994: 155–156). This view has recently been strengthened by the results of a laser-scan at Stonehenge commissioned by English Heritage in 2011 and a subsequent archaeological analysis of the results in 2012. These have revealed that much more care was taken in dressing the stones that would be visible when approaching the monument

from its Avenue: the stones in the Sarsen Circle at this point were all completely pick-dressed to remove the uneven surface. By contrast, the stones at the very “back” of the monument (for example, the outer faces of the sarsen stones on the south-west side of the circle) were not dressed or shaped with the same care and attention (Abbott and Anderson-Whymark 2012).

Part of the Stonehenge Avenue (c. 2,300 BC) is itself aligned along the main “solstitial axis” of Stonehenge (Fig 4.3), and this part is still visible as an earthwork. Excavations and recent geophysical surveys along its length (Fig. 4.4) have revealed buried linear geological features known as periglacial stripes, which might have been visible above ground during prehistory, for example through differential vegetation growth. In places, some of these stripes appear to be aligned on the solstitial axis, and the Avenue may have been built to formalise this natural phenomenon: this may be one of the reasons why the area was special to prehistoric peoples (Parker Pearson 2012: 240–248; Ruggles 2014: 1234).

Also built during this period around 2,500-2,300 BC were a number of other monuments, including Durrington Walls henge and Woodhenge, which also appear to contain solstitial alignments. Woodhenge is interesting because the solstitial alignment is manifested in the oval shape of its concentric timber rings, rather than the position of the earthwork henge entrance. A closer examination of the plan (see Fig. 4.5, left) reveals that the outer two rings (A and B) appear to be less regular in plan and have entrances that appear to match the henge entrance rather than being on the solstitial alignment. The outer rings A and B appear less regular in plan than the inner rings, and are also placed at a slight distance from them. When one considers the archaeological evidence for the post-holes, Rings A and B are variable in depth whereas the others are more consistent in their depths and dimensions. The inner four timber rings (C, D, E and F) are oval in shape and are certainly solstitially aligned. This suggests that Rings A and B are likely to be of a different date from rings C–F. While the dating evidence



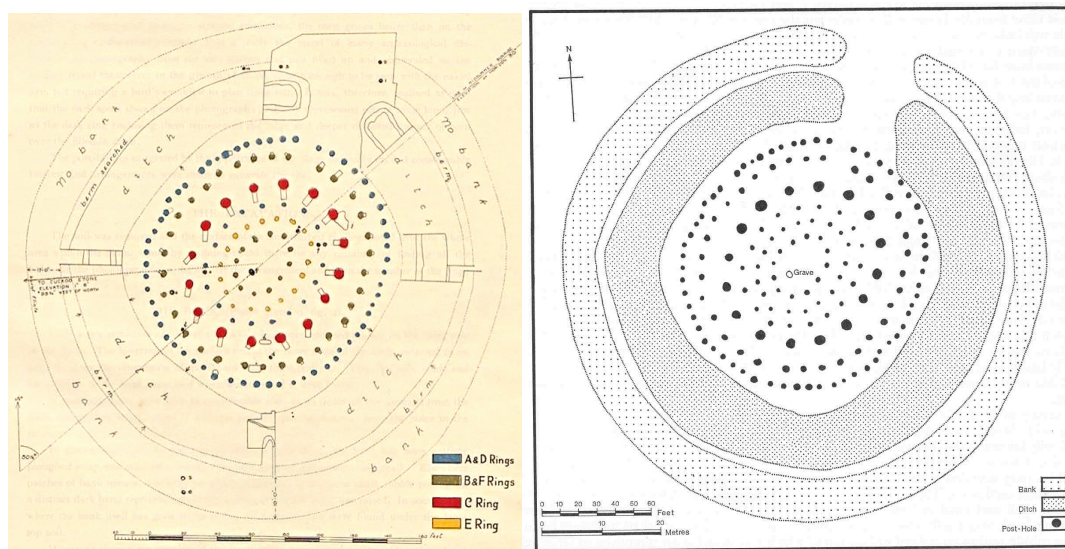
**Fig. 4.2.** The midwinter sunset at Stonehenge taken from the Stonehenge Avenue, and showing the setting winter solstice sun seen through the monument. Photograph by James O. Davies, © Historic England (Photo Library N030018)



**Fig. 4.3.** The Stonehenge Avenue is aligned on the solstitial axis. In places, periglacial stripes appear to run parallel with it – one stripe is apparently visible as a shallow linear depression just to the left of the Avenue on this photograph. © 1994 Crown Copyright, Historic England NMR 15041\_26



**Fig. 4.4.** Two views of the Stonehenge Avenue ditches under excavation, August 2013.  
Photographs by Adam Stanford, Aerial-Cam. © English Heritage



**Fig. 4.5.** Plans of Woodhenge showing the bank and ditch: **(left)** by Cunnington (1929, plate 3) and **(right)** by Wainwright & Longworth (1971, fig. 85, p. 208) (reproduced by kind permission of the Society of Antiquaries of London, © reserved)

currently available for this monument is insufficiently precise to prove this conclusively, it seems likely that there are two phases of timber rings, and that only the inner rings can be considered to be of astronomical importance.

The entrance of the Southern Circle, a set of six concentric timber rings that stood within Durrington Walls (see Fig. 4.5, right), was aligned south-eastwards towards midwinter sunrise, whereas the short Avenue (the “Southern Circle Avenue”) was approximately aligned upon (within 1.5 degrees of) midsummer sunset towards the north-west (Ruggles 2006; 2014: 1232–1233). These two solstitial directions deviate by several degrees from being opposite to each other at this location because of the high horizon to the north-west.

The remains of small houses – perhaps seasonally occupied – were discovered in 2005 around and under the henge banks of Durrington Walls. These also date to c. 2,500 BC (Parker Pearson *et al.* 2005; Parker Pearson 2007: 132–140), but appear to relate to the timber circles enclosed by the henge banks rather than to the slightly later henge earthworks. About 500 years after these henge monuments were built, many burial mounds known as round barrows were constructed, some in linear cemeteries, particularly on the tops of the ridge lines overlooking Stonehenge.

It is difficult to be precise about the uses of the many monuments within the WHP, particularly as they were sometimes in use for many hundreds of years. It is certainly the case that large numbers of monuments in the area have a funerary element to them: the long barrows and round barrows were places of burial, and Stonehenge itself was used as a cremation cemetery, with the ashes of the dead placed in the Aubrey Holes. But other monuments do not appear to have had a primary function as a place of burial. For example, Robin Hood’s Ball, the Lesser and Greater Cursus, the timber circles and the henges are more likely to have had ceremonial or meeting-place functions.

It is unclear what function the solstitial alignments at Stonehenge and other monuments in the WHP may have had. However, their significance is not in doubt and it is clear that they reflected the importance of the heavens to prehistoric peoples. Archaeologists have made various attempts to understand the cosmologies of these ancient peoples by studying these



monuments. The intentionality of the lunar alignment of the Station-Stone rectangle is much less certain, and it has been claimed that Stonehenge was also important for other solar, lunar and even stellar events, but the evidence for this is even more tenuous.

Other sites for which solstitial alignments have been claimed include Coneybury henge (SU 1344 4160) and a “new henge” discovered in 2010 by the University of Birmingham. However, the possible alignments at both of these sites are very broad and it is difficult to be sure that they were intentional; Coneybury has recently been discounted in any case (Ruggles, 2006: 17). Nor is there strong evidence that the earthwork enclosures themselves (e.g. at Woodhenge and Durrington Walls) were deliberately aligned (ibid.: 20). It has also been suggested that the Northern Circle at Durrington Walls (SU 1518 4379) may have solstitial alignments, but there is not enough evidence to consider them further. A setting of six timber postholes known as Durrington 68 (SU 1513 4325) has also been claimed to face midwinter sunrise, but this has recently been discounted (Ruggles 2014: 1233). Other monuments such as the Greater Cursus have recently been claimed to have alignments: Gaffney et al. (2012: 154) consider that there are two large pits that line up with the Heel Stone to form solstitial alignments. However, as it is also clear that there are other pits within the Cursus, and as the relevant fieldwork has not yet been fully published, it is not easy to assess these claims. None of these alignments will be considered further here, although it is possible—perhaps even likely—that other astronomical alignments and sites existed within the WHP and are waiting to be discovered.

### **3. Justification for inscription**

#### **3.c Comparative analysis**

Stonehenge WHP can and should be seen within a regional context of sites in the Neolithic and Bronze Age in north-west Europe that have astronomical alignments. These include monuments such as the Newgrange passage tomb, part of the Brú na Bóinne—Archaeological Ensemble of the Bend of the Boyne WHP ([whc.unesco.org/en/list/659](http://whc.unesco.org/en/list/659)) (Prendergast 2014: 1273–1275), and various stone circles and monuments. All seem to have had some sort of funerary or ceremonial function, although astronomical practices in domestic contexts are also noted on occasion. This is more fully discussed elsewhere (Ruggles 2010, 28–34).

The monuments of the Stonehenge WHP provide the earliest evidence in Britain or Ireland of a consistent local practice of aligning monuments with some precision upon sunrise or sunset around the solstices. This is in contrast, for example, to the solstitial orientation of Newgrange, a “one-off” alignment among the Boyne Valley tombs (see Prendergast 2014); to the very broad pattern of orientation clustered around the intercardinal directions observed among Neolithic tombs and houses in the Orkney Islands (Parker Pearson and Richards 1994); and to evidence that Early Neolithic long barrows in the Salisbury Plain area, in the vicinity of Stonehenge—which preceded the construction of the Stonehenge stone circle by about a millennium—followed a broad pattern of orientation within the sun-rising/sun-climbing arcs, between north-east and south (Ruggles 1997: 212).

#### **3.d Integrity and/or authenticity**

There is a statement of integrity and authenticity in the retrospective Statement of Outstanding Universal Value prepared for the Property in 2011 and recently adopted by UNESCO, which does set out some of the damage to astronomical alignments and sightlines. The relevant passages are quoted below:

*Integrity*

*... The presence of busy roads going through the WHP impacts adversely on its integrity. The roads sever the relationship between Stonehenge and its surrounding monuments, notably the A344 which separates the Stone Circle from the Avenue.*

*Authenticity*

*... At Stonehenge, several monuments have retained their alignment on the Solstice sunrise and sunset, including the Stone Circle, the Avenue, Woodhenge, and the Durrington Walls Southern Circle and its Avenue.*

*Although the original ceremonial use of the monuments is not known, they retain spiritual significance for some people, and many still gather at both stone circles to celebrate the Solstice and other observations ...*

We now consider these issues in more detail.

We have seen how the design of a number of monuments within the Stonehenge WHP had an astronomical significance. Some of these monuments are now largely or wholly buried and their astronomical significance is not readily apparent on the ground. Nevertheless, their remains are preserved underground and their authenticity and integrity are not affected. It is generally agreed that the solstitial alignments that form such a key element of the design at Stonehenge itself have not been impaired by intrusive modern structures, although the companions to the Heel Stone and Slaughter Stone are missing, as are some stones in the Sarsen Circle.

However, three monuments with astronomical significance have been directly damaged, all by roads. These are the Durrington Walls Avenue, the Durrington Walls Southern Circle, to which it leads, and the Stonehenge Avenue. The 200-year-old A344 road, which cut off the Stonehenge Avenue from Stonehenge itself (see Fig. 4.3), was of concern to UNESCO at the time of inscription in 1986, and the British Government promised to close the road. Happily, this took place in 2013 as part of the Stonehenge Environmental Improvements Project, and Stonehenge is once again connected with its Avenue for the first time since at least the 18th century, when the turnpike road that became the A344 was first constructed. A modern embanked road (the A345) cuts across the Durrington Walls Avenue, and also buries part of the Southern Circle. The integrity of these important monuments is badly compromised by the presence of this road.

In prehistory, one or more observers would probably have stood at an appropriate point and viewed the sun or moon appearing or disappearing behind a distant horizon at specific times of the year. Thus, clear and unobstructed sightlines and horizons are important to aid our understanding of how these monuments functioned. Although the sightlines from the six monuments listed above are generally understood, it has not always been a straightforward matter to identify the ridge-line or horizon that would have originally been used, especially where intervening woods, road embankments and/or buildings currently block the view.

Table 4.2 assesses the integrity of the astronomical components of the WHP, with the proviso that the relevant horizons are not yet fully understood. This detailed work needs to be done as part of the setting study and boundary review.

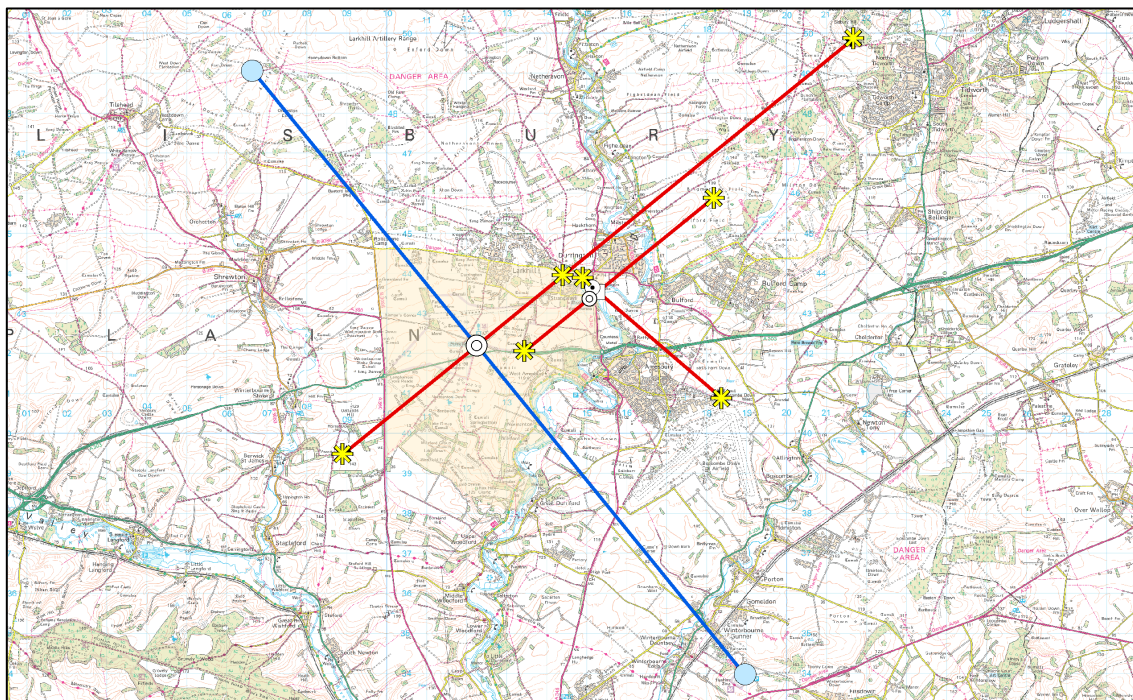
**Table 4.2.** Integrity of the astronomical components of the Stonehenge WHP.

ATTRIBUTE	COMPONENT	INTEGRITY
4. The design of Neolithic and Bronze Age funerary and ceremonial sites and monuments in relation to the skies and astronomy	Stone settings at Stonehenge (Bluestone and Trilithon horse-shoes, Bluestone Circle, Sarsen Circle, Slaughter Stone and its companion, Heel Stone and its companion), and the relevant sightlines and horizons	Generally good
	Stonehenge Avenue (straight segment closest to Stonehenge) and the relevant sightlines and horizons	Bisected for 200 years by the A344; this road was removed in 2013
	Woodhenge and the relevant sightlines and horizons	Generally good
	Southern Circle, Durrington Walls, and the relevant sightline and horizon	Partly under the large A345 road embankment
	Southern Circle Avenue, Durrington Walls and the relevant sightline and horizon	Partly under the large A345 road embankment
	Stonehenge Station-Stone Rectangle and the relevant sightlines and horizons	Generally good

***The integrity of sightlines within the Stonehenge WHP***

In assessing the integrity of these sightlines today, we make the assumption that they were largely kept clear in the Neolithic and Bronze Age, so that the monuments could be used in the way in which we presume they were used, with the sun or moon rising or setting behind distant horizons visible from the monuments themselves. The sightlines are shown in Figs. 4.6 and 4.7. For a summary of the integrity of astronomical sightlines within the Stonehenge WHP, see Table 4.3.

*Sightline from Stonehenge looking south-west (midwinter sunset).* There is a growing consensus that the midwinter sightline was more important than the midsummer one, as discussed in Section 2b above. Today the integrity of this sightline, and its intermediate ridge-lines and final horizon, is marred. Looking out from Stonehenge, the first problem is the A303 (0.5 km), which runs relatively close to the monument, and presents a considerable visual and noise intrusion to this alignment. Moving further south-west, the round barrow known as the Sun Barrow—which is on the alignment and on the Normanton Down ridge line—is intact (0.9 km), but the sightline then quickly runs into the plantation known as Normanton Gorse (1.1 km), which obscures it. Still further south-west is another plantation known as The Diamond (2.2 km), before the alignment continues towards the place that would form the visible horizon from Stonehenge in the absence of intervening vegetation, a hill WNW of Druid's Lodge to the west of the A360 road (and outside the WHP) (4.4 km). This horizon is also obscured by yet another plantation, at The Park. The sightline appears to end just to the north of a much later Iron Age/Romano-British oval enclosure, probably a settlement, which is situated near the hilltop. It is difficult to determine the exact place because the various obstructions mean that we must rely upon computer modelling.



**Fig. 4.6.** Astronomical sightlines at Stonehenge World Heritage Site and the surrounding area, with their end-points on horizons. These should be treated as indicative rather than necessarily exact. The WHS area is shaded in yellow. Produced by Nick Hanks, Historic England, February 2015. © Crown Copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 100024900

The Stonehenge Avenue looking south-west (midwinter sunset) shares the same alignment, and the same issues apply regarding its integrity. On the initial approach towards Stonehenge along the Avenue from the “elbow” at Stonehenge Bottom, Stonehenge itself forms the horizon; the more distant landscape only appears during the final stages of the approach.

*Sightline from Stonehenge looking north-east (midsummer sunrise).* The A344 has now been closed to traffic and, once the grass has regenerated, visitors will be able to walk uninterrupted from Stonehenge to its Avenue for the first time in centuries. The integrity of this sightline is good for 1.7km until it hits the line of trees to the immediate north of the Cursus which obscure it (these were planted to screen the view of the Steel Houses from Stonehenge). Further to the north-east, by good fortune it avoids buildings within the Larkhill Garrison (although not some garrison roads), and its final horizon is probably the ridge along which the Packway road runs (3.0 km). Alternately, it may continue into the Salisbury Plain Training Area, with the visible horizon formed by a ridge just to the south of Sidbury Hill hillfort, some 12km from Stonehenge. It is difficult to check which ridge forms the final horizon because of the Cursus Northern Plantation, which compromises all views further to the north-east: again, computer modelling is needed.

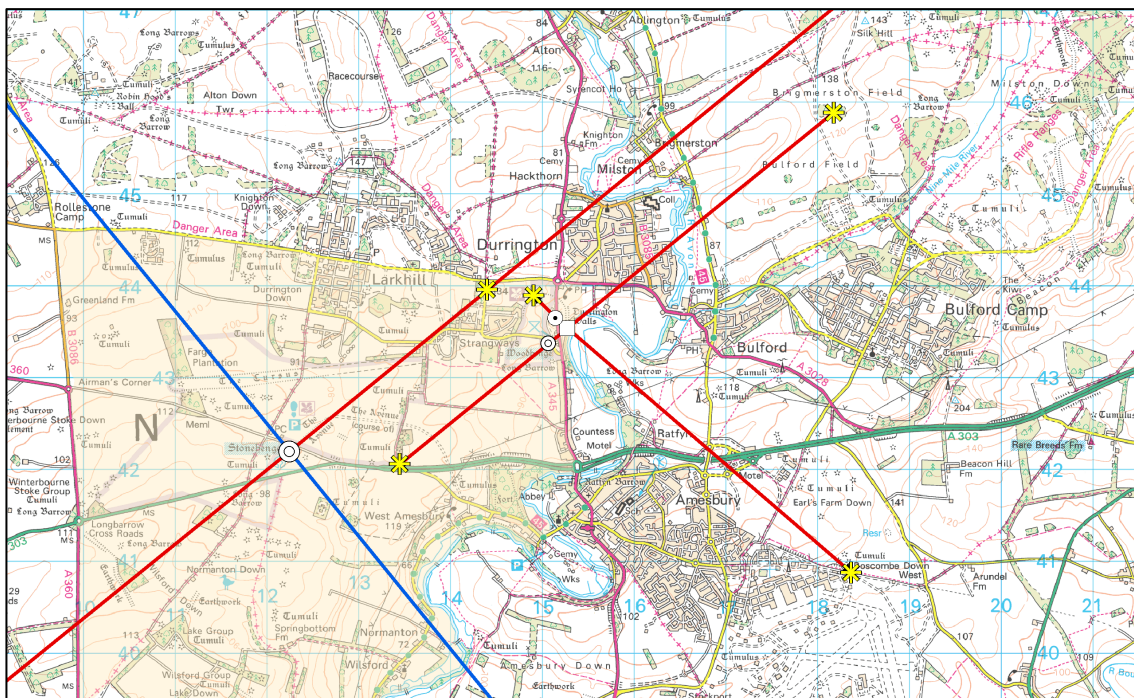
The Stonehenge Avenue looking north-east (midsummer sunrise) shares the same alignment, and the same issues apply regarding its integrity.

*Sightlines from the Stonehenge Station-Stone rectangle looking south-east (southernmost moonrise).* (This is assessed as a single line in the landscape, not two parallel lines.) Today the integrity of this sightline, and its intermediate ridge lines and final horizon, is marred. Looking out from Stonehenge, the first problem is the A303 (0.2km), which runs relatively close to the

monument, and presents a considerable visual and noise intrusion to this alignment. Further south-east, it is obscured by the Luxenborough Plantation (1.0 km), which obscures the first ridge line it hits at Coneybury Hill. The alignment continues over the Avon Valley and outside the WHP boundary. It just misses the Field Barn Buildings (4 km) on the east side of the Avon, but is further obscured by the Cocked Hat plantation (5 km), which lies near another ridge line on which the A345 runs. After crossing the A345 (where there is some new planting which will also grow and obscure the line more in future), the alignment runs as far as the chalk ridge on which the hillfort of Figsbury Ring sits (10.5 km), where its original horizon was probably located (but passing just north of Figsbury Ring itself, and to the south of the highest point of the ridge). Again, computer modelling is needed to construct the exact sightlines, as the obstructions make it difficult to check on the ground, but the view back from Figsbury Ring into the WHP is helpful.

*Sightlines from the Stonehenge Station-Stone rectangle looking north-west (northernmost moonset).* (This is assessed as a single line in the landscape, not two parallel lines.) This sightline has relatively good integrity for some distance. The A344 has been closed, and from Stonehenge the alignment runs north-west through the WHP to the Lesser Cursus ridge-line, then runs outside the WHP into the Salisbury Plain Training Area with few interruptions. It is obscured by the caravan park at the Bustard Inn (5 km), and its final horizon may have been the ridge at Westdown Artillery Range (12 km), subject to confirmation by computer modelling.

*Sightline from Woodhenge looking north-east (midsummer sunrise).* This is a relatively well-preserved alignment. Although it runs through groups of buildings in the village of Durrington, these are relatively low-lying and do not obscure it. The final horizon appears to be outside the WHP at Silk Hill in the Salisbury Plain Training Area (5.3 km).



**Fig. 4.7.** Astronomical sightlines at Stonehenge, Woodhenge, and Durrington Walls Southern Circle and Avenue. These should be treated as indicative rather than necessarily exact. The WHS area is shaded in yellow. Produced by Nick Hanks, Historic England, February 2015. © Crown Copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 100024900

**Table 4.3.** Summary of the integrity of astronomical sightlines within the Stonehenge WHP.

	<b>Sightline (alignment)</b>	<b>Integrity</b>	<b>Horizon</b>
1	Stonehenge looking south-west (midwinter sunset)	Line obscured by A303 and several plantations.	Probably hill ~1km to WNW of Druid's Lodge (4.4 km).
2	Stonehenge looking north-east (midsummer sunrise)	A344 now closed, but line obscured by a plantation and the Packway road.	Packway ridge (3.0 km) or Sidbury Hill, south of hillfort (12 km). The latter intact, the former obscured.
3	Stonehenge Avenue looking south-west (midwinter sunset)	Line obscured by A303 and several plantations.	Probably hill ~1km to WNW of Druid's Lodge (4.4 km).
4	Stonehenge Avenue looking north-east (midsummer sunrise)	A344 now closed, but line obscured by a plantation and the Packway road.	Packway ridge (3.0 km) or Sidbury Hill, south of hillfort (12 km). The latter intact, the former obscured.
5	Stonehenge Station-Stone rectangle looking south-east (southernmost moonrise)	(This is assessed as a single line in the landscape, not two parallel lines). Line obscured by A303 and several plantations.	Probably the ridge line on which Figsbury Ring hillfort sits (10.5 km). Intact.
6	Stonehenge Station-Stone Rectangle looking north-west (northernmost moonset)	(This is assessed as a single line in the landscape, not two parallel lines). Relatively good for several km.	Probably Westdown Artillery range (12 km). Intact.
7	Woodhenge looking north-east (midsummer sunrise)	Relatively good for several km.	Silk Hill (5.3 km). Intact.
8	Woodhenge looking south-west (midwinter sunset)	Good.	Probably King Barrow Ridge (2.0 km). Exact point obscured by trees.
9	Southern Circle, Durrington Walls, looking south-east (midwinter sunrise)	Destroyed by A345 embankment.	Earl's Farm Down ridge (4.2 km). Intact.
10	Southern Circle Avenue, Durrington Walls, looking north-west (midsummer sunset)	Destroyed by A345 embankment.	Durrington Walls henge banks (0.7 km). Intact.

*Sightline from Woodhenge looking south-west (midwinter sunset).* This is a relatively well-preserved sightline as far as its horizon, which is probably at King Barrow Ridge (2.0 km), which sits slightly higher than Woodhenge. It is difficult to be precise about this because today there are numerous trees on the ridge that forms the horizon, together with the Stonehenge Cottages and also the New King Barrows themselves, although the sightline is well preserved up until this point. If the alignment continued, it would eventually hit the Lake Barrow Group (5 km).

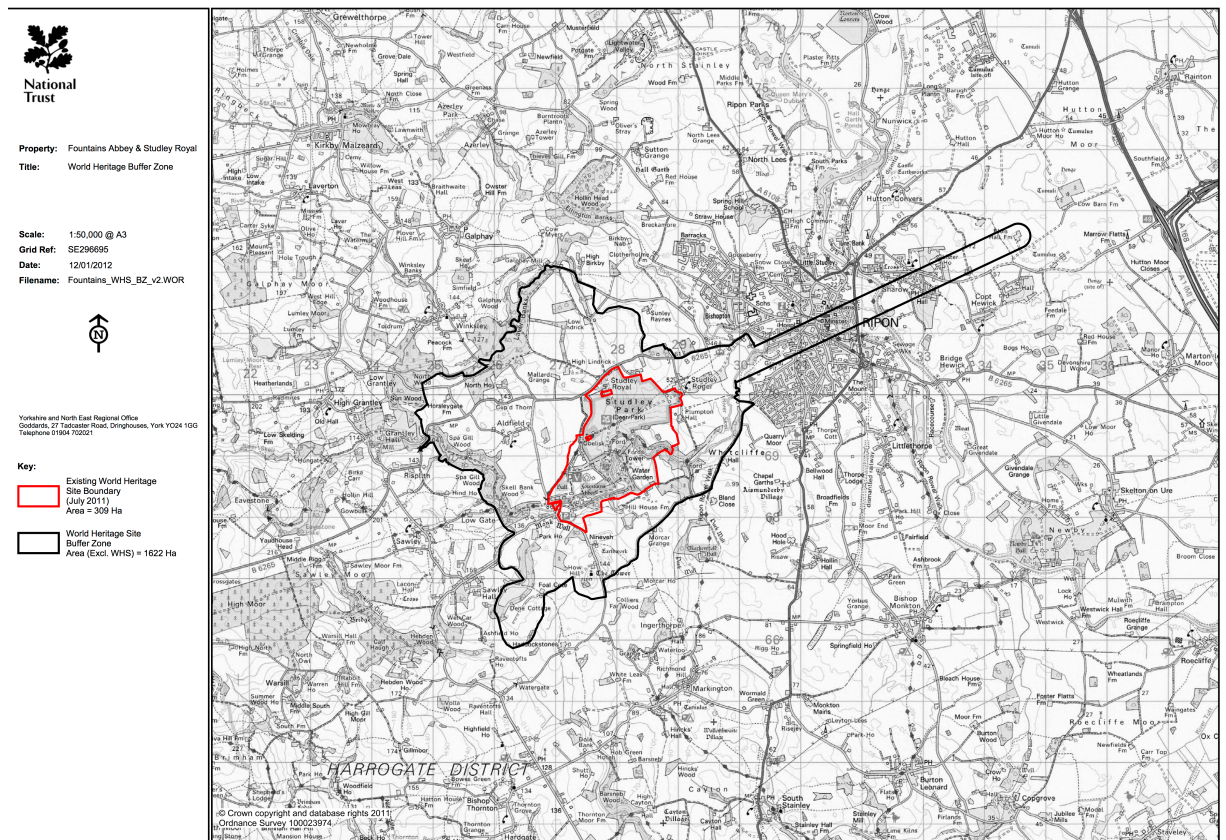
*Sightline from the Southern Circle, Durrington Walls, looking south-east (midwinter sunrise).* This is wholly destroyed by the embankment of the A345, which sits over half the monument. If it were not destroyed, the alignment would swiftly run south-east outside the WHP over the Avon Valley and into the modern industrial development of Solstice Park (whose name is coincidental). The horizon for this alignment is the Earl's Farm Down ridge (4.2 km), near to

round barrow group SM 28925 and Bowl Barrow SM 28946. Despite much development in this area, this horizon appears to be intact, with large modern buildings currently sitting below it.

*Sightline from the Southern Circle Avenue, Durrington Walls, looking north-west (midsummer sunset).* This is wholly destroyed by the embankment of the A345, which sits over part of the Avenue, severing the Avenue from the Southern Circle. If the road were not there, the horizon for this sightline would be the north-westerly banks of Durrington Walls henge (0.7 km).

**The integrity of sightlines and the boundary of the Stonehenge WHP**

It is recommended here that the minor boundary review and setting study for the WHP (see Section 1.e), and any for a buffer zone, should also consider the solstitial alignments of those monuments that are known to have had them, to ensure that the relevant and appropriate horizons and sightlines are taken into account within any new boundary or future buffer zone. This will probably require some computer modelling (which should be done using topographic modelling excluding vegetation and buildings) and ground-truthing by field observation and measurement as required. We know that not all the relevant horizons and sightlines are captured within the existing boundary, but this needs to be checked in detail. Any extensions needed should fall within the scope of a minor boundary review (UNESCO 2011: paras 163–4), because UNESCO’s Statement of Outstanding Universal Value (OUV) for Stonehenge already recognises its astronomical importance, or could come within the scope of a new buffer zone, as at Studley Royal and Fountains Abbey WHP ([whc.unesco.org/en/list/372](http://whc.unesco.org/en/list/372))—see Fig. 4.8.



**Fig. 4.8.** The UNESCO-adopted Fountains Abbey buffer zone, which includes a (non-astronomical) sightline. © National Trust.

### 3.a Potential criteria under which inscription might be proposed

Stonehenge is inscribed under three criteria (using the definitions current in 1985/6):

- Criterion (i): It represents a unique artistic achievement, a masterpiece of human creative genius.
- Criterion (ii): It has exerted great influence, over a span of time or within a cultural area of the world, on developments in architecture, monumental arts or town planning and landscaping.
- Criterion (iv): It bears a unique or at least exceptional testimony to a civilization that has disappeared.

These are fully set out in the UNESCO Statement of Outstanding Universal Value for Stonehenge. It is additionally considered that Stonehenge might meet two more criteria with respect to its astronomical importance:

- *Criterion (iv): “be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history”.*

The most famous elements at Stonehenge – the Stone Circle and Stone Settings – were built c. 2,500 BC, and are the first elements of the monument that can definitely be considered to have astronomical importance. This date is on the cusp of a major technological change in Southern Britain, at the very end of the Neolithic and the start of the Chalcolithic or Copper Age (c. 2,500 BC to c.2,200 BC). It may be significant that the date of an apparent change in ritual behaviour associated with astronomy is also the date of the introduction of metals to the country. The other monuments of astronomical importance in the Stonehenge WHP also appear to date to the Chalcolithic period, and this surely is no coincidence.

- *Criterion (vi): “be directly or tangibly associated with events or living traditions, or with beliefs, with artistic and literary works of outstanding universal significance”.*

The influence of Stonehenge on a variety of people is already recognised in Attribute 7 (Young, Chadburn and Bedu 2009: 28): “the influence of the remains of Neolithic and Bronze Age funerary and ceremonial monuments, and their landscape settings on architects, artists, historians, archaeologists and others”. This attribute would sit better under Criterion (vi), than with the existing three criteria.

### 3.b Suggested statement of outstanding universal value

There is already a Statement of Significance, agreed by UNESCO in 2008 (quoted in full in Young, Chadburn and Bedu, 2009: 26-7). A retrospective Statement of Outstanding Universal Value (SOUV) was prepared for the Property by the State Party in 2011 and has been approved by UNESCO. The relevant parts of that SOUV in relation to astronomy are quoted here and elsewhere (see Integrity and Authenticity [above] and Protection and Management [below]):

#### **Statement of Significance**

*The Stonehenge, Avebury and Associated Sites WHP is internationally important for its complexes of outstanding prehistoric monuments...*

*They provide an insight into the mortuary and ceremonial practices of the period, and are evidence of prehistoric technology, architecture and astronomy...*

*The complexes of monuments at Stonehenge and Avebury provide an exceptional insight into the funerary and ceremonial practices in Britain in the Neolithic and Bronze Age. Together with their settings and associated sites, they form landscapes without parallel.*

*The design, position and inter-relationship of the monuments and sites are evidence of a wealthy and highly organised prehistoric society able to impose its concepts on the environment. An outstanding example is the alignment of the Stonehenge Avenue (probably a processional route) and Stonehenge stone circle on the axis of the midsummer sunrise and midwinter sunset, indicating their ceremonial and astronomical character...*



## **4. Factors affecting the property**

### **4.a Present state of conservation**

The present state of the monuments is generally good, although the integrity of some monuments is compromised as set out above. The WHP generally still has sites “at risk” due to the plough, and the increasing numbers of burrowing animals, particularly the badger, which is legally protected. The sites of astronomical importance listed above are in permanent grassland and are well cared for by their relevant owners. However, it is possible that some as-yet-undiscovered sites may be at risk from the plough or from burrowing.

The night sky is compromised in some places owing to lights from cars on the roads, street lights, housing, and Larkhill Garrison, Amesbury town and Durrington village. Although the dark skies are not part of the WHP, it is considered important to try and preserve the dark-sky setting for these monuments, as this is how they would have originally been viewed.

### **4.b.i Developmental pressures**

There are strong policies in local and national plans (set out in Section 1e above) to protect the WHP from adverse development. However, there is still the potential for adverse effects, particularly from lighting spill. Recently planning applications have started to take the dark skies into consideration, but some damage in and around Larkhill Garrison has already been done.

Unless the relevant horizons and sight-lines are known for the sites of astronomical importance, it may be possible that some future development may adversely affect these. It is therefore essential to identify these as soon as possible.

### **4.b.ii Environmental pressures**

Stonehenge and other monuments are vulnerable to erosion from natural processes such as weathering. However, natural processes do not appear to have markedly changed them, and the fact that there is such a well-preserved colony of lichens on the Stones suggests that the air is very clean and that emissions are not a problem. Light pollution from the neighbouring military settlements and installations at Larkhill and Boscombe Down are more of a problem. The dark skies which once existed in prehistory are often difficult to see today because of light spillage from these areas.

### **4.b.iii Natural disasters and risk preparedness**

There are risk management plans written for Stonehenge. The WHP property is at a very low risk for flooding and hurricanes, and an even lower one from such natural disasters as earthquakes etc.

### **4.b.iv Visitor/tourism pressures**

Stonehenge monument is visited by over a million paying visitors each year, not including those visiting at the summer solstice, but this does not adversely affect its astronomical importance. The centre of the monument is not available for general visiting, but only for small numbers via the “Stone Circle Access” scheme which runs before and after the normal opening hours.

### **4.b.v No. of inhabitants**

There are some local inhabitants, particularly in and around Larkhill Garrison and the Countess Road, Amesbury, and also the villages in the southern parts of the WHP including Lake and West Amesbury.

## 5. Protection and management

There is a statement of protection and management requirements in the Statement of Outstanding Universal Value for the Property. The relevant passages are:

### *Protection and Management Requirements*

*.... At the time of inscription, the State Party agreed to remove the A344 road to reunite Stonehenge and its Avenue and improve the setting of the Stone Circle. The impact of roads and traffic and the need to improve visitor facilities remain the biggest challenge.*

### 5.a Ownership

The WHP is a living landscape in multiple ownership. Much of it is in private hands, and most of it is farmland. However, a large part of the WHP is now owned or managed by conservation bodies, although no single body has overall responsibility for the whole WHP. The National Trust owns 827 hectares in the northern and central parts of the WHP. Part of the WHP is owned by the Ministry of Defence, where it forms part of Larkhill military garrison, and additionally, at Amesbury, Durrington and the Woodford Valley, there are a number of private houses within the WHP.

Stonehenge itself is owned by the State Party and in the care of English Heritage, a charity that cares for the National Heritage Collection of more than 400 historic properties and their collections.

### 5.b Protective designation

The Stonehenge WHP is protected as a WHP, which is a “material consideration” in UK planning law, and many individual elements within it are also protected by law. For example, there are 180 scheduled monuments which include over 415 archaeological sites and monuments within the scheduled areas, which are all protected by the 1979 Ancient Monuments and Archaeological Areas Act. There are also various listed buildings, registered parks and gardens and conservation areas within the WHP.

### 5.c Means of implementing protective measures

The Property is managed by multiple owners, although there is the Stonehenge WHS Management Plan 2009, which sets out main, agreed overall goals for managing the WHP, and a Stonehenge World Heritage Committee (comprising key stakeholders) who oversee this management framework (Young, Chadburn and Bedu 2009). A new Management Plan was published in 2015 (Simmonds and Thomas 2015).

The legally protected archaeological sites and listed buildings and other heritage assets are protected through the UK’s spatial planning system and specific heritage laws. These are administered by relevant planners, conservation officers and archaeologists in local government and Historic England, the national state heritage agency. Further details are set out in section 4.0 of the Stonehenge WHS Management Plan 2009 (Young, Chadburn and Bedu 2009, 37-41).

### 5.d Existing plans

See Young, Chadburn and Bedu 2009; Simmonds and Thomas 2015.

### 5.e Property management plan

See Young, Chadburn and Bedu 2009; Simmonds and Thomas 2015.

### 5.f Sources and levels of finance

Various stakeholders set out in the Stonehenge WHS Management Plan 2009 (Young, Chadburn and Bedu 2009; Simmonds and Thomas 2015) contribute towards the repair and maintenance of the Property.

### **5.g Sources of expertise and training**

Historic England, English Heritage, the National Trust and Wiltshire Council all employ archaeologists to advise on the WHP and its monuments.

### **5.h Visitor facilities and infrastructure**

English Heritage opened a new Stonehenge Visitor Centre in 2013 which has educational facilities and an interpretation centre with museum objects. Interpretation has also been improved at various sites around the landscape including Durrington Walls and Woodhenge. There is a café, shop, car and coach park, and all the usual facilities one would expect to find.

### **5.i Presentation and promotion policies**

A new Visitor Centre was opened in 2013, as above. The WHP is not actively promoted because visitor numbers are so high anyway.

### **5.j Staffing levels and expertise**

The main stakeholders (e.g. Historic England, English Heritage, the National Trust and Wiltshire Council) all employ appropriate numbers of staff, although there is always room for improvement. There is a dedicated Stonehenge WHS Coordinator funded by Historic England, and employed in the World Heritage Site Coordination Unit at Wiltshire Council.

## **6. Monitoring**

### **6.a Key indicators for measuring state of conservation**

With regard to astronomy, these are not all yet in place. Although the sites are directly protected, their sightlines and horizons are not yet fully understood, and are therefore not yet fully protected. For this reason we append the discussion in Appendix I.

### **6.c Results of previous reporting exercises**

Two Periodic Reports have been prepared for the Property (2005-6 and 2012-14), of which the main recommendations in relation to astronomy were those to close the A344. This has now been undertaken. See

<http://whc.unesco.org/archive/periodicreporting/EUR/cycle01/section2/373-summary.pdf>

## **7. Documentation**

### **7.b Texts relating to protective designation**

1979 Ancient Monuments and Archaeological Areas Act.

<http://www.legislation.gov.uk/ukpga/1979/46>

Stonehenge WHS Management Plan 2009.

<http://www.stonehengeandaveburywhs.org/assets/Full-MP-2009-low-res-pdf.pdf>

Stonehenge and Avebury WHS Management Plan 2015.

<http://www.stonehengeandaveburywhs.org/management-of-whs/stonehenge-and-avebury-whs-management-plan-2015/>

### **7.c Most recent records or inventory**

Held by the local Historic Environment Record of Wiltshire Council, and the archives and GIS of Historic England.

### 7.d Agencies holding inventory records

Stonehenge and the key monuments of the WHP are prehistoric and so, by definition, there is no surviving original documentation relating to them. However, there are a number of important museum and archive collections relating to the WHP, most notably at Salisbury and South Wiltshire Museum and Wiltshire Heritage Museum in Devizes, where a number of antiquarian archives are housed, along with important finds from the WHP. There are also very important collections of data in the Wiltshire and Swindon History Centre (including the Wiltshire Sites and Monuments Record), the National Monuments Record of Historic England and The National Archives.

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## APPENDIX I

### The management of astronomical values – how can this be achieved in practice?

Table 4.4 below sets out a possible way of monitoring the astronomical values, and potential OUV, of the Stonehenge WHP, with two worked examples. Unless the components of each attribute are identified fully, one cannot monitor them, nor ensure they are taken into account in planning and development. Possible impacts also need to be fully identified. Each component is not only directly vulnerable: its setting can also be damaged, particularly its horizons and sightlines. If these are obscured by trees or buildings, this can damage the astronomical importance of the site in question.

The main action needed now is to ensure that these horizons are captured within the boundaries of the WHP or a Buffer Zone, and are fully understood by the WHP’s managers, curators and by local planners.

Each relevant sightline and horizon needs to be identified. When this is done, barriers and obstructions on the sightlines, and preventing a clear view along them, need to be specifically identified. These might include trees and buildings. Ideally, all the monuments of astronomical importance should have the relevant sightlines and horizons clear, allowing visibility as it was presumably originally intended. Recommendations for action and management need to be made on a case-by-case basis, once there is a full and detailed understanding of the impacts. Some barriers, e.g. scrub, may be easy to remove and manage. Other impacts, particularly roads (e.g. the A303 and A345) may be difficult or impossible to remove, although we have already noted that the A344 has been closed and is being returned to grass.

Assuming that these were once largely clear in the Neolithic and Bronze Ages, it is important to try and ensure that the sightlines are as clear as possible today. All plans should ensure that no further planting or development takes place along them. Consideration should be given to cutting view-lines through plantations to maintain the alignments unless there are reasons for retaining them (e.g. the screening of buildings), and any Woodland Strategies for the WHP should consider the alignments and how best to manage them.

**Table 4.4.** Suggested way of monitoring the astronomical values, and potential OUV, of the Stonehenge WHP: two worked examples.

Attribute	Component	Impacts, e.g.		
		On sightlines and horizons	Direct impacts (e.g. development, agriculture, burrowing animals)	From lighting
4. The design of Neolithic and Bronze Age funerary and ceremonial sites and monuments in relation to the skies and astronomy	Stonehenge (Bluestone and Trilithon horseshoes, Bluestone Circle, Sarsen Circle, Slaughter Stone and its companion, Heel Stone and its companion), and the relevant sightlines and horizons	<b>A303.</b>  Recommended action: remove road from surface	<b>Visitor erosion.</b>  This is already carefully managed	<b>Vehicle headlights on A303.</b>  Recommended action: remove road from surface
	Stonehenge Avenue and the relevant sightlines and horizons		<b>Part of the Avenue (not the aligned part) is under the plough.</b>  Recommended action: remove it from arable	<b>Lights at Larkhill.</b>  Recommended action: explore removing lights and reducing light spill

The roads and buildings that exist along alignments today are a difficult issue. Although the A344 has been closed to great effect, the A303 remains a major problem for some of these sightlines and a road tunnel would be an excellent solution. On 1 December 2014, the British Government announced that it would invest in a fully-bored tunnel of at least 2.9km to remove part of the A303 road from the Stonehenge WHP. At Durrington Walls, the A345 embankment is extremely damaging, and the only obvious physical solution (short of closing the road and redirecting it elsewhere, which would be very difficult to achieve) is that a pedestrian underpass is built along the solstitial alignment through the embankment. This would have the effect of visually linking the Southern Circle and its Avenue once more. However, this would be very expensive, and with two different landowners on either side of the road and currently no public access, would be problematic to achieve. At present, the best we can do is to improve interpretation and intellectual access, and this should be prioritised.

The alignments should be protected via future WHS management plans, policies in spatial planning documents, and consideration should be given to extending the WHP boundaries where appropriate, or managing them via a Buffer Zone (as at Studley Royal and Fountains Abbey WHP ([whc.unesco.org/en/list/372](http://whc.unesco.org/en/list/372))).