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Stonehenge Environmental Improvements Project

Assessment Report on Archaeological Mitigation

Planning ref: S/2009/1527/FULL
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archaeology

Stonehenge Environmental Improvements Project
Assessment Report on Archaeological Mitigation

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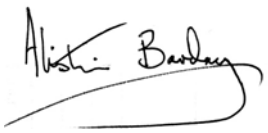
V03	E	ABP	AJB		6.02.15
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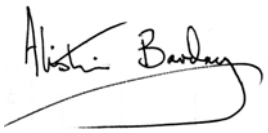
V04	E	ABP	AJB		31.03.15
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Summary

Wessex Archaeology was commissioned by Vinci Construction on behalf of English Heritage to undertake a programme of archaeological work during the groundworks associated with the Stonehenge Environmental Improvements Project, including excavation, watching briefs, historic building recording, and monitoring during the relocation of the Grade II Listed Airman's Cross memorial and an adjacent unlisted milestone.

The archaeological excavation during the removal of the A344 road adjacent to Stonehenge revealed short lengths of the Stonehenge Avenue ditches, and a part of the outer edge of the ditch that encircles the Heel Stone. These features appear not to have been significantly truncated during the road's construction, and the excavation of slots through them largely confirmed the results obtained from previous excavations, in particular the observations by the Vatchers of the Avenue ditches in a trench to the immediate north of the road, and by Pitts, of the southern Avenue ditch and the Heel Stone ditch in a trench to the immediate south. No traces of the Avenue's internal banks survived, although these were reflected in the ditches' fill profiles. A small assemblage of worked flint was recovered from through the ditch's fills, and small pieces of Bluestone, and one of Sarsen, were recovered from their upper fills.

A large oval feature was exposed on the west side of the A360, approximately 110 m south of Airman's Corner. A slot cut through it revealed a sequence of fills, including layers of burnt soil the lowest of which provided a radiocarbon date of cal AD 1655–1955. The feature is interpreted as a possible quarry, perhaps to provide bank material for the post-medieval square embanked pond on the other side of the road. The burning event, which occurred after the feature had partly silted up, may have involved the burning of turves to provide fertiliser for the cultivation of former pasture, a process known in Wiltshire as 'burnbaking'. A number of *Burnbake* field names are recorded on historic mapping in the Stonehenge landscape.

The old visitor facilities and structures at Stonehenge were subject to Level 1 building recording prior to their demolition. The Grade II listed Airman's Cross memorial, which commemorates the first fatal military aviation accident, on 5th July 1912, was photographed *in situ* and during lifting, as was the adjacent unlisted milestone.

The results of the excavation of the sections through the Heel Stone ditch and the Avenue ditches have the potential to provide a fuller picture of these features, while largely confirming the results from previous observations in the immediately adjacent trenches. Their importance within the context of Stonehenge means that these results are considered to be of considerable significance, and therefore merit detailed publication, placing them in the context of previous findings. It is recommended that an article be submitted for publication in the *Wiltshire Archaeological and Natural History Magazine*. This will include a description the burnbake feature, and discuss its significance within the context of documentary and cartographic evidence.

Acknowledgements

This project was commissioned by Vinci Construction UK Limited on behalf of English Heritage, and Wessex Archaeology is grateful to Nigel Adams and Simon Clarke in this regard.

Wessex Archaeology would also like to thank the Stonehenge Archaeological Working Committee who provided technical expertise during the course of the project and monitored the fieldwork undertaken, and included Claire King (Assistant County Archaeologist) and Melanie Pomeroy-Kellinger (County Archaeologist) who monitored the project on behalf of Wiltshire Council, Martin Harvey (Project Development Manager), Dr Heather Sebire (Property Curator West) and Phil Mcmahon (Inspector of Monuments) at English Heritage, and Dr Nicola Snashall, Archaeologist for the National Trust. Wessex Archaeology would like to thank the Royal Engineers who lifted and cleaned the Airman's Cross memorial.

The project was managed for Wessex Archaeology by Sue Farr and Alistair Barclay. The fieldwork was directed by Oliver Good (up to 2014) and Lorrain Higbee (2014 onwards), assisted by Tom Blencowe, Daniel Connor, Ben Cullen, Peter Fairclough, Angus Forshaw, Phil Harding, Dave Murdie John Powell, Matt Kendall, Piotr Orczewski, Sian Reynolds, Tom Wells and Steve Winterton. Geoarchaeological advice was provided by Dave Norcott and Nicki Mulhall. The building recording was undertaken by Grace Flood and Matt Rous. Conservation advice was provided by Lynn Wootten.

This report was compiled by Andrew Powell and Sue Farr, with contributions by Lorrain Higbee and Oliver Good (fieldwork), Grace Flood and Matt Rous (building recording), Phil Harding and Rob Ixer (stone), Matt Leivers (worked flint), Lorraine Mepham (other finds), Lynn Wootten (conservation), and Sarah Wyles and Alistair Barclay (environmental evidence and radiocarbon dating). The illustrations were prepared by Nancy Dixon and Rob Goller. The revised report was compiled by Andrew Powell and Alistair Barclay.

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology was commissioned by Vinci Construction UK Ltd, on behalf of English Heritage and with the approval of the National Trust to undertake a programme of archaeological mitigation and historic building recording during the groundworks associated with the Stonehenge Environmental Improvements Project, Wiltshire, (Fig. 1) which comprised the following principal elements:

- *construction of the new Stonehenge Visitor Centre, with car and coach parking at Airman's Corner, and a visitor transit system along the former A344;*
- *construction of a new roundabout junction of the A360, B3086 and former A344 at Airman's Corner, including realignment of the B3086 to its original (pre-1964) route, and the relocation of the Grade II Listed Airman's Cross memorial, and an unlisted milestone;*
- *decommissioning and removal of the existing visitor facilities and car park at Stonehenge, leaving only a minimal operations facility and emergency toilets;*
- *and the decommissioning and landscaping of the A344 between Byway 12 and Stonehenge Bottom, and reconfiguration of the A303(T)/A344 junction.*

1.1.2 The likely impacts of the development on the historic environment and archaeology were assessed in an Environment Statement (English Heritage 2009), and planning permission and Listed Building Consent (planning reference: S/2009/1527/FULL) were granted by Wiltshire Council on 23rd June 2010 subject to a condition requiring a programme of archaeological works to be undertaken. Scheduled Monument Consent (SMC S00052419 and S00031192) was granted for works affecting Stonehenge and the Avenue (SM 10390) and the Bell Barrow (East of Stonehenge, SM 10371). Much of the work along the A344, and the works in and immediately adjacent to the old visitor centre, were carried out on National Trust land, and under a National Trust Archaeological Agreement.

1.1.3 A Written Scheme of Investigation (WSI) setting out the archaeological mitigation strategy was approved by Wiltshire Council, the English Heritage Lead Advisor for the Stonehenge & Avebury WHS and the National Trust Archaeologist for the Stonehenge & Avebury World Heritage Site (Wessex Archaeology 2012a). The WSI described the methodologies for recording during the archaeological mitigation, and the subsequent post-excavation assessment, analysis and reporting. The fieldwork reported here was carried out between July 2012 and December 2014; additional works remained to be monitored during 2015 and will be the subject of a supplementary report.

1.1.4 During the watching brief, a large feature containing burnt deposits of uncertain date and nature, was exposed south of Airman's Corner. An addendum to the original archaeological mitigation strategy was requested by English Heritage and Wiltshire Council, describing how it should be further excavated (Wessex Archaeology 2012b).

1.1.5 Method statements were also approved for the dismantling, storage, conservation treatment and relocation of the Airman's Cross memorial, as required by Listed Building Consent condition 4 (Wessex Archaeology 2012c), and the relocation of an unlisted milestone at Airman's Corner (Wessex Archaeology 2012d). The Airman's Cross was lifted on 25th June 2012.

1.2 Site location, topography and geology

1.2.1 Two main areas were subject to the archaeological monitoring – that associated with the construction of the new Visitor Centre south-east of Airman's Corner (Phase 1 and 2) centred on NGR 409845 142921 (Fig. 2), and that adjacent to Stonehenge and the old visitor facilities to its immediate south-east centred on NGR 412234 142278) (Fig. 3). Most of the works fell within the boundary of the Stonehenge, Avebury and Associated Sites World Heritage Site (WHS), which at the west follows the line of the A360 and B3086.

1.2.2 The site occupies undulating ground between approximately 95 m and 110 m above Ordnance Datum (aOD). At the north-west, the new Visitor Centre at Airman's Corner is sited within a dry valley that runs south-west towards the River Till. At the south-east, the old visitor facilities and adjacent length of the A344, lies on the north-facing slope of Stonehenge Down, above a dry valley that runs east into a larger dry valley in Stonehenge Bottom.

1.2.3 The underlying geology is Seaford Chalk Formation (Upper Chalk), with Head (coombe deposits) in the bases of the dry valleys (British Geological Survey on-line viewer).

1.3 Scope of document

1.3.1 This report provides a summary of the results of the archaeological mitigation undertaken and presents proposals for the subsequent preparation of an academic report commensurate with the significance of the data recovered. It also presents proposals for the subsequent archiving of the project.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Introduction

2.1.1 An archaeological desk-based assessment was undertaken by English Heritage to consider the archaeological potential of five areas put forward for public consultation for the site for the new Visitor Centre (Leary 2008): Area V, the existing visitors car park and facilities at Stonehenge; Area W, at Durrington Down Farm, south of Larkhill; Area X, at Fargo, west of Stonehenge; Area Y at Airman's Corner (the site chosen); and Area Z, at Rollestone Camp.

2.1.2 The two main areas subject to archaeological monitoring were at Stonehenge and Airman's Corner. Both lie adjacent to the A344, which was built in the early 1760s, and is first shown on the Andrews & Dury map of 1775.

2.2 Stonehenge

2.2.1 The Stonehenge 'triangle' has been subject to integrated non-invasive survey (Field *et al.* 2014), and the archaeological potential of the Stonehenge part of the site is well documented (eg, Cleal *et al.* 1995; Darvill 2005; Parker Pearson 2012). That potential is not repeated here, with the exception of features closely associated with the areas of groundworks described below. These include four large post-holes of unknown function, radiocarbon dated to the Early Mesolithic, that were excavated in the old Stonehenge car park.

2.2.2 The A344 lay to the immediate north-north-east of Stonehenge, passing very close to the Heel Stone, a large leaning sarsen pillar which lay just outside the north-eastern entrance to the monument. The Heel Stone is encircled by a small ditch. Other stone holes and post-holes have been recorded close to the line of the road. The road also crossed the line of the Avenue between 20 m and 40 m from its western end, where it approaches the entrance to Stonehenge. A radiocarbon date of 2580–2280 cal BC (OxA-4884, 3935±50 BP), on antler at a depth of 0.7 m on base of the northern Avenue ditch, 2.5 m from its terminal, provides a suggested date for the construction of the Avenue (Cleal *et al.* 1995, 327; Darvill 2005).

2.2.3 Stonehenge came into public ownership in 1918, and its visitor facilities were developed in the 1920s–1930s. The main structure of the old visitor centre were built in 1968, and subsequently modified and enlarged to accommodate increased visitor numbers.

2.3 Airman's Corner

2.3.1 The nearest round barrow, visible as a mound and mapped from aerial photographs, lies 260 m north-west of Airman's Corner (WSHER MWI7044); it was excavated by Colt Hoare (1812). Numerous other barrows lie at a greater distance, mainly to the north, east and south.

2.3.2 A substantial rectilinear field system (WSHER MWI7093) mapped from aerial photographs covers 65 hectares on Winterbourne Stoke Down to the west of the A360 south of Airman's Corner, but is not recorded to the east of the road, although another field system (WSHER MWI13145) lies further to the east. The field systems may be later prehistoric in date, or alternatively associated with Romano-British settlements to the west (WSHER MWI7096 and MWI7097).

2.3.3 John Cary's 1801 map of Wiltshire and the Ordnance Survey (OS) First Series map (by 1817) show a 'Well' just south of the Airman's Corner junction on the east side of the road. By the 1st edition OS map (1877–80) a structure approximately 15 m square, probably a dewpond of a type ('Imber pond') frequently found in Wiltshire, is shown at this location, 130 m south of the crossroads, as well as two small irregular earthworks, one to the south-east of the pond, the other to its north-west on the west side of the road. Also on the west side of the road at this location a large undated pit has been identified from aerial photographs (WSHER MWI7203).

2.3.4 The Grade II listed Airman's Cross memorial, erected in 1913 at Airman's Corner, commemorates the first fatal military aviation accident, on 5th July 1912, in which Captain Eustace Loraine and his navigator Staff Sergeant Richard Wilson, both seconded to the newly formed Royal Flying Corps, were killed. The aircraft wreckage was burnt *in situ* and subsequently dismantled. The precise crash site has yet to be conclusively established, although it may be indicated by a large ferrous anomaly recorded by geophysical survey in 2009 (Linford and Martin 2009).

2.4 Previous archaeological work

Geophysical surveys

2.4.1 In 2009 an area measuring approximately 3ha positioned to the south-east of Airman's Corner was subject to further geophysical survey, and confirmed the location of former 19th-century agricultural buildings shown on historic maps, and a wider scatter of possibly much earlier pit-type anomalies across the downs. A large ferrous anomaly may be

related to the aviation accident commemorated by the Airman's Cross (Linford and Martin 2009) but this has never been tested archaeologically.

2.4.2 A further geophysical survey of 24.6ha around Airman's Corner site identified a number of pit-like anomalies forming an approximate circle of 25 m diameter, approximately 100 m to the east of the barrow north-west of Airman's Corner (WSHER MWI7044) (Wessex Archaeology 2009a). The barrow and the possible pit-circle appear to form a continuation of the linear barrow cemetery associated with the Lesser Cursus. Elsewhere within the survey area, a profusion of discrete circular and sub-circular anomalies are consistent with the responses from further possible pits, with some evidence for local clustering. Numerous linear and curvilinear trends may be of anthropogenic origin. A very large anomaly lay on the west side of the A360, approximately 110 m south of the road junction (see feature 10018, below). Whilst all the survey areas show some traces of ploughing trends, the north-eastern quadrant is most affected by these responses.

Earthwork survey

2.4.3 In March–April 2009 an earthworks survey at Airman's Corner (Field 2009) revealed a cultivated landscape where traces of earlier activity had for the most part long been levelled. Apart from the round barrow to the north-west, and the possible Imber pond 130 m south of the crossroads, a levelled linear ditch orientated north-west to south-east was recorded in the south-eastern quadrant. This is suggested to be of later Bronze Age date, possibly forming part of an extensive linear feature (WSHER MWI13119) visible on aerial photographs to the north-west and south-east of the site.

Archaeological evaluation

2.4.4 In August 2009, an archaeological evaluation at Airman's corner, comprising fifty-two 30 m trial trenches and forty 1 x 1 m test pits, revealed three undated gullies, and a possible post-hole, which although also undated did contain fragments of burnt flint, material intrinsically linked with prehistoric activity. All other features were either modern (plough scars) or natural tree throw-holes and tree hollows (Wessex Archaeology 2009b). A number of pit-like features identified during the geophysical survey proved to be natural in origin.

2.4.5 The distribution of finds within the topsoil revealed only a general scattering of later Neolithic–Bronze Age (3000–1100BC) activity. The distribution of modern finds corresponded with geophysical anomalies, and structures identified on the historic mapping namely the 'Well House. Despite the location of the site largely within the WHS, the low level of archaeological remains recorded during the evaluation was considered to be an accurate reflection of the site's archaeological potential, providing significant negative evidence.

Other works

2.4.6 In 2011 mitigation works within the proposed parking and service area to the north of the A344 at Airman's Corner comprised a watching brief during the drilling of boreholes and number of boreholes within a drilling compound and a strip map and sample excavation prior to the construction of a temporary water storage area (Wessex Archaeology 2012e).

2.4.7 In 2011 a watching brief was maintained during the hand excavation of twelve small geotechnical test pits; two of them in the Stonehenge visitor car park, four along the A344 between the car park and the junction with the A303, and six around Airman's Corner (two on the A360, and four on the B3086). The test pits in the vicinity of the Avenue (test pits 12 and 13) had identified the depth of road construction (tarmac and hogging) as up to 0.3 m thick above the Chalk natural (Wessex Archaeology 2011).

2.4.8 In 2012–13 a programme of evaluation, excavation and watching brief was undertaken during work to upgrade the Longbarrow Crossroads roundabout (Wessex Archaeology 2014a). The work confirmed the line of a probable Late Bronze Age Linear ditch, and established that a further ditch, recorded during the initial construction of the roundabout in 1967 and listed as a 'stockade trench', cut through the tertiary fills of the Linear ditch.

2.4.9 In 2014 archaeological monitoring was undertaken during the restoration and re-profiling of three Early Bronze Age round barrows (Scheduled Monuments 1011039, 1011040 and part of 1012368) on Winterbourne Stoke Down. The barrows, all subject to antiquarian investigations, were listed on the Heritage at Risk Register due to severe damage from badger burrowing (Wessex Archaeology 2014b).

2.4.10 In 2015 a watching brief was undertaken during groundworks to install a temporary inspection chamber on an existing cable duct located 33 m north-west of the fenceline marking the boundary of Byway 12 on the south side of the former A344 (SU1197 4235) (Fig. 3). No archaeological material, deposits or features were observed during the course of this work (Wessex Archaeology 2015).

3 AIMS AND OBJECTIVES

3.1 Fieldwork

3.1.1 The overall aim of the archaeological mitigation was to ensure the identification, protection and recording of any archaeological remains revealed during the proposed works through a programme of archaeological monitoring, supervision and recording as set out in the WSI (Wessex Archaeology 2012a). Decisions as to how to proceed if archaeology was found during the course of the works were made by the SEIP Archaeological Working Group.

3.1.2 Specifically the project aimed to:

- *Identify, investigate and record any such archaeological remains to the extent possible by the methods set out in the WSI;*
- *Monitor and record the implementation of measures designed to preserve archaeological remains left* in situ*; and*
- *Disseminate the results of the project through deposition of an ordered archive with Salisbury and South Wiltshire Museum, the deposition of a detailed report with the Wiltshire Sites and Monuments Record, and publication at a level of detail commensurate with the significance of the results.*

3.2 Building recording

3.2.1 The mitigation strategy also aimed to record the visitor facilities and structures prior to demolition. The aim of the recording was to provide a Level 1 record of the facilities to be demolished, and a Level 3 record of elements to be retained/reused by English Heritage.

3.2.2 A Level 1 record is a basic visual record, supplemented by the minimum of information needed to identify a building's location, age and type. A Level 3 record is an analytical record comprising an introductory description followed by a systematic account of the building's origins, development and use; it includes an account of the evidence on which the analysis has been based, allowing the validity of the record to be re-examined in detail, and includes all drawn and photographic records that may be required to illustrate

the building's appearance and structure and to support an historical analysis (English Heritage 2006, 14).

3.2.3 The redevelopment works included the dismantling, storage and reinstatement of the Airman's Cross memorial (in a new location), and the project aimed to record the structure to an appropriate level, and within its context, prior to the dismantling/lifting and relocation, and to ensure its safe removal, transport, storage, conservation and reinstatement.

4 METHODOLOGY

4.1 Fieldwork

4.1.1 In line with the approved WSI (Wessex Archaeology 2012a), the archaeological mitigation comprising watching brief and a strip, map and record investigation was undertaken in four phases (Fig. 1), during which all soil stripping and groundworks were completed under constant archaeological supervision. This included the archaeological supervision during the placing of imported or relocated fill or topsoil, and the placing of geotextiles.

4.1.2 Most works were undertaken by 360º excavators (of 3 to 20 ton) using toothless buckets, but where appropriate, and in accordance with the WSI some groundworks were undertaken by hand. The topsoil was removed in spits down to the top of chalk, so that trenches could be inspected for archaeological remains, before being taken down to the required construction levels.

4.1.3 The strategy for any hand excavation of archaeological features was agreed in advance, with consultation of the SEIP Archaeological Working Group (Wiltshire Council Archaeology Service, National Trust and the English Heritage Inspector). The work was monitored by the County Archaeologist, the Lead Advisor for the Stonehenge and Avebury WHS, and the National Trust Archaeologist (Stonehenge & Avebury WHS), who made regular visits to the site to review progress and to agree on the appropriate course of action on the ground including specific excavation and sampling strategies.

4.1.4 All site attendance and recording was conducted in compliance with Chartered Institute for Archaeologists' (CIfA) standards (CIfA 2014a) and in accordance with the approved WSI (Wessex Archaeology 2012a).

4.2 Monitoring

4.2.1 An archaeological watching brief was maintained during all works associated with the Phase 1 & 2 works at Airman's Corner and Phase 4 works at the former visitor centre. A strip, map and record investigation and watching brief was completed during the Phase 3 works. During the course of the project the following works were monitored in four phases (Fig. 1) and comprised:

Phase 1 – Airman's Cross memorial and milestone

- ***Memorial and milestone recording****: the Airman's Cross memorial and milestone were recorded* in situ *prior to their removal. The recording was broadly commensurate with an English Heritage Level 1–2 historic building survey (English Heritage 2006), and comprised on-site description/analysis and photographic recording of the monument and milestone. The Milestone Society was consulted prior to the works being undertaken.*

Phase 2 – New Visitor Centre facilities and junction improvements at Airman's Corner

- ***Construction of services and drainage trenches****: extensive drainage works were undertaken linking the new Airman's Corner roundabout and associated roads, and consisted primarily of the machine excavation of 1 m wide trenches at varying depths to connect a series of manholes, pipes and drains.*

- ***Construction of the new Visitor Centre building****: although the use of a reversible zero-ground impact construction method for the majority of the development was proposed, it was necessary to strip a small area of topsoil in the south-eastern corner of the plot.*

- ***Construction of a new roundabout and associated roads****: the construction of a new roundabout at Airman's Corner, and the realignment of associated roads, including the widening of the A360 south of the junction was monitored over several months.*

- ***Deposition of imported topsoil and/or materials****: large amounts of imported stone and chalk were used to level/landscape the site of the new Visitor Centre and car park; this process was monitored to ensure the location of the imported material was mapped and recorded.*

Phase 3 – A344 works

- ***Modifications to the visitor footpath at Stonehenge****: the footpath by the VTS turning circle at Stonehenge was widened, and the tarmac footpath running around the stones was retained but resurfaced. The removal of the edgings were undertaken by hand and monitored by the attending archaeologist.*

- ***Puncturing of the A344 road****: following closure of the A303/A344 junction, the existing road surface of the A344 was punctured between the junction and the Bell Barrow (East of Stonehenge, SM10371). A temporary hoarding was erected around the Grade II listed milestone.*

- ***Removal of the A344 kerb, footpaths, shrub and bank****: the kerb stones defining the A303/A344 junction were removed, as were the tarmac footpath along the northern side of the A344 and its kerb edgings, and the bank alongside the southern side of the A344 between the Heel Stone and the old visitor facilities.*

- ***Removal of redundant street furniture and fencing****: the swing gate and the traffic signs along the A344 were removed, as were the bollards and signage at the original entrance to the old visitor car park.*

- ***Breaking out and removal of the A344 road****: the road between the Bell Barrow and the VTS turning circle and new footpath, was broken out and removed down to the top of the Chalk; plans to remove its sub-base layers by hand within the area designated as an archaeological strip, map and record investigation were started, but reassessed following discussion with the Stonehenge Archaeological Working*

Committee. It was agreed to remove the sub-base by careful machine excavation. The subsequent excavation area measured 80 m x 7 m and was positioned across the footprint of the former A344 road (Fig. 3). Following completion of the work, a geotextile membrane was laid over the new sub-base in areas that had been subject to archaeological excavation.

- ***Removal of fencing**: the chain link fence that ran along the northern edge of Stonehenge from the Bell Barrow to Byway 12 was removed; the posts around the Heel Stone were pulled by hand.*

Phase 4 - Decommissioning of existing facilities and new hub works

- ***Recording of the old visitor facilities and structures**: recording of the structures was undertaken by a Senior Buildings Archaeologist, prior to decommissioning. A photographic record of the structures was compiled in digital format. A record to English Heritage Level 1 was made of the complex as a whole (English Heritage 2006).*

- ***Construction of temporary fencing**: a temporary fence erected to create a compound and prevent access to the building site, involved breaking ground.*

- ***Construction of a drop-off point at FARGO plantation**: construction of a drop-off point, located on the northern side of the old A344 between the new Visitor Centre and Stonehenge was monitored. Works involved the excavation of the existing verge down to the top of Chalk before re-contouring works.*

- ***Construction of a Vehicle Transport System (VTS) turning circle**: the VTS was positioned immediately east of Byway 12 on previously developed land, and a watching brief was maintained during the construction works. A slot was archaeologically excavated across the car park bank, confirming that it was made up of modern deposits. Part of the bank was then removed down to the Chalk under archaeological supervision to allow construction of the VTS turning circle.*

- ***Demolition of the old visitor facilities**: these works consisted primarily of the removal of the existing buildings and the crushing of materials. The removal of the retaining wall exposed the natural Chalk which had to be battered for safety reasons. Before this could be done the area was stripped to Chalk to confirm the presence/absence of any archaeological remains.*

- ***Construction of the car park temporary entrance:** the construction of a temporary entrance for the existing visitor car park involved the hand-excavation of two slots across the bank in the south-west corner of the car park before its removal.*

- ***Removal of tree stumps**: tree stumps from around the old Visitor Centre were either lifted out of the ground, or if they could not be removed without significant ground disturbance, were cut off at ground level.*

- ***Excavation of cable trenches**: two cable trenches were excavated within the old visitor car park; one ran south-east to north-west from the main buildings towards the toilet block, and the other was located on the eastern side of the visitor facilities to replace an existing cable.*

4.3 Recording

4.3.1 All archaeological features and deposits exposed during the fieldwork were cleaned and recorded in plan using GPS survey equipment. Full written and photographic records were made of each area, even where no archaeological remains were identified. Feature sections and representative sections were recorded at an appropriate scale (1:10). Other plans, sections and elevations of archaeological features and deposits were drawn as necessary at an appropriate scale (normally 1:10 or 1:20). Drawings were made in pencil on permanent drafting film. Written records were made using WA *pro forma* record sheets.

4.3.2 The spot height of all principal features and levels was calculated in metres relative to Ordnance Datum, correct to two decimal places. Plans and sections have been annotated with spot heights as appropriate.

4.3.3 A full photographic record was maintained during the fieldwork. General site photographs were taken to record the progress of the investigations, including shots to record the condition of the nature and progress of the development work.

4.4 Specialist strategies

General

4.4.1 All finds and environmental samples were processed according to procedures set out in WA's policies and guidelines on finds analysis, environmental sampling and archive preparation, and in accordance with the CiFA's *s*tandards (CIfA 2014b).

Artefact

4.4.2 All artefacts were recovered, stored and processed in accordance with standard methodologies and national guidelines (Society of Museum Archaeologists 1993; 1995). Small finds were recorded three-dimensionally using GPS surveying equipment. Bulk finds were collected and recorded by context from both excavated features and the surfaces of unexcavated features.

4.4.3 Any finds requiring immediate on site conservation treatment to prevent deterioration were dealt with according to guidelines laid down in *First Aid for Finds* (Watkinson and Neal 1998).

Environmental

4.4.4 Bulk environmental soil samples, of up to 60 litres, for plant macro-fossils, charred plant remains, small animal bones and other small artefacts were taken from appropriate well-sealed and dated/datable archaeological deposits following Wessex Archaeology's standard environmental sampling policy.

4.4.5 The environmental sampling strategy followed the recommendations outlined in *Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation* (second edition) (English Heritage 2011).

4.5 Building recording

4.5.1 The Airman's Cross memorial and unlisted milestone were recorded on 22nd June 2012 and included the capturing of basic dimensional details together with comprehensive photography of the structure, using 35 mm black and white film and high-quality digital photography. During the exercise, 67 digital images and 24 black and white photographs

were taken of Airman's Cross in its present context. The digital images were captured on a Canon EOS 5D Mark II digital SLR camera (with 21 megapixel capability) and black and white photographs on a Canon EOS 3 SLR camera. Photographs were recorded on Wessex Archaeology *pro forma* Photographic Record sheets which included the location, direction and number of each photograph

4.5.2 The former visitor facilities and structures were recorded by a Senior Buildings Archaeologist, using a similar methodology on 26th September 2013. The structures were photographed individually, in groups and within their setting to show them in context and provide the basic visual record required. Limited documentary research was conducted for the analytical record of facility elements to be retained. Cartographic records and planning documents were consulted to understand the chronological development of the facilities.

5 FIELDWORK RESULTS

5.1 Introduction

5.1.1 The following section is described in accordance with the phases of work undertaken, and provides a summary of the information held in the site database and archive. Details of individual excavated contexts and features are retained in the site archive. The numbers for trenches from previous excavations follow Cleal *et al.* 1995.

5.2 Phase 1 - Airman's Cross and milestone recording

Introduction

5.2.1 Prior to the removal and relocation of the Grade II Listed Airman's Cross memorial and an unlisted milestone (Fig. 2) the structures were recorded *in situ* in accordance with the approved method statements (Wessex Archaeology, 2012c & 2012d).

5.2.2 Airman's Cross is a commemorative stone cross (Plates 1–4) which, up until June 2012, was situated on a traffic island at the junction of the former A344 and the A360 near Stonehenge in Wiltshire. The cross was erected to commemorate two pioneer aviators of the Royal Flying Corps, who were killed in a fatal crash flying a Nieuport monoplane from Larkhill airfield on 5th July 1912. The cross appears to have been moved and re-dedicated on previous occasions, most recently in 1996. It was listed Grade II on 5th May 1995.

Airman's Cross

5.2.3 In brief, the monument consists of a Cornish granite relief carved Celtic cross with short shaft which rests on a three-tier plinth. The plinth is positioned centrally within a larger rectangular area of irregular concrete paving with grass beyond. The total height of the monument is approximately 1.4 m with the base measuring approximately 0.8 m in length, 0.68 m in width and 0.15 m in height. The south face of the three steps of the monument bears the following inscription:

TO THE MEMORY OF CAPTAIN LORAINE AND STAFF-SERGEANT WILSON WHO, WHILST FLYING ON DUTY, MET WITH A FATAL ACCIDENT NEAR THIS SPOT ON JULY 5TH 1912. ERECTED BY THEIR COMRADES.

5.2.4 In addition to the original inscription a rectangular re-dedication plaque is situated immediately below and adjoining the bottom step (south side) which bears the following inscription:

AIRMAN'S CROSS. REDEDICATED 5 JULY 1996. TO THE MEMORY OF CAPTAIN EUSTACE BROKE LORAINE GRENADIER GUARDS AND STAFF SERGEANT RICHARD HUBERT VICTOR WILSON ROYAL ENGINEERS. THE FIRST MEMBERS OF THE ROYAL FLYING CORPS TO LOSE THEIR LIVES WHILST FLYING ON DUTY. PLAQUE LAID BY THE FRIENDS OF THE MUSEUM OF ARMY FLYING, MIDDLE WALLOP

5.2.5 The plaque is made of marble and measures 0.3 m in width, 0.42 m in length and 0.02 m in depth.

5.2.6 Shortly after its recording in June 2012, the cross was removed by 22 Engineer Regiment to Tidworth Barracks where it was restored before being re-erected adjacent to the new Stonehenge Visitor Centre.

Dismantling, lifting and conservation

5.2.7 The dedication plaque at the base of the memorial cross was successfully lifted whole by the Royal Engineers (Plate 5). It was bolted onto two sections of seating material, one of which is still attached to the plaque. A few of the letters were missing from the dedication.

5.2.8 It was not possible to dismantle the monument before lifting (Plate 6). During the previous removal, the cross and top tier of its base had been separated from the bottom two sections of plinth. Initial attempts to remove the fixing material at the same point showed that whatever had been used when the cross was re-erected was far too hard to be loosened without risk of damage to the monument. The bottom plinth is firmly embedded in a large square of concrete.

5.2.9 As it would be extremely difficult to remove the concrete without serious risk to the cross, this material was left in place and used as the primary seating when the cross was re-erected. Before reinstatement the cross was cleaned and the lettering refreshed by the Royal Engineers, following advice from the Wessex Archaeology conservator.

5.2.10 The memorial, repositioned outside the new Visitor Centre (Fig. 1; Plate 7) was re-dedicated in a service attended by the Earl and Countess of Wessex on 1st May 2014.

Milestone

5.2.11 The unlisted milestone at Airman's Corner was photographed before and during lifting (Plate 8). Following lifting it was cleaned by the Wessex Archaeology conservator, and subject to further conservation treatment by Rowland Stone, Bristol, before being reinstated close to its original location (Fig. 1; Plate 9).

5.3 Phase 2 – New Visitor Centre facilities and Airman's Corner junction improvements

Introduction

5.3.1 An archaeological watching brief was maintained during all excavation works associated with the Phase 2 works at Airman's Corner (Fig. 2), and comprised the monitoring of groundworks within the footprint of the New Visitor Centre, and all machine excavation associated with the construction of the new roundabout and associated road realignments (Plates 10 and 11), landscaping works (Plate 12) and excavation of drainage trenches (Plate 13) to link with existing manholes and pipes.

Stratigraphy

5.3.2 The stratigraphic sequence within the Phase 2 area was generally consistent, and comprised a 0.20 m to 0.30 m deep plough-soil or topsoil overlying the natural Chalk with

periglacial features (Plate 14). A slightly thicker topsoil was recorded within a dry valley which runs south-west into the Till valley, and measured up to 0.45 m deep as a result of plough derived hill-wash.

Features 10018 and 10022

5.3.3 A large sub-oval spread of colluvium (10002), 9.2 m long (north–south) and 6.4 m wide, was exposed during the machine excavation of a pipe trench associated with the drainage works on the western side of the A360 (centred on NGR 409840 142766), approximately 110 m south of the Airman's Corner crossroads, on the south-facing slope of the dry valley (Fig. 2). The deposit corresponded to a large anomaly recorded during the geophysical survey (Wessex Archaeology 2009a, fig. 9), and measured 0.5 m in depth.

5.3.4 A 1.2 m wide, north–south aligned slot was initially cut through the deposit, revealing two distinct features comprising a large hollow (10018), measuring 1.4 m deep from its up-slope edge (northern side) with irregular sides and a near-flat base, and, a smaller feature (10022), 2 m wide and 0.9 m deep, which has been interpreted as a tree-throw hole (Fig. 4, Plate 15).

5.3.5 In consultation with the Stonehenge Archaeological Working Committee, it was agreed further excavation should be undertaken and an addendum to the archaeological mitigation strategy (Wessex Archaeology 2012b) detailing the proposed strategy was agreed. The feature was excavated by quadrant (*i.e*. divided into four sections by means of a line running across the feature perpendicular to the pipe trench), with the two opposing quadrants initially excavated.

5.3.6 Feature 10018 contained a series of fills, composed largely of chalk rubble on the upslope (northern side) with topsoil-derived fills on the downslope (southern side), and was recorded to a depth of 0.54 m. The uppermost of these fills (10006), comprised a 0.22 m thick layer of brown silty loam containing common chalk fragments and a moderate number of flint nodules, which extended across much of the feature.

5.3.7 A sequence of three deposits (10003, 10004 & 10005), indicative of a substantial burning event (Plate 16), were recorded overlying deposit 10006. The upper fill composed of a thin very dark silty loam (10003) contained charcoal and burnt flint, and sealed a red, burnt, well-oxidised silty clay loam (10004) up to 0.19 m thick at the centre but thinning out to the sides. This overlay a thin very dark greyish brown silt loam (10005), indicative of a burnt or partially burnt turf-line. Considerable quantities of burnt flint were recovered from layers 10003 (983g), 10004 (4063g) and 10005 (4650g).

5.3.8 Apart from one piece of struck flint (presumably residual) no datable finds were recovered from the deposits. However, charred seeds of oat/brome grass from the lowest burnt layer (10005) provided a radiocarbon date of cal AD 1655–1955 (SUERC-43905, 185±25 BP), which given the depth of the overlying colluvium suggests a post-medieval or 19th century date.

5.4 Phase 3 – A344 works

Introduction

5.4.1 The earliest complex of features recorded during the mitigation works were identified during the Phase 3 works associated with the strip, map and sample investigation along the line of the former A344 road, adjacent to Stonehenge (Fig. 3). Furthermore a watching brief was maintained during preparatory works along the A344 (Plate 17).

5.4.2 Following discussion with the Stonehenge Archaeological Working Committee it was agreed the sub-base of the road material in the area next to Stonehenge should be removed by careful machine excavation. The resulting surface was then hand cleaned, although by agreement much of the lowest road layer was left *in situ* and, therefore, remained unexcavated. As a result, only parts of the Avenue ditches, and the natural geology between them, were exposed (Fig. 5).

5.4.3 On completion of the works two layers of geotextile membrane was laid over the excavated area prior to it being backfilled (Plate 18).

Natural features

5.4.4 Within the two geotechnical pits closest to the Avenue, approximately 50 m to either side, the natural of degraded Chalk had been recorded at 101.16 m aOD in test pit 12 (to the north-west), and 99.42 m aOD in test pit 13 (to the south-east), each below up to 0.3 m of hogging and tarmac. At the Avenue the natural was recorded at 102.19 m aOD (north-west ditch (10078) and 101.91 m aOD (south-east ditch 10068), and at 102.13 m aOD at the Heel Stone ditch (10094).

5.4.5 These levels, taken using GPS survey equipment, appear to be at odds with the benchmark on the side of the Heel Stone shown on Ordnance Survey maps as 100.70 m. Whatever the cause of this discrepancy, it suggests that the natural within the road line had not been significantly truncated by the road's construction.

5.4.6 A number of linear features of periglacial origin, orientated approximately north-east to south-west were observed in the natural where the sub-base of the road had been completely removed (Plate 19); they were not mapped. These were also evident adjacent to and cut by the edges of the northern Avenue ditch (10078, below) (Fig. 8). They are visible in the sections of both Avenue ditches (Figs 7 and 8) as undulations in the upper, more degraded levels of the Chalk, filled with darker soil – eg, 10104 in ditch 10078, and 10102 in ditch 10068; it seems likely that layer 10120, recorded as a fill of Avenue ditch 10068, is in fact degraded Chalk natural.

5.4.7 A small number of other undated natural features were also investigated. These included a shallow natural hollow (10067), interpreted as the base of a tree-throw hole, surviving to a maximum depth of 0.06 m, which lay to the immediate north of the Heel Stone ditch (Fig. 6).

Heel Stone ring ditch

5.4.8 Along the southern limits of the strip, map and sample area, a 5.1 m long section of a partially exposed ditch (10094) which encircled the Heel Stone was recorded (Figs 5 and 6). Following on site discussions with the SEIP Archaeological Working Group a narrow north–south slot was excavated towards the western end of the exposed section (Plate 20). This confirmed the partial profile of the northern edge of the ditch, which was irregular in form and moderately steep, recorded to a maximum depth of 0.4 m below the natural, the surface of which was at 102.13 m aOD; due to the site constraints the base of the feature could not be reached.

5.4.9 Two fills were recorded within the partially excavated ditch, and comprised a lower deposit (10095), with a maximum thickness (in the slot) of 0.23 m. The deposit consisted of a dark brown silty clay with common, well-sorted and variably-sized chalk inclusions. Two pieces of struck flint were retrieved. The upper fill (10096), with a maximum thickness of 0.17 m, consisted of dark brown silty clay with frequent chalk inclusions and flint nodules.

Avenue ditches

5.4.10 Both of the Avenue's ditches, the southern ditch (10068) to the south-east and the northern ditch (10078 to the north-west, survived beneath the former road (Fig. 5), with little evidence that they had been significantly truncated by the road's construction. However, because the road sub-base was only partly removed neither ditch was exposed over the fully width of the excavation, and their edges were only established where the road material had been completely stripped, and in the excavated slots (Plate 21).

5.4.11 No positive evidence of the Avenue's internal banks was recorded. Angled slots were excavated across both ditches to provide south-west facing sections at right angles across both ditches (Figs 7 and 8) as well as an obliquely angled profile across the whole Avenue (Fig. 5).

5.4.12 The ditches were broadly similar in form and fill sequence, although there was some variation in their profiles, even between the opposing sides of the same slot. The fills largely comprised natural erosion deposits, deriving from both sides, including material probably resulting from the erosion of the Avenue's internal banks. Worked flint was recovered from the secondary and tertiary fills (the finds are assigned to the fill numbers recorded in the perpendicular sections).

Southern ditch (10068)

5.4.13 A slot was excavated through the southern Avenue ditch (10068) close to the southern edge of the excavation, providing a full cross-section (one section at a right angle, the other oblique). In addition, at the request of the Stonehenge Archaeological Working Committee, a narrow sondage was excavated to the north-west to assess the chalky deposit overlying the ditch; this was shown to comprise the remaining road sub-base.

5.4.14 In the excavated section the ditch was 2.6 m wide and 0.8 m deep; it was the same width over a further 1 m length where its upper fill was fully exposed by the removal of the road sub-base layer. The north-western edge of the ditch was only partly exposed in the narrow sondage through the road material, although there was some variation in profiles visible in the opposing sides of the slot excavated across it. In the south-west facing section the ditch had a pronounced V-shaped profile with steep sides extending to the base, while the opposing (oblique) section had slightly convex sides and a wider concave base (Fig. 7).

5.4.15 Similar fill sequences were recorded in the two faces of the slot, the fills containing decreasing quantities of chalk rubble up the profile. In the south-west facing section, the lower secondary fill (10072) derived largely from the north-western (inner) side of the ditch and may represent eroded bank material. In the opposing section both the primary fill (10105) and a corresponding lower secondary fill (10107) again derived from the inner side, but these interleaved with comparable layers (10106 and 10108) lying against the ditch's outer side, making any evidence of eroded bank material less evident. In the south-west facing section the upper secondary fills (eg, 10072, 10100 and 10101) also derived from the inner side of the ditch, but this was not matched in the opposing section. The upper fills comprised dark loamy soils with evidence of bioturbation resulting from root and earthworm action (Plate 22).

5.4.16 Nineteen pieces of worked flint were recovered from the ditch, six from lower secondary fill 10072, one from secondary fill 10071, and 12 from the lower tertiary fill (10070); the latter fill also contained three pieces of Bluestone. Within the upper tertiary fill (10069) fragments of animal bone and one sherd of post-medieval pottery was retrieved.

5.4.17 The uppermost fill, where exposed, was cut by a number of parallel wheel ruts (Plate 23), which had become infilled with bedding material for the former road, which comprised spreads of chalk and flint rubble (10074, 10075), the former producing three residual flint flakes.

Northern ditch (10078)

5.4.18 A slot was excavated through the northern Avenue ditch (10078) close to the northern edge of the excavation, again providing a one section at a right angle, and the other oblique.

5.4.19 In the excavated section the ditch was 3 m wide and 0.77 m deep (Fig. 8); elsewhere it was wholly or partly covered by road material and its width was no established. As in ditch 10068 there was some variation in the profiles revealed in the perpendicular and oblique sections. In the perpendicular section the ditch had a wide V-shaped profile with a slightly rounded base, the sides being not as steep as in ditch 10068. In the oblique section the ditch had a less regular profile, with a wider, almost flat base, and sides that were shallow where eroded at the tops (Plate 24). In addition, there were clear irregularities in the upper part of the sides as revealed in plan.

5.4.20 In both sections there was a clear preference for the primary and secondary fills to derive from the south-eastern (inner) side of the ditch, possibly as a result of the erosion of the bank. In the perpendicular section, an eroded naturally derived primary deposit (10085) was overlain by a band of largely stone-free soil (10103), then by mixed secondary fills (10083 and 10084). The tertiary fills (10081 and 10080) were largely devoid of chalk, but contained occasional pieces of flint.

5.4.21 A considerable quantity of worked flint (91 pieces) was recovered throughout the deposits, along with five pieces of Bluestone and one of Sarsen fragment recovered from the lower tertiary fill (10081). The upper tertiary fill (10080) again contained fragments of animal bone and recent material (clay tobacco pipe fragments).

5.4.22 As in the southern ditch, the ditch's uppermost fill, where exposed, was cut by a number of parallel wheel ruts. The ditch was sealed by a layer of compacted chalk rubble (10079), forming the lower part of the bedding material for the former road.

5.5 Phase 4 – Decommissioning of existing facilities and new hub works

Introduction

5.5.1 An archaeological watching brief was maintained during all works associated with the old visitor centre car park, and Visitor Transit System. This included the machine excavation of trenches within the former car park,works related to decommissioning the car park, and the removal of the temporary buildings (Fig. 3). A comprehensive record of the former visitor facilities was made, in line with English Heritage Level 1 for the complex as a whole (English Heritage 2006). This record and the supporting background research forms part of the SEIP project archive.

The former car park

5.5.2 Groundworks and the puncturing of the tarmac surface during the decommissioning of the former car park were monitored by Wessex Archaeology. One service trench ran just north of the positions of the three Mesolithic post-holes and a tree-throw hole excavated in 1966 (Vatcher and Vatcher 1973; Cleal *et al.* 1995, fig. 24) (Plate 25). The natural was exposed during the stripping of the central islands and at the entrance to the car park. No archaeological features were recorded.

5.5.1 The surface of the car park was punctured using a 60 mm diameter tool to the depth of the imported pavement material. This was undertaken on a grid pattern at 900 mm centres, avoiding the Mesolithic features (Plate 26). Once the drainage works were completed the area was infilled with imported material to a depth of 300 mm and re-contoured to fit in with the surrounding landscape (Plate 27). The imported material comprised 150 mm of topsoil over 150 mm of crushed chalk. Much of this material had been retained from works undertaken on other parts of the improvement project, subsidised with a secondary source of crushed chalk from the Devises area. The different imported materials were mapped and this data forms part of the SEIP project archive.

5.5.2 As part of the reinstatement works the existing reinforced grid, grass and loose gravel was removed from the overflow car park (Area F) and the area backfilled with topsoil to a depth of 150 mm. In order to estimate the provision for topsoil in this area of the site, five test pits were machine dug through the topsoil and down to the surface of the underlying chalk in the northwest corner of the car park (Fig. 9). This work did not form part of the agreed schedule of works and was undertaken without prior notification to Wessex Archaeology and, therefore, without archaeological supervision. Once informed Wessex Archaeology made a full record of the five topsoil test pits.

5.5.3 The spoil from the five test pits was examined for archaeological material by Lorrain Higbee and Heather Sebire. Two pieces of worked flint (test pit 1: small flake and test pit 2: broken flake) were recovered and a very small chip of possible bluestone (1 g) was recovered from test pit 4. No archaeological features were observed.

A344 road construction

5.5.4 The construction cut (10047/10059/10073/10076) for the A344 was recorded to the west of the Avenue (Plate 26). Below the tarmac surface (10048) on the southern side of the road a band of large blocks of limestone was recorded, 0.3 m wide and 0.2 m thick, which was abutted by a compact layer of limestone hardcore (10049), 0.06 m thick, overlying a layer of compacted flints (10051).

5.5.5 Extensive bedding layers were recorded overlying the Chalk on the north side of the road near the entrance to the former Stonehenge car park (Fig. 9; Plate 29). These included a layer of reddish-brown sand (10064) overlain at the edge of the road by a layer large stones (10066), and towards the centre of the road by a spread of greenish-yellow sand and sandstone (10060) which contained a single fragment of ceramic building material (CBM), and overlay a layer of flint gravel to its south. An adjacent section of road surface was removed during decommissioning works on the former car park (Fig. 9; Plate 30). This revealed a similar range of bedding materials to those described above.

5.5.6 A 0.5 m wide slot was excavated through the roadside bank (10046) on the edge of the car park (Plate 31, Fig. 9) prior to its removal. It measured 1.2 m high and included four dumped layers, comprising a 0.25 m deep topsoil (10040) layer overlying a loose brown silty clay (10043), which in turn sealed a layer of silty clay with chalk inclusions 0.15 m thick (10044) above a 0.5 m thick dark brown silty clay (10045). Three pieces of residual struck flint were recovered from it.

5.5.7 Two areas adjacent to the new footpath from the bus drop off point to Stonehenge were re-contoured (Fig. 9, Plates 32 and 33). The area on the south side of the road measured 24.4 m by 5 m while the area to the north was 9 m by 5 m.

Building recording results

5.5.8 The former visitor facilities had been in place since the late 1960s. The former concrete structures were constructed to provide a low key ticketing and access point, with an underpass beneath the A344 and adjacent car parking, out of sight of the Stones. Visitor facilities also included toilets and a small shop. Subsequent expansion resulted in an enlarged shop and additional ticketing and staff facilities in temporary timber structures. Although following inscription of the WHS in 1986 they were widely criticised as too small and outdated, the existing facilities nevertheless represented an important stage in the public presentation of Stonehenge.

5.5.9 The archaeological mitigation required a Level 1 record of the existing facilities prior to their decommissioning and replacement, and included a limited programme of documentary research, involving the consultation of cartographic records and planning documents, to chart the chronological development of the facilities, and recording of the structures (Wessex Archaeology 2012a).

Chronological development of the Stonehenge visitor facilities

5.5.10 Stonehenge was in private ownership until 1918 when it was given to the public and managed by the Ministry of Works. Stonehenge became an English Heritage site in 1983 and part of a World Heritage Site in 1986.

5.5.11 By 1924, a crossroad junction with the A344 had been built and at some point between 1924 and 1938 a car park was developed to the west of this intersection. The facilities were constructed in 1968. The crossroad was relocated further west from the henge and the new facilities were sited immediately east of this new route. The 1972 Ordnance Survey mapping shows that the plan of the 1968 structures including toilets, car park and pedestrian route under the A344 have not changed significantly since construction but have been augmented by temporary structures. These temporary portable buildings served as staff facilities and the ticket, audio guide and information booths.

5.5.12 Planning applications made to Wiltshire Council indicate there have been several modifications to the facilities since construction. Improvements to the visitor and staff facilities were granted in 1987 and alterations to the existing ticket and sales facilities granted in 1991. In 1993, permission was granted for construction of a temporary portable building to house an exhibition. In 1996 an application to make minor alterations to the existing car park entrance was granted. Unfortunately the planning documents with further details of these various developments were not accessible.

5.5.13 Secondary toilet facilities in the north-west corner of the car park and a temporary ice cream kiosk along the northern boundary of the car park were added in 2003. The application site plans were drawn on a copy of the Ministry of Works Deed Plan dated 1968 which shows the facilities as originally constructed.

5.5.14 In 2005, permission was granted for a new footpath and pedestrian crossing in the car park and a secondary entrance ramp to the north of the original. The 2005 proposal plans shows the current staff facilities portable buildings, ticket booths and turnstiles.

5.5.15 The proposal to build a new Exhibition and Visitor Centre and to decommission the facilities at Stonehenge was granted in 2009, and the new Visitor Centre opened in December 2013. All the former visitor's facilities have been demolished, the existing car park grassed over, the tunnel to the stones blocked and the path to the stones landscaped and resurfaced.

Description of former visitor facilities

5.5.16 The main structure of the old visitor facilities, built in 1968 was a concrete irregular plan structure that contained public toilets to the south and a kitchen/café and shop to the north (Fig. 10). The area was landscaped when constructed to position the building at a low level and was obscured from sight when viewed from Stonehenge. Its roof was slightly below the surface of the car park to the west, whereas the area to the north and east of the structure had been excavated 2.5 m lower to create the building's ground floor (Plates 34 and 35). A ramp at the north-west corner of the building and aligned approximately parallel with its north elevation formed the entrance path to the facilities. The south wall of the ramp was part of the 1968 structure, whereas the north side was formed by a hedge and metal railing. A secondary ramp to the north of the 1968 one was built in 2005, with a gradient sufficient for disabled access (Plates 36 and 37).

5.5.17 The public toilets were accessed from car park level via two symmetrical dog-leg staircases at the south-east and south-west corners of the building (Plate 38). To the south of the toilet entrances was a seating area with bike racks (Plate 39).

5.5.18 An ice-cream servery and the café were located at the base of 1968 ramp and there was an outdoor seating area and information booth at the base of the disabled access ramp (Plates 40–43). The kitchen and servery interiors had plain painted and tiled walls with modern fixtures and fittings more recent than the building's construction. These areas were separated from the rest of the facilities by the ticket booths, turnstiles and metal fencing which controlled access to Stonehenge (Plate 44). The portable buildings, shop elevations and metal railings were all painted dark green, creating a uniform appearance.

5.5.19 To the east of the ticket barriers there were the staff facilities and audio-guide portable buildings to the north-east (Plate 45), and the shop within the 1968 structure to the south (Plates 46–48). The shop had two exterior elevations to the north and east, each with a single entrance. Both elevations had large display windows. Curved railings at the north-east corner of the shop matched those at the entrance to the staff facilities and the railings that formed the ticket barrier.

5.5.20 Access to Stonehenge was via a path aligned parallel to the east side of the shop and toilet block. It led through a tunnel underneath the A344 then changed direction to an east–west dog-leg ramp rising to the ground level of the henge. The ramp had concrete walls and floor, metal railings and murals with artist's illustrations of the raising of the monument and its prehistoric appearance (Plates 49–53).

5.6 Aubrey Hole markers and Mesolithic feature markers

5.6.1 Circular concrete markers indicating the positions of four Aubrey Holes were lifted, to allow their replacement with settings for new stone markers (Plates 54), as well as a stone hole marker next to the Heel Stone (Plate 55).

5.6.2 The locations of the three Mesolithic post-holes and the tree-throw hole, previously marked on the tarmac surface of the former car park, were marked with new wooden markers, as was the Mesolithic pit in the north-east corner of the site (Plates 56 and 57).

6 FINDS

6.1.1 A small quantity of finds was recovered during the fieldwork, consisting almost entirely of worked and burnt (unworked) flint. Quantities by feature and context are given in Table 1.

Table 1 All finds by feature and context

Feature	Cxt.	Burnt flint No.	Burnt flint *Wt. (g)*	Worked flint, No.	Stone No.	Other finds No.
10018 large hollow	10003	50	*983*	1	-	-
	10004	160	*4063*	-	-	-
	10005	92	*4650*	-	-	1 animal bone
	10006	42	*2876*	-	-	-
10031 tree-throw hole	10032	-		1	-	-
10046 roadside N bank	10040	-		1	-	-
	10043	-		2	-	-
10059 road cut	10060	-		-	-	1 CBM
10062 animal burrow	10061	-		3	-	-
10068 Avenue SE ditch	10069	-		-	-	7 animal bone; 1 pottery
	10070	-		12	3	-
	10071	-		1	-	-
	10072	-		6	-	-
10073 road cut	10074	-		3	-	-
10078 Avenue NW ditch	10080	-		4	-	3 animal bone; 2 clay pipe
	10081	-		25	6	-
	10082	-		1	-	-
	10083	-		27	-	-
	10084	-		12	-	-
	10085	-		22	-	-
10094 Heel Stone ditch	10095	-		2	-	-
Other contexts						
topsoil	10052	-		-	-	1 coin
bank on S side of A344	10053	-		-	-	2 pottery
cleaning layer over Chalk	10054	-		17	-	-
imported topsoil	10097	-		2	-	1 CBM
imported topsoil	10098	-		-	-	2 coins
Topsoil test pit 1	-	-		1	-	-
Topsoil test pit 2	-	-		1	-	-
Topsoil test pit 4	-	-		-	1	-
	Totals	**344**	***12572***	**144**	**10**	

6.2 Worked flint

6.2.1 In total, 144 pieces of worked flint were recovered, from 20 contexts. Nearly all (120 pieces, 84.5%) of the material had a thick white patina, and many had blotchy orange iron staining. These characteristics are typical of pieces which have spent time in topsoil contexts, and were present on some pieces found in features; for instance feature 10018 (context 10003), tree-throw hole 10031 (context 10032), roadside bank 10046 (contexts 10040 and 10043), animal burrow 10062 (context 10061) suggesting their redeposition. The unpatinated pieces came from contexts 10043, 10054, 10070, 10080 and 10097).

6.2.2 Most of the material was recovered from the northern Avenue ditch (10078), which contained 91 pieces from throughout its fills. The majority of these pieces were large squat flakes, quite fresh, without significant post-depositional damage. Among the flake material were some deriving from core preparation and maintenance. The only non-flake material was limited to three fragments of multi-platform cores, one of which had been

used as a hammer (Plate 58). The southern Avenue ditch (10068) contained a smaller assemblage of 19 pieces of flake debitage, again distributed through the fill profile.

6.2.3 Two flakes were recovered from the ditch surrounding the Heel Stone (10094, context 10095).

6.2.4 Two flakes, one broken, were recovered as unstratified material from topsoil test pits 1 and 2 during the decommissioning of the former car park.

6.2.5 Dating is difficult on the basis of flake debitage, but morphology and the occurrence of some facetted butts suggests a date in the Late Neolithic or Early Bronze Age for at least some of the material.

6.3 Stone

6.3.1 In total 10 fragments of stone were recovered including nine fragments from the Avenue ditches and a single fragment from the spoil of topsoil test pit 4 from near the former car park. The latter is a tiny fragment and not certainly Bluestone (Phil Harding pers comm). It is probably too small for further analysis, although it should also be checked by a recognised petrologist.

6.3.2 The nine stone fragments, of Bluestone and sarsen, from the tertiary fills of the Avenue ditches were identified visually and have been classified according to Howard (1982) (Plates 59 and 60). Three fragments of rhyolite, two of basic tuff and a fragment of saccharoidal sarsen were recovered from the northern ditch (10078, context 10081), and two fragments of rhyolite and one of tuff were found in the southern ditch (10068, context 10070).

6.3.3 Most of the material can be related directly to stone working or stone breaking at Stonehenge or to objects frequently associated with the monument. Four pieces of rhyolite were almost certainly by-products of flaking. One flake showed clearly defined conchoidal features and negative flake scars on the dorsal surface and formed part of a repeated sequence of working. One of the fragments of basic tuff from context 10081 showed flattened edges and was of a similar sub-rectangular form to a group of ground edged objects from Stonehenge (Montague 1995; Harding unpublished rep.). Only one end survived, which was squared, but poorly defined where it truncated the laminar bedding of the stone.

6.3.4 The dorsal surface of the sarsen flake was characterised by localised patches of rounding of individual grains. The flake was therefore probably removed from a parent block that had been dressed by pecking, although it does not necessarily indicate that the flake was removed from the stone circle.

6.3.5 Stone working is well known from the area immediately adjacent to the terminals of the Stonehenge Avenue (Pitts 1982); however it is unlikely that this small assemblage from the Avenue ditches was derived directly from Pitts' working floor. Microdebitage in the 3mm sieved residue provided justification that the floor represented *in situ* stone working. In contrast no microdebitage was recovered from sieved residues in the ditch sections and artefact weight averaged 49 g from ditch 10078 and 283 g from ditch 10068. This is more comparable with data (Harding unpubl. report) from other excavated features at Stonehenge including Romano-British pit F3 where average sarsen weight was 19 g. The material from the Avenue ditches is more representative of larger objects that may well

have been cast into the ditches, rather than indicative of material that has silted in from the ditch edges, incorporating a representative sample of large and small material.

6.3.6 The date at which these artefacts were made or entered the ditches remains unresolved. The relative sterility of the primary deposits is characteristic of ditch sections elsewhere that have been dug across the Stonehenge Avenue and avenues elsewhere (Gardiner 1995). Worked flints from the secondary silts are smaller than those from the tertiary fills and do probably represent objects that are likely to be derived from the more immediate locality. The tertiary fills in contrast are dominated by poorly stratified assemblages of relatively large objects, which, near the ditch terminals include both bluestone and sarsen (Montague 1995, 317). Pitts (1982) acknowledged the unstratified nature of these deposits but discounted the possibility that they might not be of prehistoric date despite the presence of Romano-British pottery. Evidence of activity in the Romano-British period is now better understood at Stonehenge (Darvill and Wainwright 2009) and it is possible that deposition of these stone artefacts does relate to a time after the stone circle had gone out of effective use.

6.4 Burnt flint

6.4.1 Approximately 12.5 kg of burnt, unworked flint was recovered, all deriving from various fills of feature 10018. It was noticeable on site that the flint in its upper layers (below the colluvium 10002) was considerably more burnt than that in the lower layers, suggesting burning *in situ*. Burnt flint is intrinsically undatable, and although often it is taken as an indicator of prehistoric activity, here the evidence points to post-medieval agricultural activity.

6.5 Pottery

6.5.1 Three sherds of pottery were recovered. The two sherds from context 10053 are Romano-British, and comprise one coarse greyware, and one grog-tempered ware. Neither can be dated more closely within the Romano-British period. The sherd from the tertiary fill (10069) of the southern Avenue ditch 10068 is a post-medieval German stoneware, probably of 17th century date, and represents post-medieval intrusion into the top of this feature.

6.6 Animal bone

6.6.1 Animal bone was recovered from three features. Six small abraded fragments of bone and a fragment of tooth enamel were recovered from fill 10069 of the south-east Avenue ditch 10068. None of the fragments are identifiable to species. Three bones were recovered from fill 10080 of the north-west Avenue ditch 10078. Two of the fragments come from the occipital part of a sheep skull. The other fragment is a canine tooth from a small mustelid, most probably pine marten. This species has previously been identified from contemporary deposits at other local sites including Durrington Walls and Boscombe Down (Worley 2013, 74). The left pelvis from a hare was recovered from fill 10005 of large hollow 10018.

6.7 Other finds

6.7.1 Other finds comprise very small quantities animal bone, ceramic building material, clay tobacco pipe and coins. All datable finds are post-medieval, and include two fragments of

clay pipe stems from an upper tertiary fill (10080) of the northern Avenue ditch 10078, presumably intrusive here.

7 ENVIRONMENTAL

7.1 Introduction

7.1.1 Twelve bulk samples were processed for the recovery and assessment of charred plant remains and wood charcoal. These samples were taken from the two Avenue ditches (10068 and 10078), the Heel Stone ditch (10094) and feature 10018. In addition, eight small samples from the Avenue ditches were processed for the recovery and assessment of land snails.

7.2 Charred plant remains

7.2.1 The bulk samples were processed by standard flotation methods; the flot retained on a 0.5 mm mesh, residues fractionated into 4 mm, 2 mm and 1 mm fractions and dried. The coarse fractions (>4 mm) were sorted, weighed and discarded. The flots were scanned under a x10–x40 stereo-binocular microscope and the preservation and nature of the charred plant and wood charcoal remains recorded in Table 2.

7.2.2 Preliminary identifications of dominant or important taxa are noted below, following the nomenclature of Stace (1997).The flots were generally relatively small with low numbers of roots and modern seeds. Charred material comprised varying degrees of preservation, with that recovered from layer 10005 in feature 10018 being particularly well preserved.

Table 2 Assessment of the charred plant remains and charcoal

Cut	Cxt.	Samp.	Vol (l)	Flot size	Roots %	Charred other	Notes	Charcoal > 4/2 mm	Other
Avenue ditches									
10078 (NW)	10081	130	51	10	5	-	-	-	Moll-t (A*)
	10082	131	55	15	10	-	-	-	Moll-t (A)
	10083	132	56	20	5	-	-	0/<1 ml	Moll-t (A**)
	10084	133	56	10	5	-	-	0/<1 ml	Moll-t (A*)
	10085	134	56	20	5	-	-	0/<1 ml	Moll-t (A*)
10068 (SE)	10071	136	56	10	15	-	-	0/<1 ml	Moll-t (A*)
	10069	137	57	7	5	-	stem frags	0/1 ml	Moll-t (C)
	10072	138	55	7	10	-	-	0/<1 ml	Moll-t (A)
	10071	139	56	5	10	-	-	0/<1 ml	Moll-t (A*)
Heel Stone ditch									
10094	10095	147	23	25	10	-	-	0/<1 ml	Moll-t (A**)
Feature									
10018	10003	102	20	80	10	A	*Arrhenatherum* tubers, *Rumex, Chenopodium, Fallopia, Atriplex*, rootlets (A*)	1/2 ml	Moll-t (A*)
	10005	107	4	45	5	A	*Avena*/*Bromus, Rumex, Polygonum. Chenopodium, Fallopia, Atriplex,* rootlets (A*)	0/<1 ml	Moll-t (A*)

Key: A*** = exceptional, A** = 100+, A* = 30-99, A = >10, B = 9-5, C = <5; Moll-t = terrestrial molluscs

7.2.3 Apart from a few stem fragments in one of the samples from ditch 10068, no charred plant remains were recorded in the samples from the Avenue ditches or the Heel Stone ditch.

7.2.4 In contrast, the preservation of material in the samples from feature 10018 was very good, in particular from the lower deposit 10005. The samples contained high numbers of rootlet fragments and weed seeds, together with a few false oat-grass (*Arrhenatherum elatius* var. *bulbosum*) tuber fragments. The weed seeds included seeds of oat/brome grass (*Avena*/*Bromus* sp.), docks (*Rumex* sp.), goosefoot (*Chenopodium* sp.), orache (*Atriplex* sp.), black bindweed (*Fallopia convolvulus*) and knotgrass (*Polygonum aviculare*). These are all grassland species.

7.2.5 The assemblages from feature 10018 may be representative of material from the burning of turfs, possibly during the paring process. The process of paring involves the cutting, drying and burning of turfs (Kerridge 1967). The ashy material can then be spread on the field, sometimes mixed with lime, to improve the fertility of the soil.

7.3 Wood charcoal

7.3.1 Very low quantities of small wood charcoal fragments were retrieved from the majority of the samples (Table 2).

7.4 Land snails

7.4.1 A series of eight samples of 880–1420 g were processed by standard methods (Evans 1972) for land snails. The flots (0.5 mm) were rapidly assessed by scanning under a x10–x40 stereo-binocular microscope to provide some information about shell preservation and species representation. The numbers of shells and the presence of taxonomic groups were quantified (Table 3). The range of mollusc species present within the bulk samples was also noted to provide additional information. Nomenclature is according to Anderson (2005) and habitat preferences according to Kerney (1999). The presence of these shells may aid in broadly characterising the nature of the wider landscape.

Table 3 Land snail assessment from the Avenue ditches

Feature.	**10078 (north-west)**				**10068 (south-east)**			
Context	**10085**	**10083**	**10081**	**10080**	**10072**	**10071**	**10070**	**10069**
Sample	**142**	**143**	**144**	**145**	**153**	**152**	**151**	**150**
Depth (m)	**spot**	**spot**	**spot**	**spot**	**0**	**0.25**	**0.4**	**0.5**
Weight (g)	**1420**	**1420**	**1240**	**1300**	**1370**	**1200**	**880**	**1060**
Open country species								
Pupilla muscorum	+	A	+	-	-	C	-	-
Vertigo spp.	-	C	-	-	-	C	-	-
Helicella itala	C	C	C	+	-	C	-	-
Vallonia spp.	-	C	C	-	C	C	-	-
Intermediate species								
Trochulus hispidus	C	A	-	-	-	+	-	-
Pomatias elegans	+	+	-	-	+	-	-	-
Cochlicopa spp.	+	C	C	-	-	C	-	-
Punctum pygmaeum	-	C	-	-	-	-	-	-
Approx totals	5	35	7	0	2	9	0	0

Key: A = >10, B = 9-5, C = <5; + = present

7.4.2 The four mollusc samples from Avenue ditch 10078 contained low numbers of shells. The largest of these assemblages (from context 10083) was dominated by *Pupilla muscorum* and *Trochulus hispidus*; no shade-loving species were recovered and a similar range of species was observed in the bulk samples, with the addition of the shade-loving species *Aegopinella nitidula*. Very small quantities of shells were recovered from the four mollusc samples from ditch 10068; the bulk samples also included shells of the intermediate

species *Punctum pygmaeum* and *Vitrina pellucida* and the shade-loving species *Aegopinella nitidula* and *Discus rotundatus*. These assemblages were similar to those recorded from ditch 10078.

7.4.3 The molluscs noted in the bulk sample from the Heel Stone ditch 10094 included shells of the open country species *Vallonia excentrica*, *Vallonia costata*, *Pupilla muscorum*, *Vertigo pygmaea* and *Helicella itala*, the intermediate species *Trochulus hispidus*, *Cochlicopa* sp. and *Cepaea* sp., and the shade-loving species *Clausilia bidentata*.

7.4.4 The mollusc shells recorded in the bulk samples from feature 10018 were very well preserved, with a number of them still having the periostracum present. They included open country species *Vallonia excentrica*, *Vallonia costata*, *Pupilla muscorum*, *Helicella itala* and the introduced Helicellids, and the intermediate species *Trochulus hispidus*.

7.4.5 These assemblages appear to be broadly indicative of a well-established open downland landscape, probably of grassland. The shade-loving elements are more likely to be exploiting long grass or niche habitats within the ditches rather than being representative of woodland environments.

7.5 Geoarchaeology

7.5.1 Monolith samples were taken through contexts 10002–10006 in feature 10018 for the geoarchaeological examination and assessment of the burnt layers. The sediment descriptions are given in Table 4.

Table 4 Sediment descriptions of burnt layers in feature 10018

Depth (m OD)	Context	Sediment description
0–0.05	10002	10YR 3/3 dark brown silt loam to silty clay loam, sparse chalk pea grit 2–3 mm (in worm burrows largely), occasional chalk pieces <15 mm, occasional flint <30 mm (larger pieces noted higher up). Boundary sharp but mixed.
0.05–0.21	10004	5YR 4/6 yellowish red silt loam to silty clay loam, very friable ('Edinburgh rock' texture), 2% fine macropores, rare very small ?chalk pieces, occasional burnt flint up to 50 mm (no unburnt flint observed). Some wormholes with unburnt material from upper contexts in. Slightly yellower to top and darker to base. Boundary clear. After sieving samples and comparing inclusion content, tallies well with immediately local toil/subsoil. Decalcification probably a result of high temperature fire, combined with subsequent water percolation of this permeable poorly consolidated context.
0.21–0.24	10005	10YR 3/2 very dark greyish brown silt loam, very fine macropores 2–5%, very humic, moist, slippy, darkening to black at base and in places with noticeable fine charcoal material. Sharp irregular boundary. Texture very unusual, very fine and slippery – either very fine humics, or more probably ash.
0.24–0.40	10006	10YR 6/3 pale brown silt loam, common small chalk fragments, occasional flints sometimes large (80 mm).
0.40+		Hollow fills

7.6 Scientific dating

7.6.1 A radiocarbon date was obtained on three seeds of oat/brome grass (*Avena*/*Bromus* sp.) from deposit 10005 in feature 10018. It has been calibrated against the IntCal09 Northern

Hemisphere radiocarbon curve (Reimer *et al.* 2009) using the program OxCal 4.1 (Bronk Ramsey 1995; 2001). Calibrated dates are quoted as calibrated years AD/BC. Date ranges are quoted using the 2σ calibrated range (95.4%) with the end point rounded outwards to 5 years (Bayliss *et al.* 2008, xii).

7.6.2 A post-AD 1600 date for the burning is indicated (**Table 5**).

Table 5 Radiocarbon result

Sample and context	Material identification	Laboratory code	Radiocarbon age	$\delta^{13}C$ (‰)	Calibrated date range (95.4% confidence)
<107> 10005	Charred seeds: 3 *Avena*/*Bromus*	SUERC-43905	185±25 BP	-23.8	cal AD 1655–1955

8 POTENTIAL AND RECOMMENDATIONS FOR FURTHER WORK

8.1 Stratigraphic potential

Neolithic

8.1.1 The excavation of the features within the line of the A344 adjacent to Stonehenge (Fig. 5) – the Heel Stone ditch and the two Avenue ditches – suggests that they had not been significantly truncated by the road's construction. Determining the level of truncation, however, is hampered by the difference between the OD heights recorded during this project and those recorded during previous investigations, particularly those based on the height of 100.70 m OD for the benchmark carved into the roadside face of the Heel Stone.

Heel Stone ditch

8.1.2 Only the outer edge of the Heel Stone ditch was excavated, and it appears likely that the short length of its exposed side was near the top of the ditch. In the adjacent section recorded by Pitts in a trench on the south side of the road (trench C91; Fig. 5) the ditch was approximately 0.65 m deep (Pitts 1982, fig. 5), but Hawley had recorded it as 1.2 m deep (Hawley 1925, 25). The two fills recorded (10095 and 10096), therefore, probably represent the ditch's upper secondary and tertiary fills, respectively, lying well above the basal fills in which Hawley had found an antler pick, but probably corresponding closely to the uppermost part of the profile in which the majority of Bluestone chips had been concentrated (*ibid*.). Only two pieces of worked flint were recovered from 10095.

8.1.3 The Heel Stone ditch has no potential for further analysis, although a description, plan and section should be published.

Avenue ditches

8.1.4 The finding from the slots cut through the Avenue ditches conform closely to the results of earlier excavations. The excavated sections lie between the observations by the Vatchers in the trench on the north side of the A344 (trench C83), and by Pitts on the south side (trench C91) (Fig. 5). The profiles of the ditch fall within the considerable range of variability recorded in previous excavations, generally either V-shaped or with a rounded bottom, up to 2.3 m wide and 1.06 m deep (Cleal *et al.* 1995, 306).

8.1.5 In the drawn sections, both ditches were over 0.75 m deep. This is significantly deeper than the approximately 0.55 m depth recorded by Pitts for the southern ditch (Pitts 1982, fig. 13), and approaching the approximately 0.8 m depths recorded for both ditches by the Vatchers in the trench to the north-east, where remnants of the banks had survived overlying distinct rises in the Chalk (Cleal *et al.* 1995, fig. 180). This suggests that while

any remnant bank material had been levelled during road construction, the upper levels of the ditches may not have been significantly truncated. This appears to be confirmed by the very shallow nature of their upper sides and by the recording of possible periglacial features both in plan and in section.

8.1.6 The fills sequences recorded in the two ditches are also broadly consistent with those recorded in previous excavations, reflecting the significant variation even over short distance. There was no evidence in the southern ditch (10068), for example, for the suggested recut truncating the primary in trench C83; similarly no such recut had been observed in trench C91.

8.1.7 There were clear indications, however, in three of the four sections, for the preferential filling of the ditches from their inner sides, which is likely to reflect the erosion of bank material. In the southern ditch (10068) this is clearly seen, in the south-west facing section, in lower secondary fill 10072, and again, following a period of possible stabilisation represented by layer 10071), by two upper secondary fills (10100 and 10101). This is not so clear in the opposing section. In the northern ditch (10078, both section), there are some indications of this process in the primary fills (10085 and 10121), but it is clearer in the upper secondary fills (10083 and 10115).

8.1.8 While worked flints were recovered from throughout the fill sequences (form primary, secondary and tertiary fill), the stone fragments were recovered only from the lower levels of their tertiary fill (10070 and 10081); this too is consistent with earlier findings (Cleal *et al.* 1995, 314–17). All other finds (animal bone, and post-medieval pottery and clay tobacco pipe) were from the uppermost fills.

Summary

8.1.9 The results of the excavation of the sections through the Heel Stone ditch and the Avenue ditches show that these features had not been significantly truncated by the road's construction and have the potential to provide a fuller picture of these parts of the monument. They largely confirm the results from previous observations in the immediately adjacent trenches. There is no potential for further stratigraphic analysis.

Post-medieval

8.1.10 Clues to the original function of feature 10018, and the burning event which occurred in it when it had partially filled up, are suggested by historic map evidence. The 1st edition OS map (1877–80) shows a small earthwork at the feature's location. Just to the south-east, on the other side of the road, was a large square embanked pond, of a type ('Imber pond') frequently found in Wiltshire: the pond is also shown (although not in this form) on earlier 19th century maps. One possibility is that feature 10018 was a quarry for the construction of the pond's bank; another large possible pit has been identified to its immediate south-west from aerial photographs (WSHER MWI7203). Before this area's inclosure *c.* 1812 much of it had probably been open pasture, and ponds would have been necessary to provide water for sheep grazing on the downs. As rainwater filters through the Chalk it collects at different levels, often emerging in dry valleys, and the presence of a well at this location (and a nearby 'Well House' by 1901) may indicate a natural, if seasonal, water source.

8.1.11 The burning event is also likely to be related to changing agricultural practices (Bond 1991). One process which could have led to the formation of the burnt deposits was the burning of turves, historically referred to in Wiltshire as 'burnbaking' (also known as denshiring, paring or burn-beating), in preparation for short-lived or intermittent cultivation (Kerridge 1967, 25). The turf was skimmed off with a breast-plough, loosely piled and

dried, then ignited at the top and left to smoulder, with the resultant ash spread over the fields and ploughed in. The partly infilled hollow left by the suggested quarry may have been considered a suitable location for the firing of the turves. The process, while burning the underlying turf line (10005), was insufficiently hot to redden the soil (10006) below it (although the soil did produce 2876 g of burnt flint). The red burnt layer (10004), may represent the burnt soil component from the turves piled up as the turves were raked together.

8.1.12 On its own, burnbaking produced only short-term benefits in the form of four or five years of arable cropping, after which the land needed to be heavily manured, or have sheep flocks folded on it. It only made economic sense in the context of wider agricultural improvements involving the growth of flocks and increased feed and fodder. The 17th century saw the increasing breaking up of the Downs for arable cultivation (Bond 1991, 109); Aubrey, for example, estimated that at least a quarter of Salisbury Plain had been converted to arable at some time between 1660 and 1685 (Kerridge 1967, 26), and there was further extensive burnbaking at the time of inclosure in the late 18th–early 19th centuries when corn prices were very high, particularly of the shallow 'blackland' soils of the higher downs, although these became quickly exhausted. Areas of 18th and 19th century burnbake are shown on maps as fieldnames along the south side the A344 immediately west of Stonehenge, as well as on Durrington Down and King Barrow Ridge (Bond 1991, figs H2–3, H5; Field and Pearson 2011).

8.1.13 This feature, therefore, has considerable potential in relation to understanding the changing agricultural regimes of the Stonehenge landscape, and their impacts on its archaeology. In 1876 William Long noted that 'Cultivation of the down adjoining Stonehenge is gradually closing in on it and on the west side has already resulted in the obliteration of the groups of barrows' (Long 1876, 186). Feature 10018 lies just over 1 km west on the 18th century burnbake field west of Stonehenge, and while burnbake sites must have been relatively common across the affected areas of the downs, they are not common in the archaeological record, making this example so close to Stonehenge of particular interest.

8.1.14 The recent A344 road, between Amesbury to Shrewton, was constructed in the early 1760s. The watching brief at Stonehenge revealed its construction cut and associated bedding and surface deposits, which have no potential for further analysis.

8.2 Finds potential

8.2.1 The Bluestone pieces have been analysed for the purposes of this report, and will be further studied petrographically by Dr R Ixer. It is probable that they belong to one of the stone groups that is already well-described. However, it is possible that they belong to one of the known orthostats, in which case it will be important to undertake further analysis (petrological thin-section and description) to accurately characterise the rock fragment for comparative purposes. The results will be published as part of the proposed publication. A selection of the rock fragments will be illustrated.

8.2.2 No further analysis of the flint is required, but the three fragments of multi-platform cores, one of which had been used as a hammer, will be illustrated (see Pl.48). A report on the flint will be included in the publication.

8.2.3 There is no potential for the further analysis of any of the other finds, although a summary of this material will be included in the report.

8.3 Environmental potential

Charred plant remains

8.3.1 Due to the virtual absence of charred material, no information on the local environment during the Neolithic can be discerned from the charred assemblages from Heel Stone ditch and the two Avenue ditches.

8.3.2 The charred plant assemblages from feature 10018 have the potential to provide some very limited information on the nature of the local environment and local agricultural practices in the post-medieval period. A summary of these results will be included in the publication report.

Wood charcoal

8.3.3 There is no potential for the analysis of the wood charcoal to provide information on the species composition and the management and exploitation of the local woodland resource due to the small quantity of remains recovered.

Land snails

8.3.4 Due to the low number of snail shells recovered, detailed analysis of the assemblages from the Avenue ditches is unlikely to help provide a detailed picture on the nature of the local landscape during the Neolithic and how this changed.

Geoarchaeology

8.3.5 No further geoarchaeological analysis of the burnt layers in feature 10018 is considered necessary, although a summary will be added to the publication report.

Radiocarbon dating

8.3.6 There is no further potential for radiocarbon dating. A short report on the radiocarbon date obtained for the burnbake feature will be included in the publication.

9 PUBLICATION PROPOSALS

9.1.1 Although the excavation of the Heel Stone ditch and the two Avenue ditches has added little new information to that gained from previous excavations by Hawley, Atkinson, the Vatcher's and Pitts (Cleal *et al.* 1995), the importance of these features within the context of Stonehenge means that these results are considered to be of considerable significance, and therefore merit detailed publication. The associated finds will be published at an appropriate level, with selected pieces illustrated.

9.1.2 The discovery of a possible burnbake site south of the Airman's Cross junction provides important new information about this agricultural practice which historic map evidence shows was a significant element of post-medieval and early 19th century landuse in the Stonehenge landscape, and which may have been directly associated with agricultural practices that impacted negatively on the archaeological resources, including the levelling of round barrows, field systems and other monuments.

9.1.3 The report will also include a signpost note of the other mitigation works as a record of the changes made during the improvement works to the World Heritage Site.

9.1.4 It is recommended that an article on the findings of the archaeological mitigation be submitted for publication in the *Wiltshire Archaeological and Natural History Magazine*, (*WANHM*) a peer-reviewed journal with a regional and national readership. This will

describe the Heel Stone and Avenues ditches within the context of the earlier excavation results. It will also describe the burnbake feature, and discuss its significance within the context of documentary and cartographic evidence.

Publication synopsis

9.1.5 *Along the Road to Stonehenge: investigations of the Stonehenge Avenue and within the World Heritage Site* by Andrew Powell with contributions by Phil Harding, Rob Ixer and Matt Leivers (7500 words, 7 figures, 4 plates):

Introduction
Investigations of the Avenue and Heel Stone
Finds: flint and worked stone, summaries of other categories.
Burnbake feature integrating the environmental evidence and the radiocarbon date.
A short summary on the repositioning of Airman's Cross, the former A344, the milestone and the decommissioning of the old Visitors Centre.

Management structure

9.1.6 WA operates a project management system. The team will be headed by a Post-Excavation Manager who will assume ultimate responsibility for the implementation and execution of the project specification as outlined in the WSI (WA 2014b), and the achievement of performance targets, be they academic, budgetary, or scheduled.

9.1.7 The Post-Excavation Manager may delegate specific aspects of the project to other key staff, who will both supervise others and have a direct input into the compilation of the report. They may also undertake direct liaison with external consultants and specialists who are contributing to the publication report, and the museum named as the recipient of the project archive. The Post-Excavation Manager will have a major input into how the publication report is written. They will define and control the scope and form of the post-excavation programme.

9.1.8 The Post-Excavation Manager will be assisted by the Reports Manager, who will help to ensure that the report meets internal quality standards as defined in WA's guidelines.

Task list

Main task	Task description	Days	Staff
	Management/ Support		
1	Project management	2	Barclay A
1	Project management: finds & archive	1	Mepham L/Seager Smith R
	Pre-analysis		
2	Project meetings	0.5	All
3	Background research	0.5	Powell A
	Finds and environmental		
4	Summarise flint report for publication	0.5	Leivers M
5	Summarise worked stone report incorporating results from petrological analysis	0.5	Harding Pl
6	Stone – specialist geological identification and reporting	1	Ixer R
7	Summarise other finds categories	0.5	Powell A
8	Finds illustrations and plates	2	Illustrator
9	Palaeo-environmental summary and integration into report	0.5	Powell A

Main task	Task description	Days	Staff
	Reporting		
10	Introduction	0.5	Powell A
11	Avenue and Heel Stone	0.5	Powell A
12	Burnbake feature	0.5	Powell A
13	Other features	0.5	Powell A
14	Discussion	0.5	Powell A
15	Site illustrations	3	Illustrator
16	Check and compile bibliography and report	0.5	Powell A
17	Compile and integrate report	1	Powell A
18	Edit report	1	Barclay A
19	Review report	0.5	P Bradley
20	Check proofs	0.25	All
21	Liaising with journal	0.25	P Bradley
22	Journal publication cost *Proceedings of the Somerset and Natural History Society*		Ext
	Archiving		
23	Final archive ordering	0.5	Powell A
24	Finds archive check	0.25	Nelson S
25	Environmental archive check	0.25	Wyles S
26	Digital data preparation	0.5 0.5	Powell A Newton D Office
27	Security copying of paper records	0.5	TBC
28	Archive deposition		External

10 STORAGE AND CURATION

10.1 Museum

10.1.1 The project archive resulting from the excavation is currently held by Wessex Archaeology under the site code 76862. It is recommended that it is deposited with Salisbury and South Wiltshire Museum. The Museum has agreed in principle to accept the project archive on completion of the project (an accession code will be issued by the museum upon deposition). Deposition of any finds with the Museum will only be carried out with the full agreement of the relevant landowners.

10.2 Preparation of the archive

10.2.1 The complete project archive, which will include paper records, photographic records, graphics, artefacts, ecofacts and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material by Salisbury and South Wiltshire Museum, and in general following nationally recommended guidelines (SMA 1995; CIfA 2014b; Brown 2011; ADS 2013).

10.2.2 All archive elements will be marked with the site/accession code, and a full index will be prepared. It comprises a ring-bound file containing a watching brief attendance form, site

'day book', trench record sheets, photographic register and *Written Scheme of Investigation*. The physical archive comprises the following:

- 1 cardboard box of artefacts & ecofacts, ordered by material type
- 2 files of paper records & A3/A4 graphics
- 6 A1 graphics

10.2.3 Details of the project will be submitted online to the OASIS (Online Access to the Index of Archaeological Investigations) database (Appendix 1).

10.3 Conservation

10.3.1 The Airman's Cross memorial and the Airman's Corner milestone have been conserved. No other finds have been identified as of unstable condition, and in need of further conservation treatment.

10.4 Discard policy

10.4.1 Wessex Archaeology follows the guidelines set out in Selection, Retention and Dispersal (Society of Museum Archaeologists 1993), which allows for the discard of selected artefact and ecofact categories which are not considered to warrant any future analysis.. Any discard of artefacts will be fully documented in the project archive.

10.4.2 The discard of environmental remains and samples follows nationally recommended guidelines (SMA 1993; 1995; English Heritage 2002).

10.5 Copyright

10.5.1 The full copyright of the written/illustrative archive relating to the site will be retained by Wessex Archaeology Ltd under the Copyright, Designs and Patents Act 1988 with all rights reserved. The recipient museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use shall be non-profitmaking, and conforms with the Copyright and Related Rights regulations 2003.

10.6 Security policy

10.6.1 In line with current best practice (e.g. Brown 2011), on completion of the project a security copy of the written records will be prepared, in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

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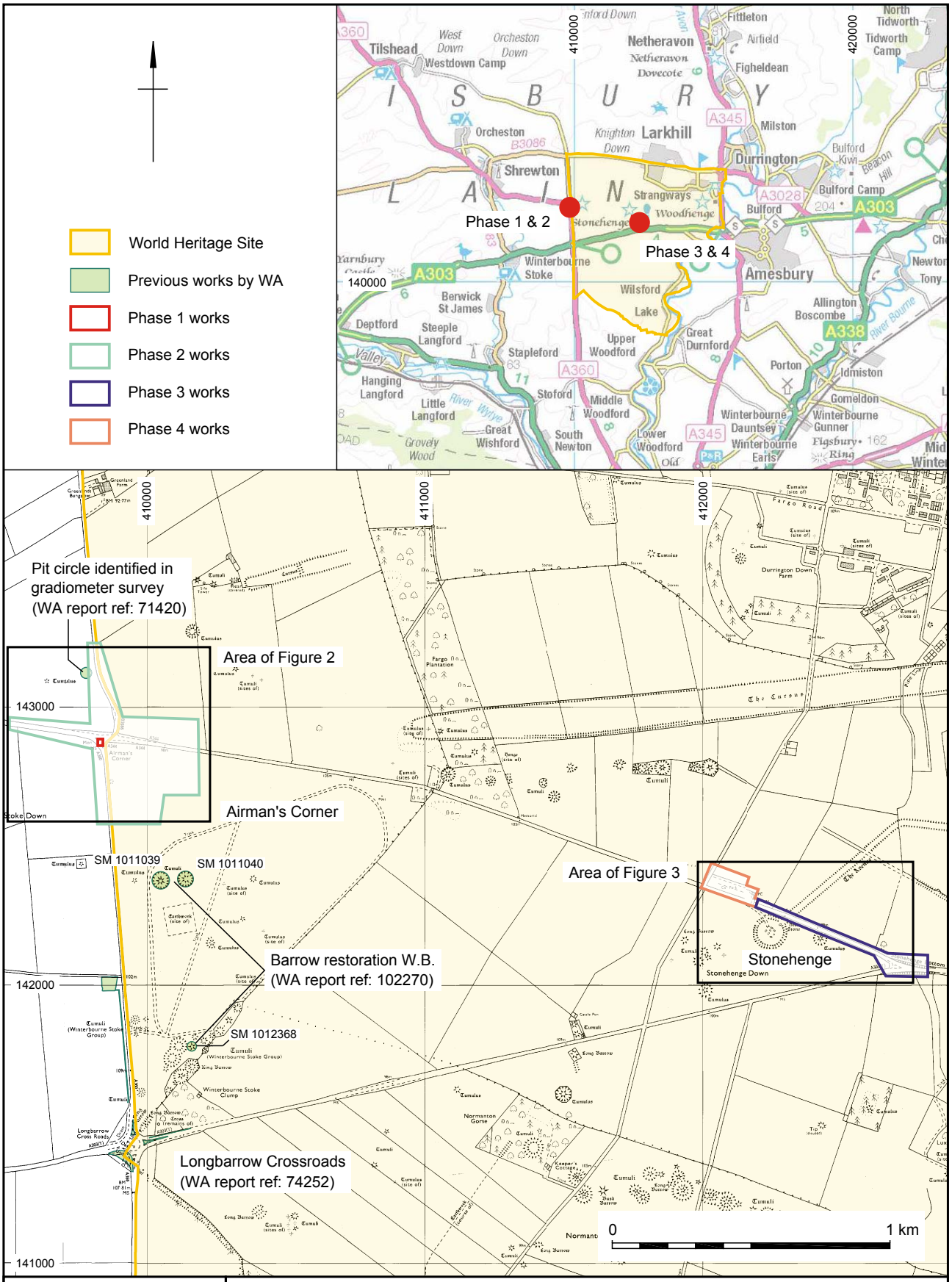
APPENDIX 1 – OASIS RECORD FORM

Stonehenge Environmental Improvements Project, Wiltshire - Wessex Archaeology

OASIS ID - wessexar1-191014

Versions				
View	**Version**	**Completed by**	**Email**	**Date**
View 1	1	Sue Farr	S.farr@wessexarch.co.uk	26 September 2014
Completed sections in current version				
Details	**Location**	**Creators**	**Archive**	**Publications**
Yes	No	Yes	Yes	1/1
Validated sections in current version				
Details	**Location**	**Creators**	**Archive**	**Publications**
No	No	No	No	0/1
File submission and form progress				
Grey literature report submitted?	No		**Grey literature report filename/s**	
Images submitted?	No		**Image filename/s**	
Boundary file submitted?	No		**Boundary filename**	
HER signed off?			**NMR signed off?**	



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Scheme location with Phase 1-4 mitigation works

Figure 1

409600
409800
410000
410200
143200
143000
142800
142600

Tumulus

Pl. 10

Pl. 11

Pl. 13

Airman's Cross (original location)
Pl. 1-6

Pl. 9

Milestone (original location)
Pl. 8
Milestone (new location)

10018 (see Figure 4)

New visitor centre

Imber pond

Pl. 12

Pl. 7

Airman's Cross (new location)

98.0m

93.5m

Stonehenge Visitor Centre

Down

World Heritage Site
Phase 1 works
Phase 2 works
Geotechnical test pit
Areas of watching brief
Area of imported material
Archaeological feature
Direction of plate

0 100 m

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Mitigation works at Airman's Corner adjacent to the new visitor centre

Figure 2

412000
412200
412400
412600
142400
142200

Old visitor centre

Mesolithic post-holes

Car Park

Trench C82
(Vatchers 1966)

Location of temporary inspection chamber for BT cable duct
(see Wessex Archaeology report T19930.01)

Area of Figure 9

Area of Figure 5

The Avenue

Stone

S00052419

Pl. 17

98.5m

Stonehenge

Pl. 54

Tumuli

Tumulus
(site of)

Stonehenge Down

Tumulus

Bell Barrow
S00031192

World Heritage Site
Phase 3 works
Phase 4 works
Geotechnical test pit
Topsoil test pit
Areas of watching brief
Area of imported material
Archaeological feature
Upper fill of ditch (extent unknown)
Tree-throw hole
Direction of plate
Position of stone-hole marker

0 100 m

Date:	08/01/2015
Revision Number:	0
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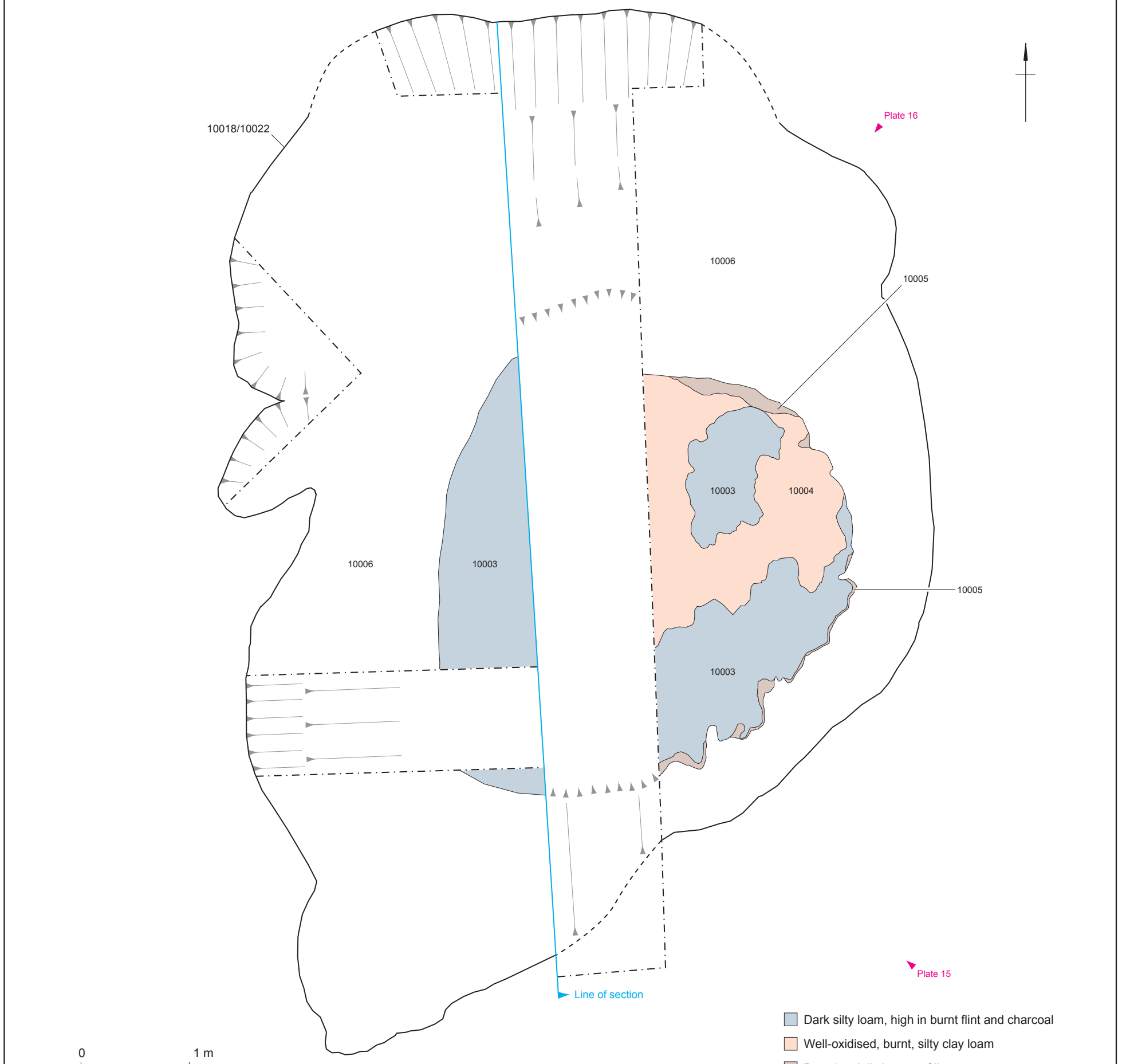
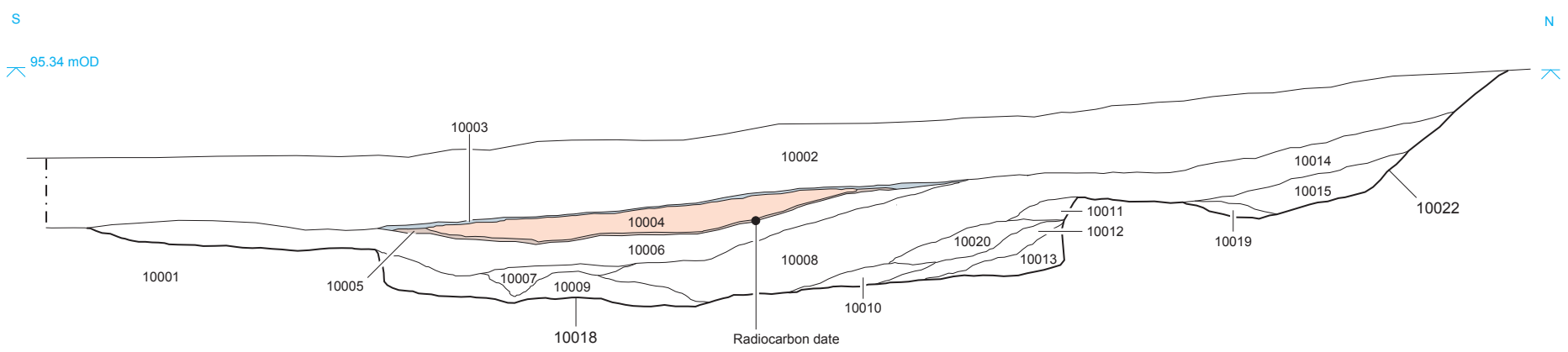
Mitigation works on A344 at Stonehenge and old visitors centre

Figure 3





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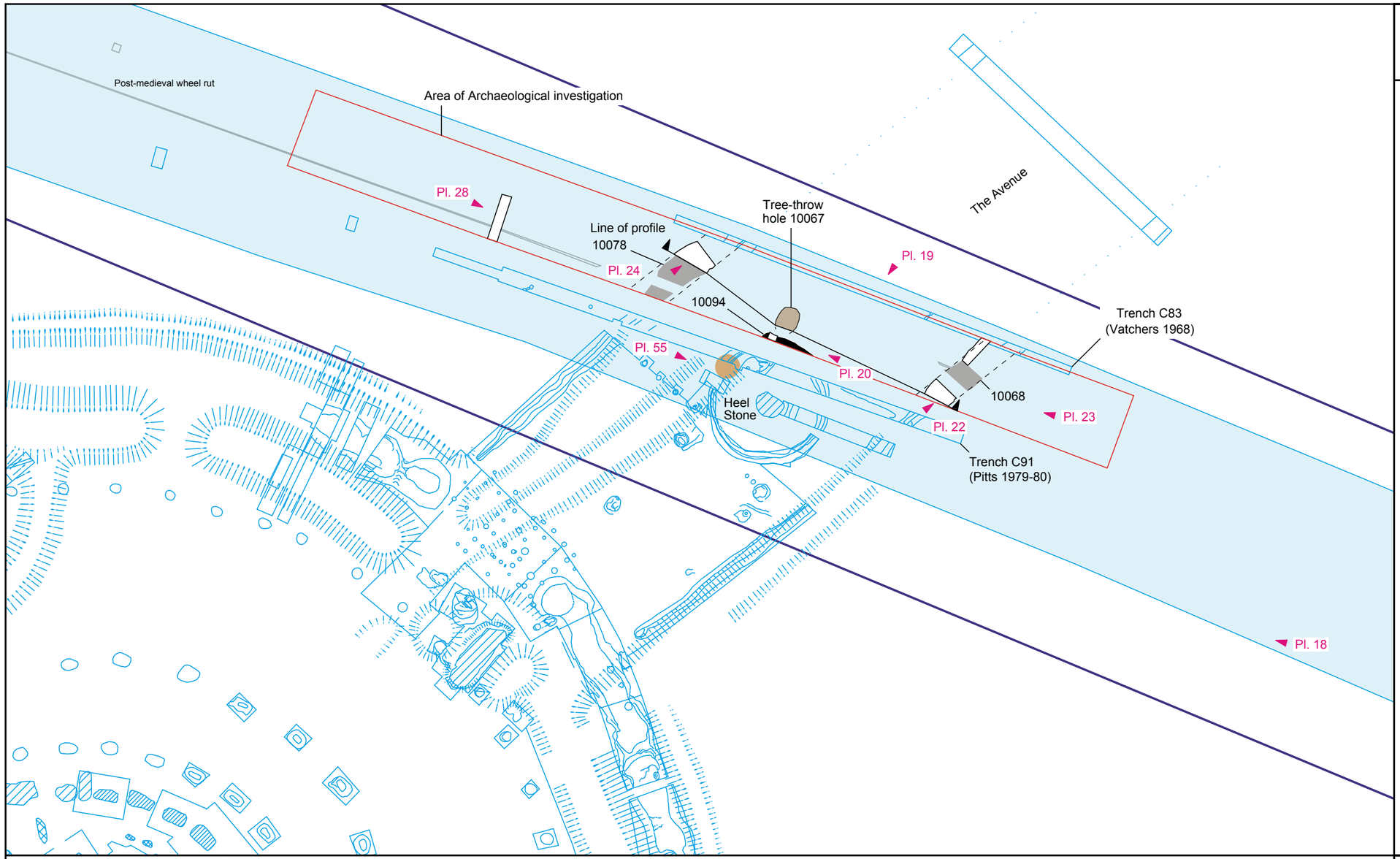
Plan of feature 10018 during excavation, Burnt layers 10003-6 exposed in plan

Figure 4



Phase 3 works

Areas of watching brief

Archaeological feature

Upper fill of ditch (extent unknown)

Projected line of ditch

Slot

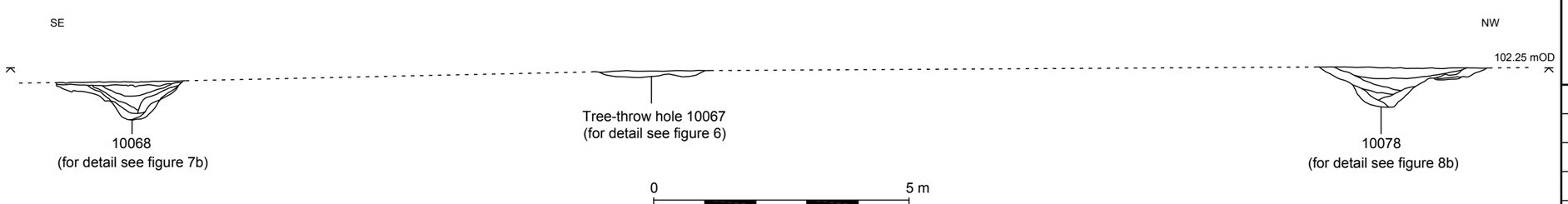
Previously recorded in Cleal *et al.* 1994

Direction of plate

Position of stone/hole marker

0 10 20 m

The Avenue North-east facing profile



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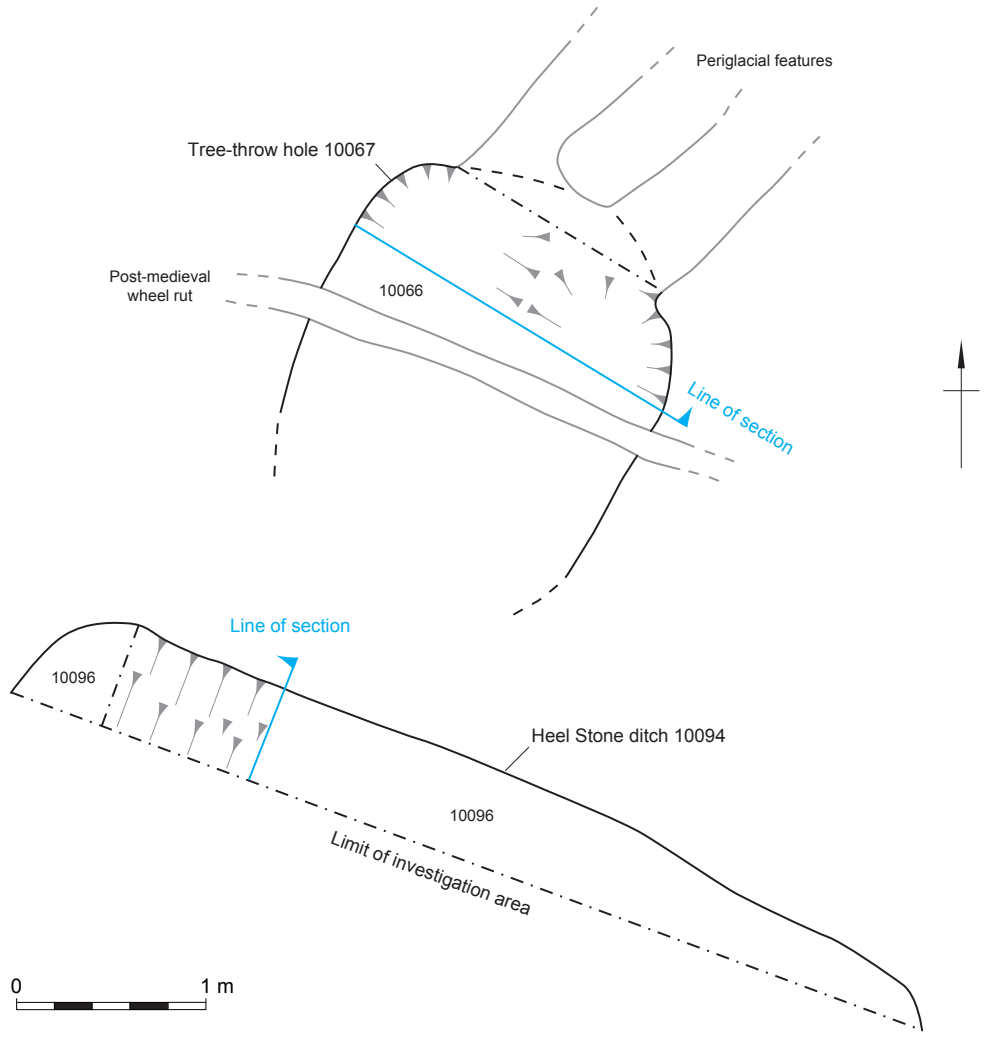
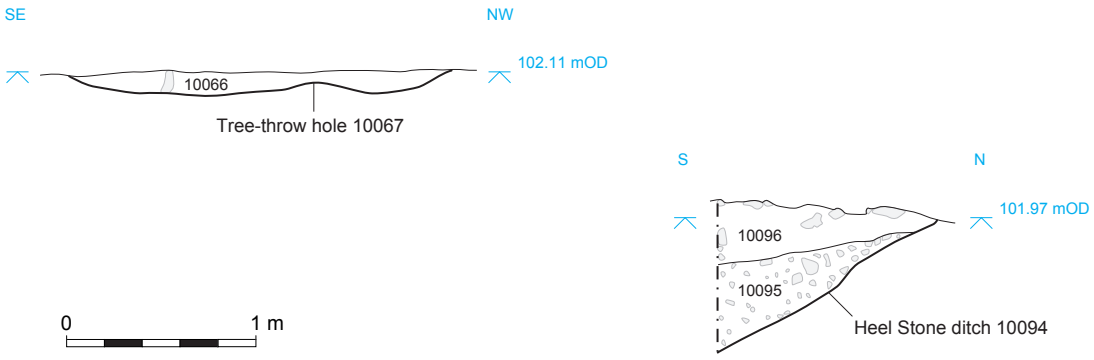
Watching_brief_reworked\2014_12_18\76862_watching_brief_areas.dwg

Excavated features on the A344 at Stonehenge in relation to previous investigations, and north facing profile of the avenue and its ditches

Figure 5





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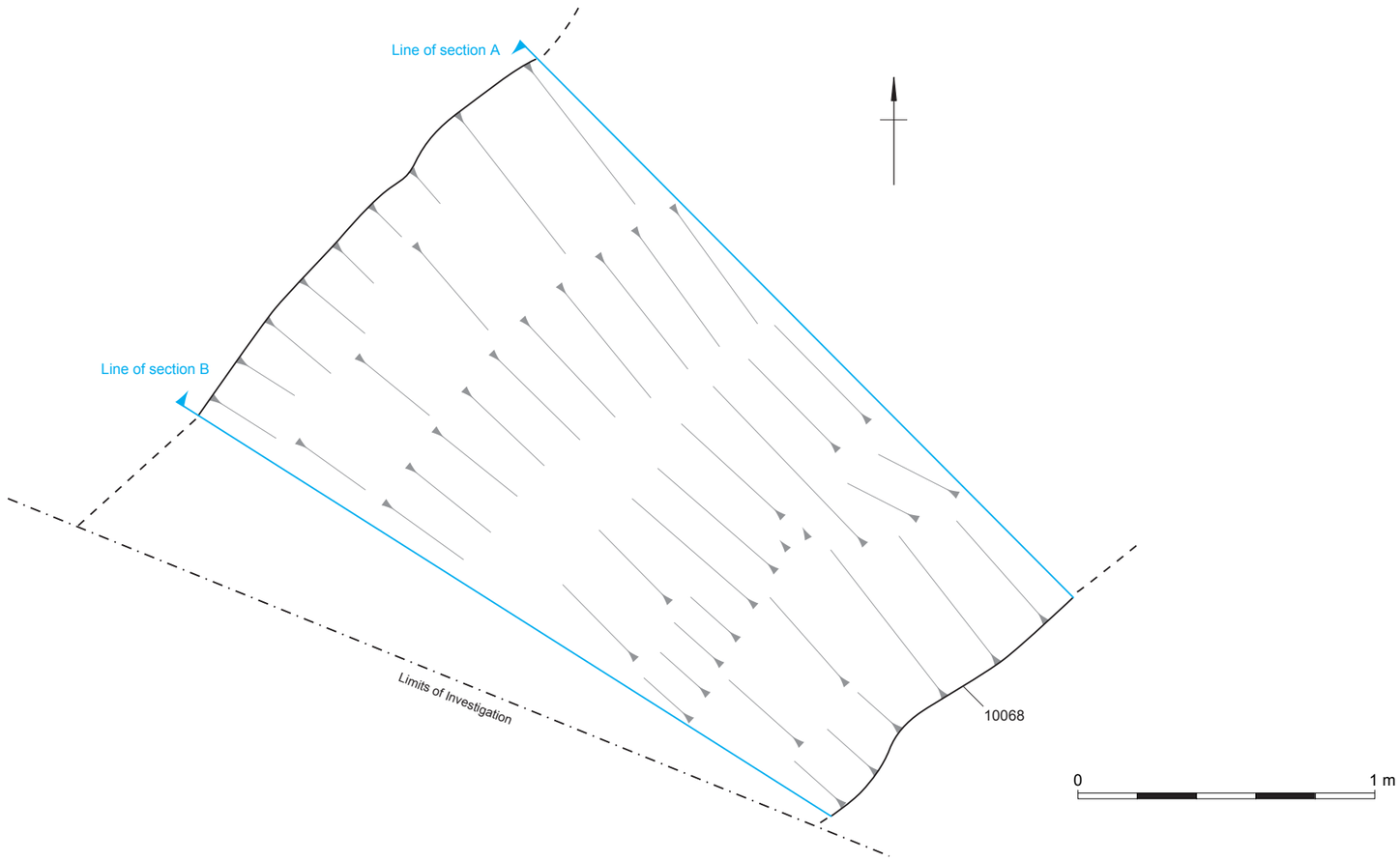
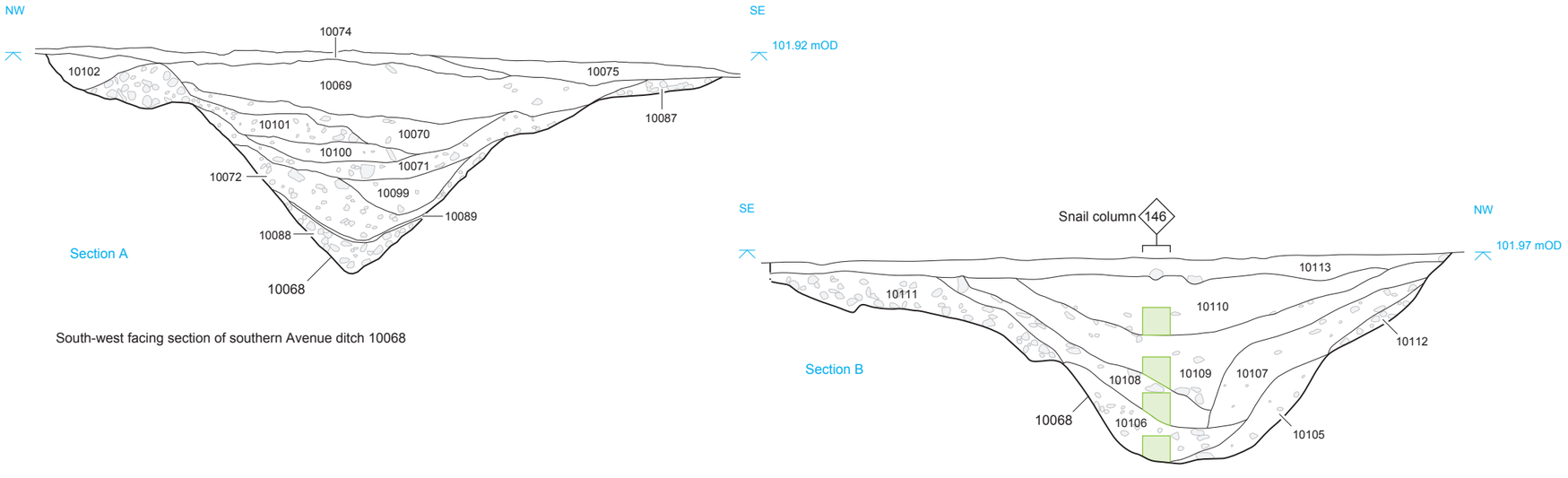
Heel Stone ditch and adjacent tree-throw hole, plans and sections

Figure 6





South-west facing section of southern Avenue ditch 10068

North-east facing section of southern Avenue ditch 10068

Revision Number:	1
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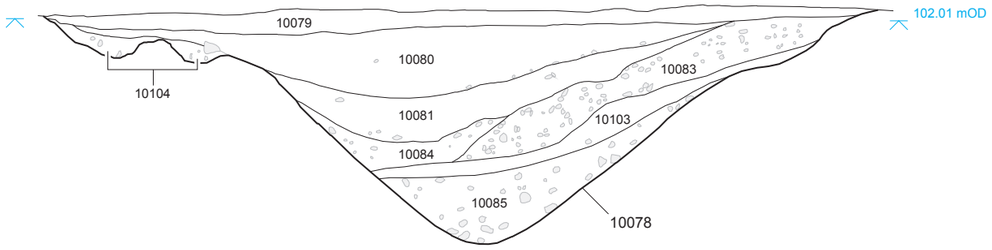
Southern Avenue ditch, plans and sections

Figure 7

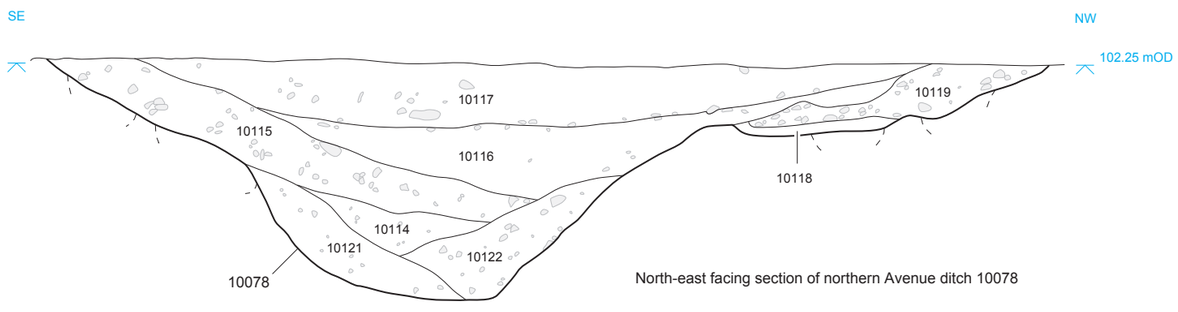
Unexcavated periglacial feature

Section A



South-west facing section of northern Avenue ditch 10078

Section B



North-east facing section of northern Avenue ditch 10078

0 1 m

Revision Number:	1
Illustrator:	RG
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Scale:	1:20 @ A3

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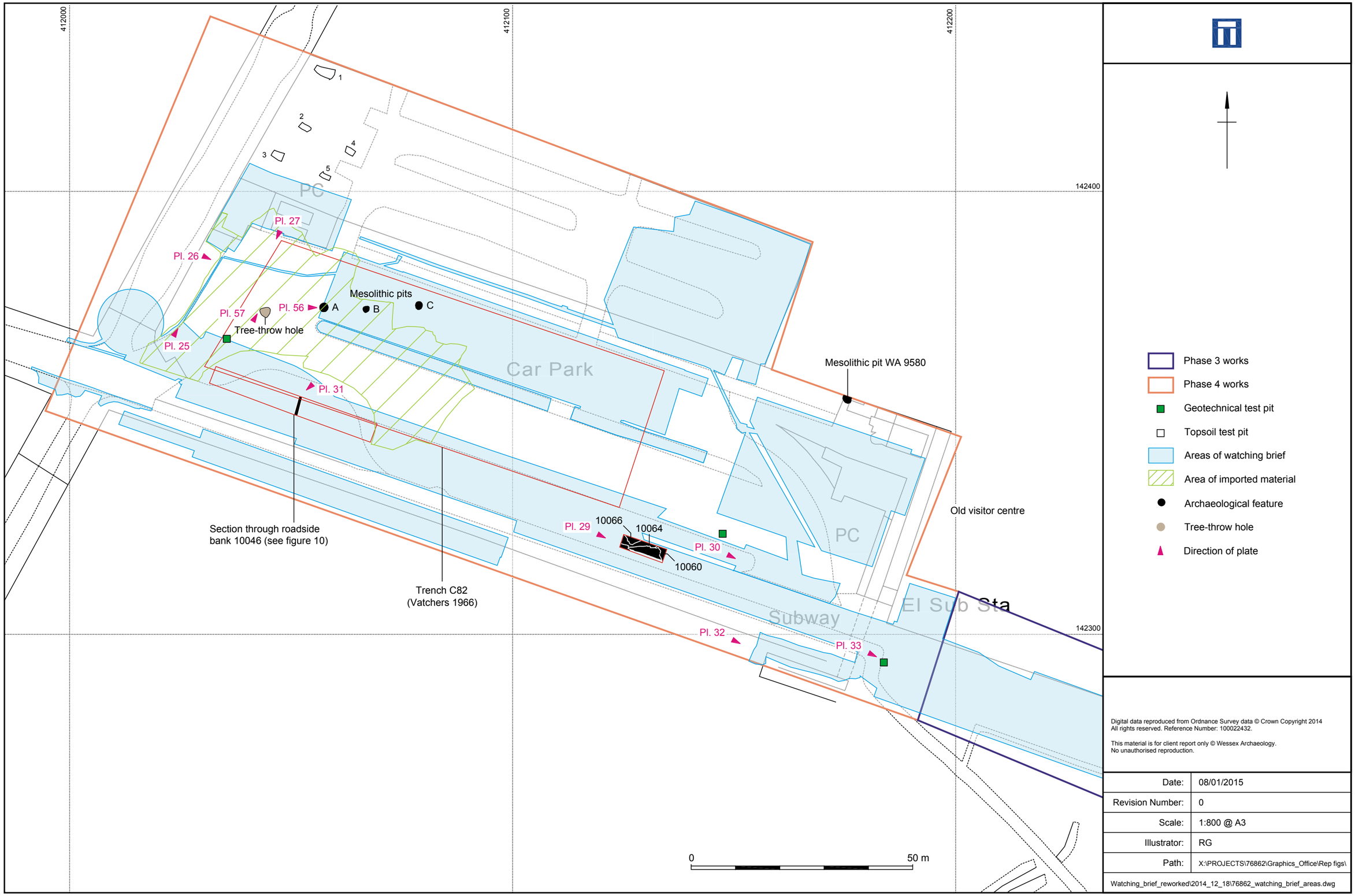
Northern Avenue ditch, plans and sections

Figure 8



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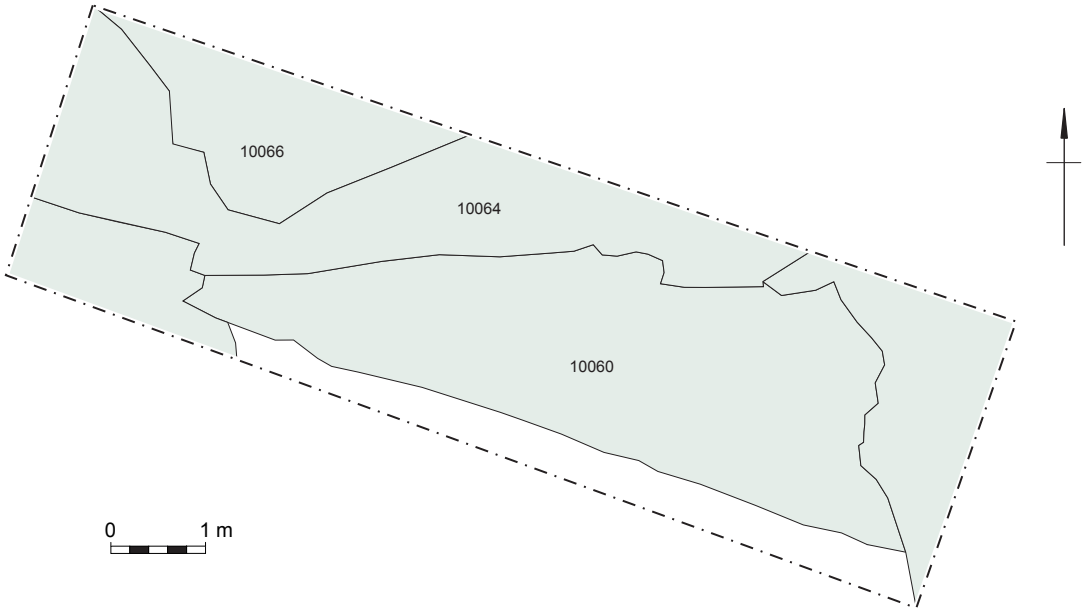
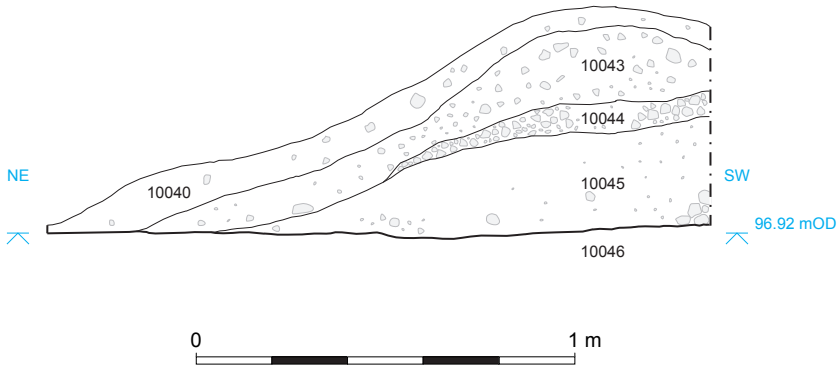
Mitigation works at the old visitors centre

Figure 9





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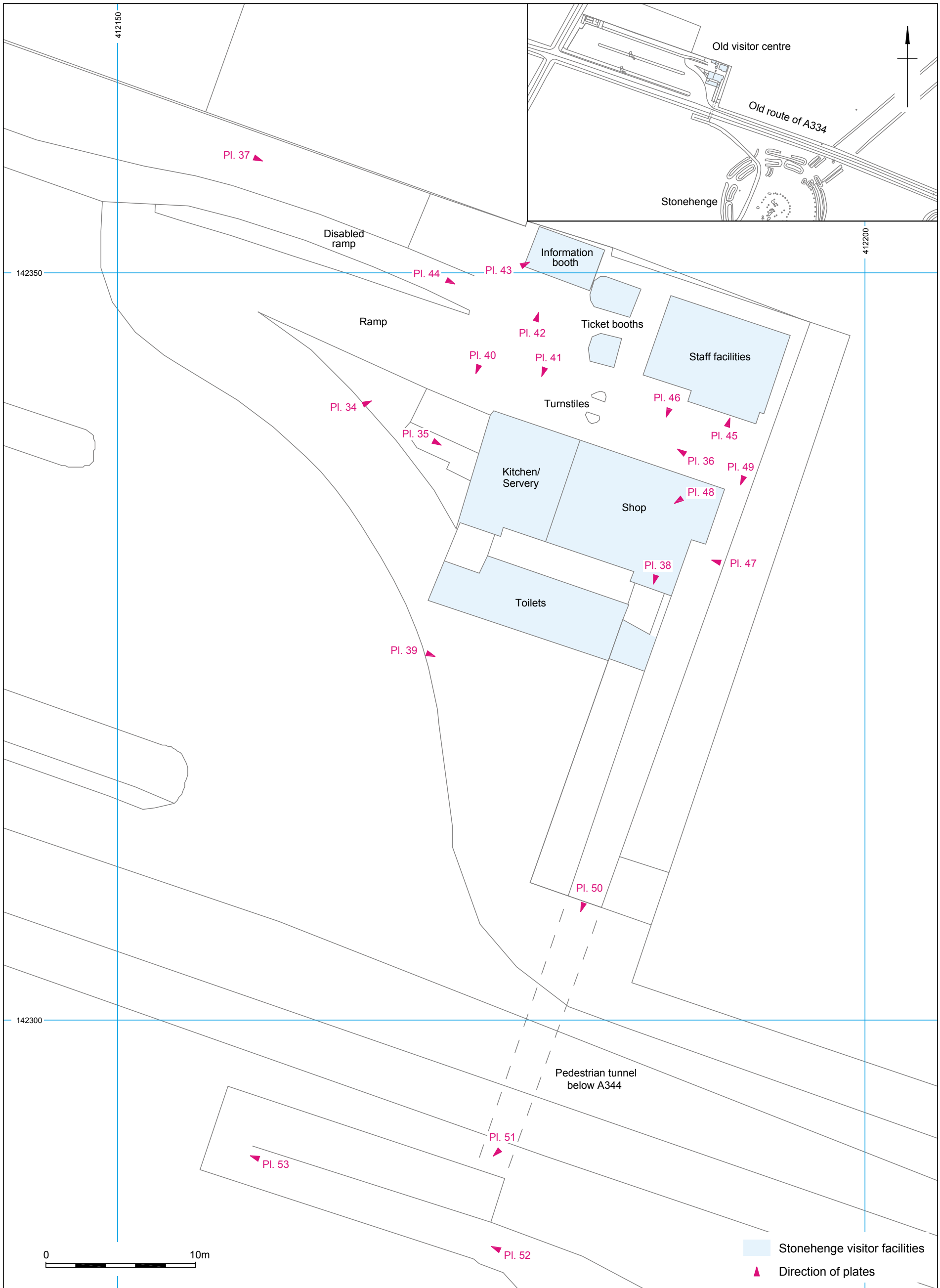
Road bedding layers and section through roadside bank 10046 Figure 10



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Plan of the old visitor facilities at Stonehenge, showing locations of building recording photographs

Figure 11

Plate 1: The Airman's Cross in its original position viewed from the south

Plate 2: The Airman's Cross viewed from the north

Date:	16/01/15	Revision Number:	0
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Plate 3: The Airman's Cross viewed from the west

Plate 4: The Airman's Cross viewed from the south-west

Date:	16/01/2015	Revision Number:	0
Scale:	n/a	Illustrator:	RG
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Plate 5: Lifting of the dedication plaque of the Airman's Cross memorial

Plate 6: Lifting of the Airman's Cross

Date:	16/01/2015	Revision Number:	0
Scale:	n/a	Illustrator:	RG
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Plate 7: The Airman's Cross in its new position outside the new Visitor Centre

Plate 8: Lifting of the milestone at Airman's Corner

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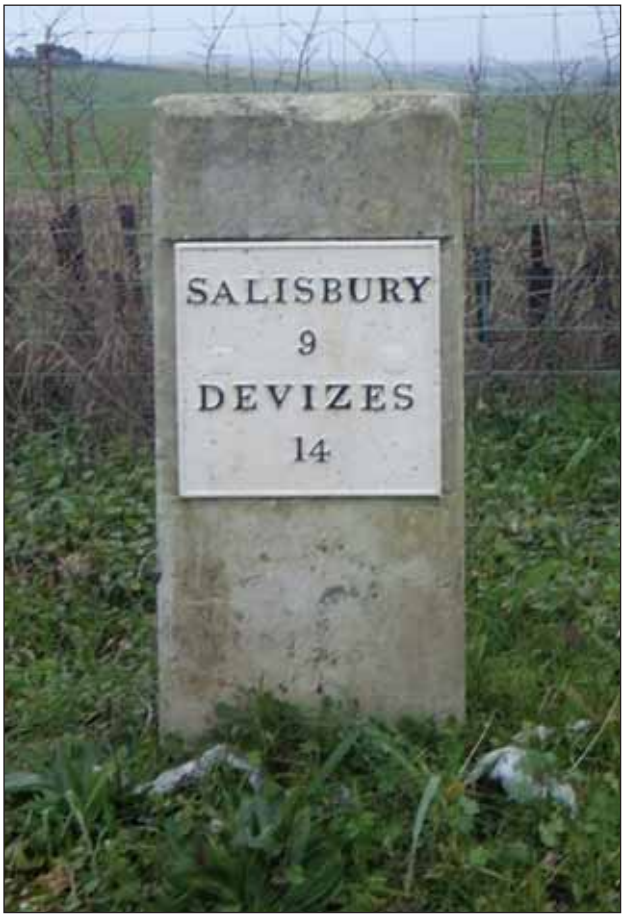

Plate 9: The reinstated milestone

Plate 10: Excavation of road realignment, north of Airman's Corner

Date:	16/01/2015	Revision Number:	0
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Plate 11: Further excavation of road realignment, north of Airman's Corner

Plate 12: The importing of materials at the new Visitor Centre car park

Date:	16/01/15	Revision Number:	0
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Plate 13: Excavation of drainage trenches during Phase 2 works

Plate 14: Section showing stratigraphy in Phase 2 area

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Plate 15: Excavation of drainage trenches during Phase 2 works

Plate 16: Burnt deposits in feature 10018, during excavation, viewed from the north-east

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Plate 17: Puncturing the tarmac along the A344 following its closure

Plate 18: Laying of geotextile over Phase 3 area

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Plate 19: Periglacial features within the Avenue, and adjacent to the northern ditch

Plate 20: The north-eastern side of the Heel Stone ditch, viewed from the south-east

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Plate 21: Post-excavation aerial view of the Avenue and Heel Stone ditch

Plate 22: Section of the southern Avenue ditch, viewed from the south-west

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Plate 23: Road deposits and wheel ruts over the southern Avenue ditch, viewed from the south-east

Plate 24: Section of the northern Avenue ditch, viewed from the south-west

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Plate 25: Monitoring of service trench in the old car park viewed from the south-west

Plate 26: Puncturing of former car park surface, viewed from the west.

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Plate 27: Re-instatement work in former visitors centre car park, viewed from the north.

Plate 28: Section through road bedding layers

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Plate 29: Road bedding layers viewed from the north-west

Plate 30: Removal of tarmac surface from north side of B344 during decommissioning works on former car park, viewed from northwest.

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Plate 31: South-east facing section through roadside bank

Plate 32: Area re-contoured on south side of footpath, viewed from the northwest.

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Plate 33: Area re-contoured on north side of footpath, viewed from the west.

Plate 34: Visitor facilities ticket booths viewed from the south-west at car park level. The roof of the kitchen and servery are shown in the foreground

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Plate 35: Entrance to kitchen and server areas viewed from the west

Plate 36: Entrance ramp viewed from the east. Ticket booth and turnstiles in the foreground

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Plate 37: Disabled access ramp viewed from the west. Seating area and information booth are at base of ramp

Plate 38: Entrance to public toilet

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Plate 39: Seating area, bike rack and electricity sub-station to the south of the public toilets

Plate 40: Ice-cream servery

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Plate 41: Café north elevation

Plate 42: Information booth south elevation

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Plate 43: Information booth interior

Plate 44: Ticket booths and turnstiles viewed from the west. A postbox at the base of the entrance ramps is to the right of the photograph

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Plate 45: Audio guide booth

Plate 46: Shop north elevation

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Plate 47: Shop east elevation

Plate 48: Shop interior

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Plate 49: Path to Stonehenge viewed from the north

Plate 50: Tunnel to Stonehenge beneath A344

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Plate 51: Ramp to Stonehenge with murals viewed from the north-east

Plate 52: Ramp to Stonehenge with murals viewed from the south-east

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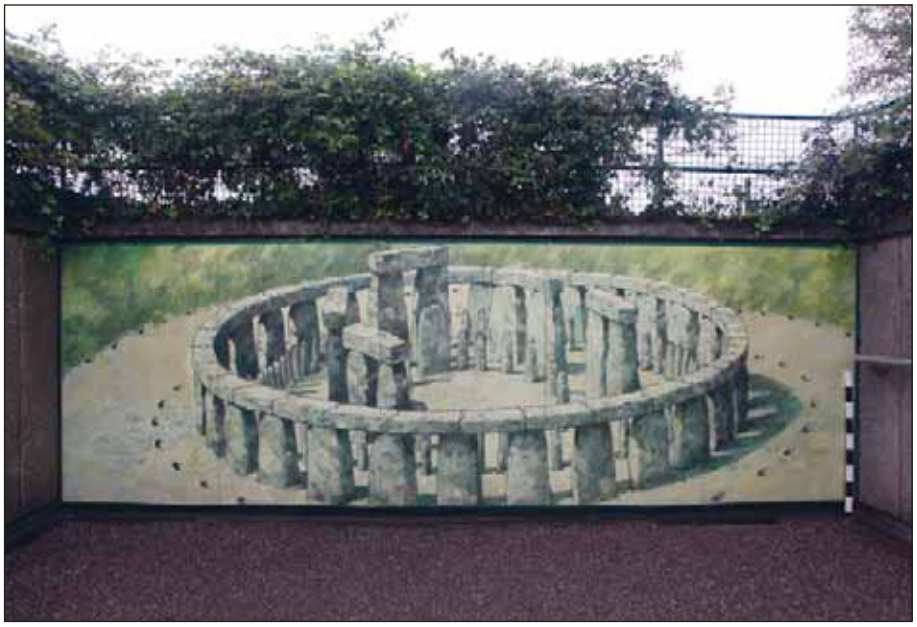

Plate 53: Stonehenge mural

Plate 54: Removal of concrete marker for Aubrey Hole 32, and replacement setting for stone marker

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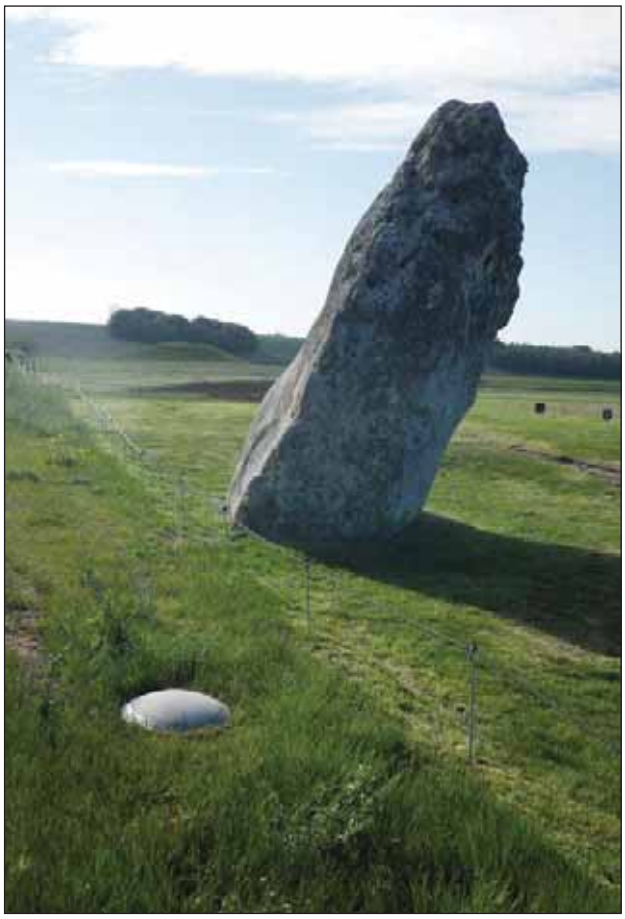

Plate 55: Marker for ‘sister stone’ to heal stone, viewed from the west.

Plate 56: Placement of markers for Mesolithic postholes, viewed from the southwest.

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Plate 57: Marker for Mesolithic tree throw hole, viewed from the southwest.

Plate 58: Fragments of multi-platform cores from the northern Avenue ditch 10078

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Plate 59: Stone pieces from the southern Avenue ditch 10068

Plate 60: Stone pieces from the northern Avenue ditch 10078

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