

A303 Amesbury to Berwick Down

TR010025

Deadline 1

Blick Mead – Note regarding proposals for additional monitoring

Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

April 2019



1 Blick Mead – Note regarding proposals for additional monitoring

1.1 Introduction

1.1.1 Archaeological excavations carried out since 2005 at Blick Mead, an area of land within Amesbury Abbey Park south of the A303, have located Mesolithic deposits. During the environmental impact assessment (EIA) and preparation of the Environmental Statement (ES) for the A303 Amesbury to Berwick Down scheme questions were raised regarding how the Scheme might affect the hydrogeology at Blick Mead.

1.2 Environmental Statement

1.2.1 The ES assessed impacts of the construction and operation of the Scheme on groundwater at Blick Mead, ES Chapter 11, Road Drainage and the Water Environment [APP-049] paragraph 11.3.14 and 11.9.6]. All groundwater effects were found to be non-significant for the temporary and permanent construction phases and the operational phase. This included negligible changes to the hydrogeology of the Blick Mead area.

1.2.2 During consultation discussions with the archaeologist who led the archaeological excavations (Professor. D Jacques) suggested that changes to the water environment in the vicinity of Blick Mead could affect the conditions of archaeological preservation at the site.

1.2.3 An assessment of the Blick Mead site was completed as part of the EIA and is reported in Annex 1 of APP-282 (6.3 Environmental Statement Appendix 11.4 - Groundwater Risk Assessment). The tiered assessment follows Historic England guidance on water environment assessment techniques for preserving archaeological remains.

1.2.4 A number of data sources were used to inform the conceptual model of the Blick Mead site and the tiered assessment. These included British Geological Survey and Environment Agency data sets, archaeological and environmental investigations carried out by the University of Buckingham and Reading University, ground investigations carried out for the A303 scheme between 2000 and 2010 and environmental information collected by Highways England during monitoring visits to the Amesbury Abbey Estate in 2017 and 2018.

1.2.5 The tiered assessment concluded that currently the Mesolithic deposits remain wetted by the underlying Chalk / sands and gravel aquifer under normal conditions but water levels can drop below the upper level of the Mesolithic deposits when groundwater levels are seasonally low or there is a natural drought.

1.2.6 It was agreed at a meeting with Professor Jacques in April 2018 and with the Heritage Monitoring Advisory Group in May 2018 that hydrological monitoring at Blick Mead would take place so that Highways England would be in a position to demonstrate that the Scheme does not harm the site.

1.3 Monitoring undertaken at Blick Mead

- 1.3.1 In addition to the surface water and spring monitoring which commenced in August 2018, five boreholes and two level gauges were installed in November 2018 for water level monitoring at different locations and different levels as indicated in the tables below. Table 1 shows the locations originally proposed. These were selected to provide areal coverage of the Blick Mead area and to target the lithological layers that had been recorded during previous archaeological excavations by Professor Jacques.
- 1.3.2 Interested parties including David Jacques, Historic England and the land owner were informed of these locations for drilling in early November 2018. On 26th November, a drilling crew, hydrogeologists and an archaeologist from Wessex Archaeology were mobilised to site.
- 1.3.3 At each location, an inspection pit of approximately 25 cm square was hand-excavated to a depth of 1.2 metres below ground level (mbgl) under supervision of the archaeologist, to ensure the presence of any archaeological material would be recorded and handled appropriately. On completion of the archaeological investigation pit, a windowless sampling percussive drilling rig was placed on top of the pit and the hole was progressed to the targeted depth. Drilling diameter ranged between 87mm and 65mm. The total drilled depth differed from the original proposed depth at some locations depending on the lithological findings from the core returns. Boreholes were installed with a combination of 50mm ND PVC blank casing and 50mm PVC geo-screens with 0.5mm slots. A gravel pack formed of clean washed 10mm gravel was installed in the annulus around the screens. A layer of bentonite pellets was installed above the gravel pack to create a hydraulic seal with the upper layer. Arisings from the hand-excavated pits were also used for backfill where appropriate. At surface, the boreholes were completed using 6" protective steel casing with lockable caps and a final layer of cement grout, approximately 10cm thick, was placed in the annulus to create a surface seal as well as to secure the protective steel casing in place. Water level recorders (data loggers) were installed in the boreholes.
- 1.3.4 Table 2 sets out the final drilled locations. The final locations were fewer than originally proposed because there was no evidence during drilling of multi-layered aquifers or separate water bearing zones and because works were curtailed at the request of Professor Jacques.
- 1.3.5 It should be noted that there is an open pit at Blick Mead which was excavated during the archaeological investigations by Professor Jacques in the autumn of 2018. This pit exposes the aquifer to the surface and therefore to direct rainfall infiltration, as well as to potential evaporation in the summer months when groundwater levels are low and the Mesolithic layer is exposed. The presence of this pit may be affecting local hydrogeological conditions so is also being monitored by Highways England.

- 1.3.6 Monitoring results from August 2018 to March 2019 were issued to the Examination on 5th April 2019 in a report on Blick Mead monitoring (Document Reference AS-015). Monitoring at the site is ongoing.
- 1.3.7 The monitoring results confirm the conceptual model set out in the tiered assessment and confirm the conclusions of the ES that the Scheme will have a negligible effect on the hydrogeology of Blick Mead.

1.4 Request for further monitoring installations

- 1.4.1 A request for installation of 10-18 more piezometers and additional monitoring was made by Professor Jacques on 25 January 2019. The suggested locations are in the same general areas as the current monitoring, between the A303 and the River Avon. The stated purpose of these additional piezometers was as 'an opportunity for the Tunnel scheme to produce data which will also enhance the understanding of the archaeology and related sedimentology at Blick Mead' as well as to obtain further groundwater level data.
- 1.4.2 There is no requirement for additional groundwater level data to support the ES and the conceptual model provided in the ES still stands. The hydrogeology of Blick Mead is dependent on the regional flows of the underlying Chalk aquifer which naturally rise and fall seasonally and result in wetting and drying of the Mesolithic deposits. Additional piezometers to infill the existing array will not add significantly to the conceptual model of the groundwater flow which is supporting the wetting of the site. The Scheme will have a negligible effect on groundwater levels at the site so there is no mechanism for impacts. As such, this additional monitoring is not required to inform or confirm the assessment of the effects of the scheme.

1.5 Proposed monitoring

- 1.5.1 Existing monitoring at Blick Mead will continue as agreed with Professor Jacques.
- 1.5.2 Reference was made by Professor Jacques during consultation to a requirement for at least twelve months of baseline monitoring. A low water level and high water level period has already been recorded (autumn 2018 and spring 2019) which covers the extremes of a twelve month period. Monitoring in advance of construction is ongoing as part of the wider groundwater monitoring for the Scheme, as discussed at paragraph 11.3.14 of the ES. It is noted that the approach to groundwater level extremes, as used in the ES, is to correlate long term regional groundwater level records with short term local data. In this way the effects of the Scheme have already been assessed under conditions such as the drought of 1976 and floods of 2014. It is this assessment of both drought and peak conditions that leads to the conclusion that there will be negligible change to the hydrogeology of the Blick Mead area as a result of the Scheme.

Table 1: Proposed Locations

Location ID	Easting	Northing	Proposed Depth (mbGL)	Monitoring Formation
5p	414952	141962	4	Peat
6p	414980	141940	4	Peat
8p	415029	141963	4	Peat
2a	414892	141969	3	Alluvium
3a	414940	142016	3	Alluvium
9a	414895	142020	3	Alluvium
5a	414952	141962	4	Alluvium
6a	414980	141940	4	Alluvium
7a	415002	142013	4	Alluvium
8a	415029	141963	4	Alluvium

Table 2: Drilled Locations

Location ID	Easting	Northing	Installed Depth (mbgl)	Drilled Depth (mbgl)	Monitoring Formation
WS05	414945	141960	5	6	Chalk
WS02	414891	141956	3.5	7	Chalk
WS03	414939	142000	3.2	4	Alluvium
WS09	414905	142031	3	3	Alluvium
WS10	414917	142037	1.2	1.2	Alluvium

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