



**Archaeological Watching Brief  
River Nar Restoration Project  
at  
West Lexham**

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**HW Report No. 106**



<b>Project name</b>	<b>West Lexham, River Nar Restoration Project</b>
<b>Client</b>	<b>Norfolk Rivers Internal Drainage Board</b>
<b>NHER Event No</b>	<b>ENF 125699</b>
<b>Grid reference</b>	<b>TF 8386 1699</b>
<b>Date of fieldwork</b>	<b>1st and 2nd February, 3rd March 2011</b>

## **Introduction**

Norfolk Rivers Internal Drainage Board (NRIDB) is undertaking restoration works at various locations along the River Nar one of which is at West Lexham. The site is situated to the east of (i.e. upstream of) the A1065 centred at TF 8386 1699. It is located within an extensive and important complex of 19th-century floated water meadow earthworks. The habitat improvement work intended to remove the redundant weirs and create scour pools and deflectors within the river channel.

Norfolk Rivers Internal Drainage Board is able to carry out the works under their permissive powers. Consent for the works within a Site of Special Scientific Interest has already been secured from Natural England. A brief was issued by Norfolk Historic Environment Services for the recording of the weirs and the monitoring of machine movements within the area of known earthworks.

The restoration work was undertaken by the Norfolk Inland Drainage Board who commissioned the archaeological works.

## **Archaeological Background**

The floated water meadows at West Lexham were designed by John 'Strata' Smith and constructed between 1803 and 1811 on the Holkham Estate farm of John Beck. The scheme won a gold award from the Board of Agriculture on its completion. The surviving earthworks cover about 10ha and extend for c.1km along the River Nar from West Lexham Hall to the east to beyond the A1065 to the west. The earthworks included a complex series of main channels, feeder channels and sluices. An earthwork survey was carried out by Brian Cushion in 2000 (Cushion and Davidson 2003, fig. 128 and p197). A description of their use through the seasons was published in 1806 (Smith, 112-116).

Few floated water meadows were constructed in East Anglia of which only a small number survive. The good preservation of the earthworks at West Lexham are therefore rare and of some importance. Given the survival of associated historical records their importance is further enhanced.

## Methods

Prior to the River enhancement works two days were spent recording three weirs; that associated with the water meadow earthworks and two others further downstream (Fig. 1). Outline plans of the weirs were surveyed using a Total Station Theodolite with detail being added by hand. These were accompanied by a written description of the weirs and a full photographic record consisting of both black and white film and digital colour images. All recording was undertaken from the banks of the river. Weather conditions were generally good.

The construction works took one day and included the monitoring of works affecting the weirs, the creation of scour pools and deflectors and the movement of machines within the area of known earthworks.

All works were carried out in full accordance with national and regional guidelines for the treatment of archaeological remains, and in particular the guidance set out in *Standards for Field Archaeology in the East of England* (Gurney 2003) and the *Institute of Field Archaeologists Standard and Guidance for an Archaeological Watching Brief* (2001).

## Results

Three weirs were recorded prior to the commencement of the works, only two of which were directly affected by the river enhancement scheme. Scour polls and deflectors were created in three locations within the area of the earthworks.

### Weir 1

(Fig. 2, Plates 1-4)

This weir was located some 60m upstream from the present A1065 road. It sits within the earthworks complex and forms part of the original design of the water meadows, diverting water from the river to flow over meadows on the north bank further downstream.

Three phases of construction are apparent within the present visible structure, the first being of brick and mortar construction, which is later repaired with similar materials and finally consolidated and partially rebuilt using concrete. The original sides of the weir were c.12m long and do not appear to have been significantly extended during the repair/rebuild phases. Several of the bricks are in poor condition and this relates to scouring by the fast pooling water as it passes over the weir. The upper 3 courses of brickwork on both the north and south sides appear to be of a different type of brick and have been interpreted as a later repair.

Further elements of the structure were apparent under the turf on both banks of the river. However as no disturbance to these was anticipated turf and topsoil was not removed to reveal them in any detail. These included short brick walls at right angles to the weir on both banks and a possible flint constructed wall on the south bank.

Concrete repair was mainly identified in the central section of the weir and particularly on the north side. A new crossing structure was built, comprised of uprights at each side and one central upright. Iron bolts were noted on the

central and southern upright, securing them in place. The central upright was T-shaped, the southern one L-shaped and the northern one Z-shaped. Running between them was a cross strut. Formed within these uprights were slots into which cross hatches could be placed to control the water flow. A steel plate, partially buried below the turf, was noted on the south bank, near to the weir. This may have been one of the (re-)moveable hatches.

In order to improve the flow of the river it was originally intended that all of the weir would be removed however, it was decided that the necessary results could probably be achieved by less drastic measures. Excavation within the channel removed three beams from either half of the weir. These were made of concrete with some iron reinforcement. It is possible that these were permanent features of the weir as there was no evidence for a lifting mechanism for these. Should the river need to be further controlled a more easily moveable hatch (such as one made of iron) could have been used. It should be noted that the use of this weir as a functioning part of the water meadow was long gone when these concrete elements of the weir were added.

The remainder of the structure was not disturbed by the works and as all three of the uprights as well as the upper horizontal lintel remains in place it has not been weakened in any way. Further erosion to the flanking brickwork is also likely to be less as the river now flows at an even pace rather than into a swirling pool as it passed over the weir.

## **Weir 2**

(Fig. 2, Plates 5-7)

Located c.52m further down stream, Weir 2 sits in a lighted wooded area between the old bridge and the present bridge for the A1065. It is not shown on Cushions earthwork survey of the water meadows (Davison and Cushion 2003 fig.128).

This weir appears to be constructed entirely of concrete with a U-shaped bastion having been built to either side of the river. The arms of the bastions were of different lengths, that facing upstream being 2.3m long, and those downstream 1.5m. The top edges against the river are all sharp, while those facing 'inland' are gently rounded. Again this has three uprights, one L-shaped at each side and one central T-shaped, with slots to take the hatch boards. A cross strut or lintel ran between these with iron bolts holding the structure together. Where the horizontal meets the bastions an additional 'patch' of concrete had been added to each side.

Adjacent to this on the north bank a short stretch of wall of different construction was noted. The lower levels were of brick, while the upper part was flint and mortar. Patchy concrete render was noted on its face.

Lower cross beams were again made of reinforced concrete; one of which had previously been removed and lay next to the weir. The present works removed further concrete cross beams and the central upright so improving the flow of the river. There was no other impact on the structure.

### **Weir 3**

(Fig. 2, Plate 8)

This weir sits downstream on the present A1065 road bridge. A dyke (now partially dry) joins the north side of the river just upstream of the weir connecting to a pool to the north. Although these are shown on Cushions earthwork survey they are not described as part of the water meadow complex.

The weir is made of concrete with a bastion on each side of the river. In plan these were a flat-based U-shape with arms of uneven length. Although similar in some ways to Weir 2 there are also very notable differences. The edges of the bastion were all very sharp. The side adjacent to the river had a very distinct slope so that the downstream arms on the bastions were 0.5m lower than the upstream elements.

The slots for the cross hatches were constructed differently. The slots at each side were cast within construction of the bastions, while the central upright was H-shaped. An iron bolt connected this to the cross beam or lintel. Further bolts inserted from above connected the cross beam to the side bastions.

No works were undertaken in this area at this time.

### **Scour pools and deflectors**

Three scour pools and deflectors were created upstream from Weir 1. The impact on the historic water meadows was negligible as small quantities of reedy material from the river margins was moved to create deflectors, enhanced by some material from the river bed.

Mats were used to support the weight on the machine close to the river, but as the weather was good and ground conditions were fair the movement of the machine along the bank did not cause any damage to the earthworks.

### **Discussion**

The aim of the project to achieve a better water flow through this stretch of the Nar was achieved with minimal impact on the historic water meadows. It is not known if Weirs 2 and 3 were part of the original water meadow design but part of a brick and flint wall was recorded adjacent to Weir 2 which may indicate that an earlier structure once stood here.

The concrete elements of all of the weirs are probably of a 20th-century date. It has been noted that although floated meadows continued in use in other parts of the country into the 1920s and '30 in Norfolk they went out of use earlier, probably in the first decade of the 20th-century (Wade-Martins and Williamson 1994, 26). It is likely then that the construction work represented by the concrete elements of the weirs was undertaken when the water meadows were no longer in use for agricultural purposes.

## **Acknowledgements**

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## **Bibliography**

- |                                      |      |   |
|--------------------------------------|------|---|
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| Smith, W.,                           | 1806 | <i>Observations on the Utility, Form and Management of Water Meadows</i>                              |
| Wade-Martins, S. and Williamson, T., | 1994 | Floated Water-Meadows in Norfolk: A Misplaced Innovation <i>Agricultural History Review</i> 42, 20-37 |



Fig. 1 Site Location

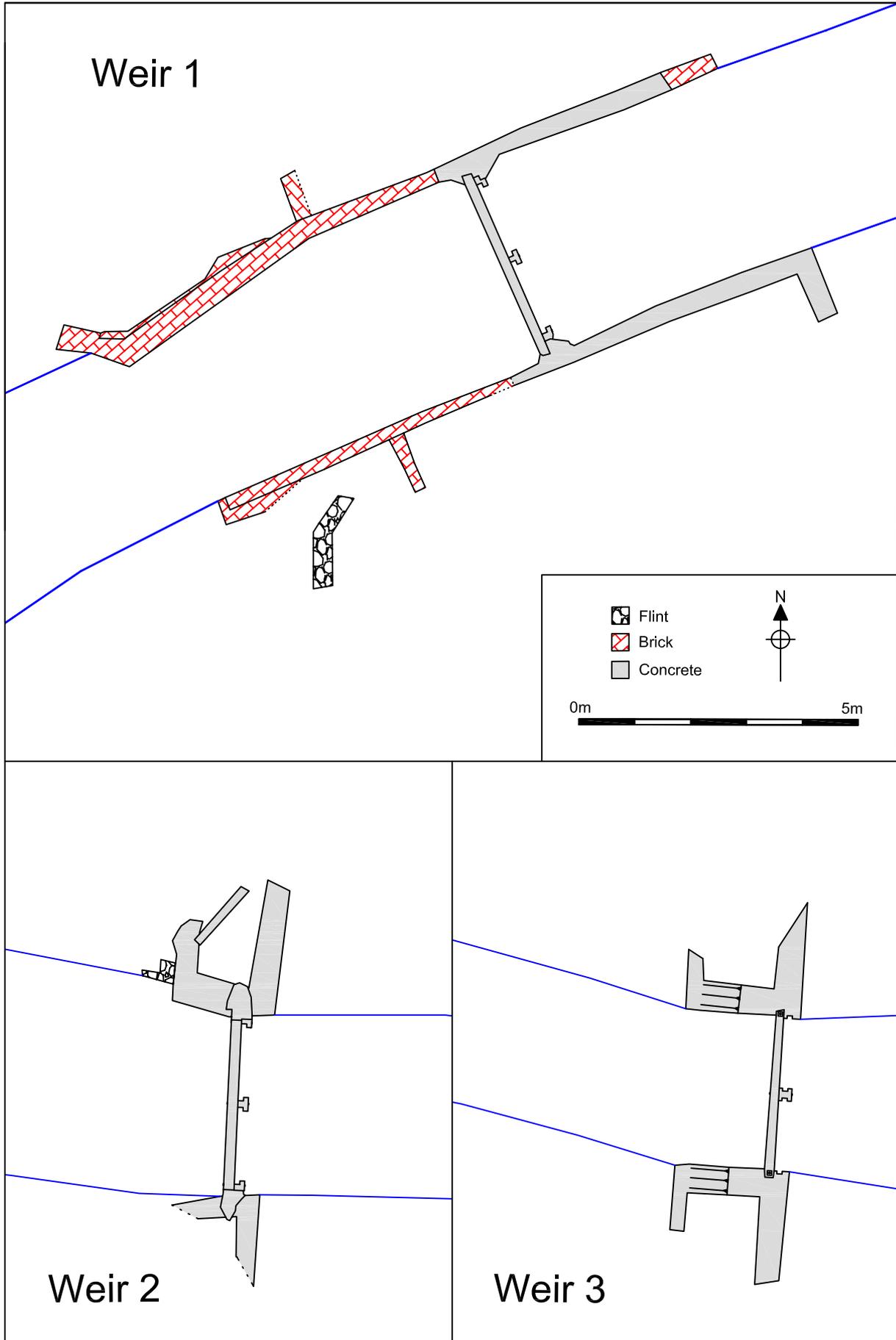


Fig. 2 Plans of weirs



Plate 1. Weir 1, before works.



Plate 2. Weir 1, after works.



Plate 3. Weir 1, showing brick structure on North bank.



Plate 4. Weir 1, showing brick structure on South bank.



Plate 5. Weir 2, before works.



Plate 6. Weir 2, after works.



Plate 7. Weir 2, showing flint and brick wall to west of weir



Plate 8. Weir 3.