

**CPAT Report No. 2572**

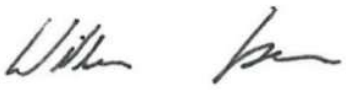
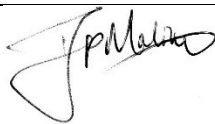

# **Llangollen Lower Weir, Llangollen, Denbighshire**

Level 2 Structural Survey



YMDDIRIEDOLAETH ARCHAEOLEGOL CLWYD-POWYS  
CLWYD-POWYS ARCHAEOLOGICAL TRUST

Client name: Denbighshire County Council  
 CPAT Project No: 2572  
 Project Name: Llangollen Lower Weir, Llangollen, Denbighshire  
 Grid Reference: SJ 21628 42101  
 County/LPA: Denbighshire  
 CPAT Report No: 1821  
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## Summary

In September 2021 the Clwyd Powys Archaeological Trust carried out a level 2 structural survey of a weir, sluice gate and revetment on the River Dee in Llangollen, Denbighshire. The weir at this site dates from around 1805, when it was constructed to provide a water supply to power a cotton mill located on the north bank of the river.

The visible structure of the weir had been largely rebuilt in concrete and is in a very dilapidated condition with most of the upperworks now missing or breached even at low water levels. The sluice gate and supporting stonework is in good condition. A section of the mill leat behind the sluice gate has been preserved in a partially infilled state.

The stone revetment wall along the north bank of the river is showing signs of deterioration probably due to failure of the mortaring, possibly exacerbated by self-seeded trees growing in the gaps between the stones.

## Crynodeb

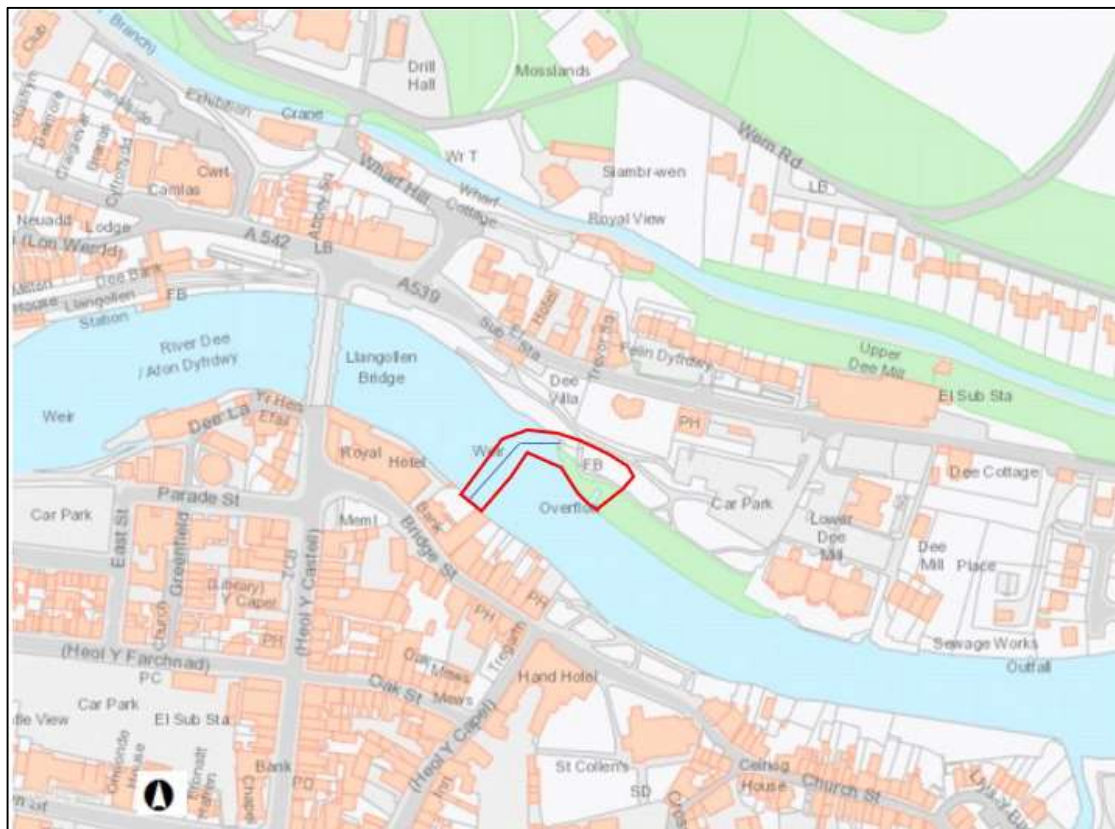
Fis Medi 2021, bu Ymddiriedolaeth Archaeolegol Clwyd-Powys yn cynnal arolwg strwythurol lefel 2 o gored, fflodiard ac wal gynnal ar Afon Dyfrdwy yn Llangollen, Sir Ddinbych. Mae'r gored ar y safle hwn yn dyddio o ryw 1805, pan gafodd ei hadeiladu i ddarparu cyflenwad dŵr i bweru melin gotwm ar lan ogleddol yr afon.

Roedd gymaint o strwythur y gored a oedd i'w weld wedi'i ailadeiladu'n helaeth â choncrit ac mae mewn cyflwr dadfeiliedig iawn, gyda rhan fwyaf y gwaith uchaf nawr ar goll neu roedd y dŵr wedi torri trwyddo, hyd yn oed pan fo lefelau'r dŵr yn isel. Mae'r fflodiard a'r gwaith cerrig cynhaliol mewn cyflwr da. Mae adran o ddyfrffos y felin y tu ôl i'r fflodiard wedi'i mewnlenni'n rhannol.

Mae'r wal gynnal o gerrig ar hyd lan ogleddol yr afon yn dangos arwyddion o ddirywiad, mae'n debyg oherwydd bod y mortar wedi methu ac mae'n bosibl bod coed sydd wedi hau eu hunain yn y bylchau rhwng y cerrig wedi gwaethygu hyn.

## 1 Introduction

- 1.1. In September 2021 the Field Services Section of the Clwyd-Powys Archaeological Trust was instructed by Denbighshire County Council to undertake a Level 2 structural survey in connection with proposed plans to remove a four metre length of the most damaged section of the weir (NGR SJ2159442108) on the south side of the river to allow safe canoe/raft and fish access, and works to repair and consolidate the riverside stone revetment wall on the north side.



*Contains Ordnance Survey data © Crown copyright and database right 2018*

*Fig. 1 Location of the weir and associated features (outlined in red)*

- 1.2. Archaeological mitigation for the scheme comprised a Level 2 structural survey of the existing remains of the revetment and other walls within the scheme red boundary area, consisting of a photographic survey, written/descriptive survey and annotated measured survey.

## 2 Historical Background

- 2.1. The Lower Dee Mills factory (NGR SJ2176742053) was owned by a Manchester based firm, Turner and Comber, who built their cotton mill at Llangollen in 1805 (Cadw 2016, 44). The site was advantageous in many ways, the cost of land was cheaper than in the industrialised north of England, the site was well connected to transportation links and there was a local workforce available to work in the mills.
- 2.2. The mill complex was powered by water taken from the newly opened section of the Ellesmere canal which ran to the north of the factory and which drove a 7.3m diameter overshoot wheel,

via cast iron water pipes. An additional source of power was taken from the River Dee, with the construction of a weir to form a mill pond that would feed two smaller wheels of 6m and 3.5m diameter via a leat running parallel to the river along the northern bank. A sluice gate was fitted at the west end of the leat.

- 2.3. The 1" Ordnance Survey Surveyors' Drawing, which was published in 1837 but surveyed in the early 19<sup>th</sup> century doesn't depict the weir or the leat, but does show the mill complex and the canal (Fig. 2). The cotton mill had initially been a success but had suffered a series of misfortunes including a fire in 1814 and then a slump in the cotton trade leaving the owners bankrupt. The complex stood empty for several years until it was taken over by a second Manchester based firm, Gardner, Taylor and Bell, but this revival was short lived and the mills closed again in 1835.



*Fig. 2 Extract from the 1837 Ordnance Survey 1" map showing the mill complex (circled in red)*

- 2.4. The 1843 Tithe Map (Fig. 3) depicts the details of the site in much more detail, and records the weir, the leat, and possibly the revetment along the northern bank of the river. The factory and the land connecting it to the weir are owned and occupied by John Hughes, who had reopened the site as a woollen mill (Apportionments 83 – 87). He was evidently successful in this venture as he built a second factory, Upper Dee Mill immediately to the west of the Lower Mill site in 1855. Both mill sites were subsequently purchased by the Lloyd Jones family, themselves owners of a mill at Mile End, to the west of Llangollen.



*Fig. 3 Extract from the 1843 Tithe depicting the weir, mill leat and Lower Dee Mill.*



*Fig. 4 Extract from the 1880 Ordnance Survey 6" map depicting the Dee Mills, now expanded by the construction of the Upper Mill site in 1855*





Fig. 5 Extract from the 1949 Ordnance Survey 6" Map

- 2.5. Lower Dee Mill remained in use until the early 1960s. During the early 20<sup>th</sup> century a turbine was installed in the mill leat by the Llangollen and District Electric and Power Company to provide electricity for Llangollen. The turbine itself is still on display close to where it had been installed.
- 2.6. The woollen mill was subsequently occupied by R. G. Cuthbert, a packet seed supplier formed during the 18<sup>th</sup> century, who had moved their premises there in 1967.

### 3 Level 2 Structural Survey

- 3.1. The survey was conducted on the 14<sup>th</sup> of September 2021 in accordance with *Cifa Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures (2014)*. The recording of the weir comprised a digital measured and photographic survey (Dwg 1), overhead drone photography supplied by the client (Fig. 7), and a digital measured survey of the leat, the sluice gate and the revetment wall along the northern bank of the river (Dwg 2).



*Fig. 6 A photograph of the weir during the early 20th century*

- 3.2. Photographic evidence from the early 20<sup>th</sup> century (Fig. 6) suggests that the weir was formerly a two tier design and a doglegged structure. An unusual feature is the use of wooden beams to buttress the upper tier, it is unclear whether this was a feature of the design or a later addition to strengthen it.
- 3.3. The extant weir dates largely from the later 20<sup>th</sup> century, when the weir was completely rebuilt on a concrete plinth with a stone and concrete superstructure. The rebuilt weir is apparently rather lower than the original design. Some wooden posts are visible within the structure, but these are likely to be remnants of the concrete shuttering used in its construction rather than relating to an earlier form of the weir. The overhead photography does seem to indicate that there is some survival of the earlier weir fabric, visible as a line of stonework running from the south bank of the Dee and truncated by the modern structure (Fig. 7).
- 3.4. The modern weir was in poor condition, with most of the upper structure missing and was largely underwater despite the river levels being very low at the time of the survey. The entrance to the mill leat was well above the current water level and had become overgrown with mature trees.



*Fig. 7 Overhead drone survey photograph of the weir (west is to the top of the photograph). Note the line of a possible earlier structure upstream of the extant weir (left of shot).*

- 3.5. The leat originally extended approximately 110m between the mill pond and the mill complex. The surviving open section of leat measured approximately 30m in length and 7.5m in width, with vertical sides revetted in stone. The base of the leat had become partially infilled and was approximately 1.2m deep (Fig. 8).



*Fig. 8 The mill leat viewed from the east Photo CPAT 4948-001*

- 3.6. The flow of water into the leat was controlled by a sluice gate located at its west extent (Fig. 9). The sluice gate comprised three gates which could be opened by turning a reduction gear on the south end of the gate. Most of the mechanism, (apart from the geared connecting shaft) was still present and the gates and supporting stonework were in good condition (Fig. 10).



*Fig. 9 The sluice gate, viewed from the east Photo CPAT 4948-013*



*Fig. 10 Detail of the winding gear for the sluice gate Photo CPAT 4948-010*

- 3.7. The revetment wall ran east from the south end of the sluice gate along the north bank of the river. The section within the bounds of the development area measured about 23m in length, although the line of the revetment was discernible as a foundation course extending further to the east (Fig. 14). It was constructed from grey random uncoursed sandstone blocks. The lower section of the wall, to a height of 1m was made from dark grey, longer more massive stone blocks than the upper wall, and the wall face was battered. The upper wall section, approximately 1.3m in height was made from smaller, lighter-coloured stone and the wall face was vertical (Figs. 11 - 13). The blockwork was bonded with a whitish gritty mortar, with evidence of repairs and repointing in a reddish cement mortar. Much of the bonding material had washed out of the joints and some of the stone work had become dislodged. The wall was topped with rectangular worked sandstone blockwork coping (Figs. 13). The stonework around the sluice gate comprised massive yellowish sandstone blocks, with blockwork made from a darker finer shale supporting the gate mechanism itself.



*Fig. 11 Western visible extent of the revetment showing the difference in stonework between the upper and lower structure Photo CPAT 4948-032*



*Fig. 12 Exposed cross section through the revetment viewed from the east Photo CPAT 4948-002*



*Fig. 13 View from the west along the revetment showing the batter on the lower structure Photo CPAT 4948-034*



*Fig. 14 View east showing the line of the revetment visible as a partially buried foundation Photo CPAT 4948-035*

## 4 Conclusions

- 4.1. It is unclear when the weir was rebuilt, but it must have occurred post 1905 as the older weir was still extant at this point. The weir was still required during the early 20<sup>th</sup> century to drive the turbine which provided electricity for Llangollen so its continued functionality must have been of considerable importance to the town during this period. It is unclear when the mill stopped using water as a motive power source.
- 4.2. The leat now survives mainly as a buried feature although the section within the development area is largely open and only partially infilled. The channel between the former millpond behind the weir and leat is dry for most of the year and largely overgrown. It is unclear whether the sluice gate is an original feature, the mechanism looks to be mid-late 19<sup>th</sup> century in design, although it may have conceivably replaced an earlier gate in the same location.
- 4.3. The revetment seems to be an early structure, possibly contemporary with the construction of the weir and the leat. It is recorded on both the 1843 Tithe Map and 1880 Ordnance Survey as extending almost the entire length of the northern bank of the Dee where it runs through Llangollen. It is unclear whether the upper and lower stonework relate to two separate phases of construction or whether they were built in one broad phase.

## 5 Sources

### Published sources

Cadw 2016 Llangollen: Understanding Urban Character

### Cartographic sources



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1837 Ordnance Survey Surveyors' Drawing No 74

1843 Tithe apportionment for Llangollen Parish

1880 Ordnance Survey 6inch 1<sup>st</sup> edition Denbighshire Sheet 34SE

1949 Ordnance Survey 6inch provisional edition Denbighshire Sheet 34SE

### **Photographic Sources**

Drone photography of the weir supplied courtesy of Natural Resources Wales

## **6 Archive deposition Statement**

- 6.1. The project archive has been prepared according to the CPAT Archive Policy and in line with the CIfA *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives guidance* (2014). The digital archive only will be deposited with the Historic Environment Record, Clwyd-Powys Archaeological Trust and the paper/drawn/digital archive with the National Monuments Record (RCAHMW).

### **Archive summary**

CPAT Event PRN: 140379

36 digital photographs, CPAT film no 4948

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## Appendix 1: CPAT WSI 2572

### 1 Introduction

- 1.1 The Field Services Section of the Clwyd-Powys Archaeological Trust has been invited by Denbighshire County Council to undertake a Level 2 structural survey in connection with proposed plans to remove a four metre length of the most damaged section of the weir on the south side of the river to allow safe canoe/raft and fish access and works to repair and consolidate the riverside stone revetment wall on the north side.
- 1.2 Archaeological mitigation for the scheme will comprise a Level 2 structural survey of the existing remains of revetment and other walls within the scheme red boundary area, consisting of a photographic survey, written/descriptive survey and annotated measured survey. The measured survey may use project survey drawings where these are accurate and detailed enough, but should otherwise include a wholly new measured instrument survey. Stone-by-stone survey is not required, and the plans of the wall outlines can be annotated with fabric detail and described in the text with the photos. The survey should include the sluice structure and channel for context and relationship information as the revetment wall is essentially linked to the sluice wall.

### 2 Objectives

- 2.1. The objectives of the survey are:
- to provide a descriptive and photographic record of any walls and revetments associated with the weir
  - to provide an annotated and measured survey of any walls and revetments associated with the weir.

### 3 Methodology

- 3.1. The archaeological works will be conducted according to the Chartered Institute for Archaeologists' (CIfA) *Standard and Guidance for the archaeological investigation and recording of standing buildings or structures (2020)* and *Standard and Guidance for Historic Environment Desk-based Assessment (2020)*.

#### Building Survey

- 3.2. The survey will take the form of the equivalent to an Historic England Level 2 Building Survey - Understanding Historic Buildings, 2016, 5.2, p.26), and will include:
- Description and photographic record of the weir
  - An annotated measured survey of the revetment and other walls associated with the weir
- 3.3. The survey will be undertaken with a reflectorless Total Station (TS). Additional recording will be carried out via photogrammetric survey, which will be tied into the TS survey.
- 3.4. The photographic survey will be conducted using digital photography with a minimum resolution of 12 mega pixels to include:
- general views
  - elevations and structural detail

- overall appearance
- fixtures, fittings etc

## 4 Site archive

- 4.1. The overall archive will conform to guidelines described in Management of Research Projects in the Historic Environment (MoRPHE), Historic England 2015, the CIfA (2020) *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives* and *The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales* (NPAAW, 2017) and *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) V1* (July 2018).
- 4.2. The archive will be deposited with the National Monuments Record (NMR), RCAHMW. This archive will include all written, drawn, survey and photographic records relating directly to the investigations undertaken. NMR Digital archives will follow the standard required by the RCAHMW (RCAHMW 2015). A copy of the digital archive only will also be lodged with the Historic Environment Record, Clwyd Powys Archaeological Trust, within two months of the approval of the project report.

### ***Data management plan***

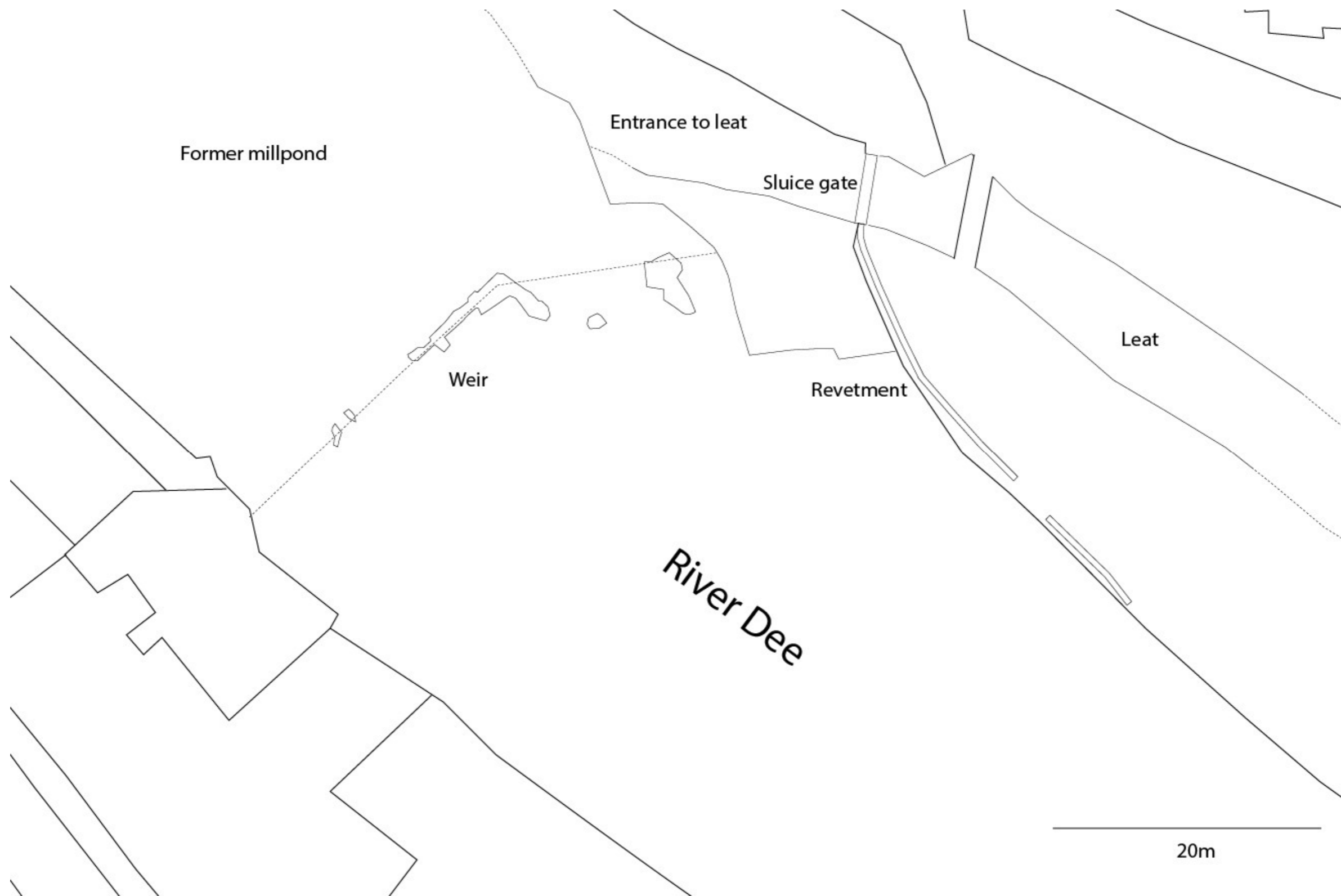
- 4.3. The project will be conducted in accordance with CPAT's data management policy. All paper records will be collated, catalogued and labelled with the unique project code. All digital data will follow strict file naming, to include the unique project code, and be sorted into a standard series of sub-folders. The digital data will be catalogued, including a list of file types and relevant software.

## 5 Resources and programming

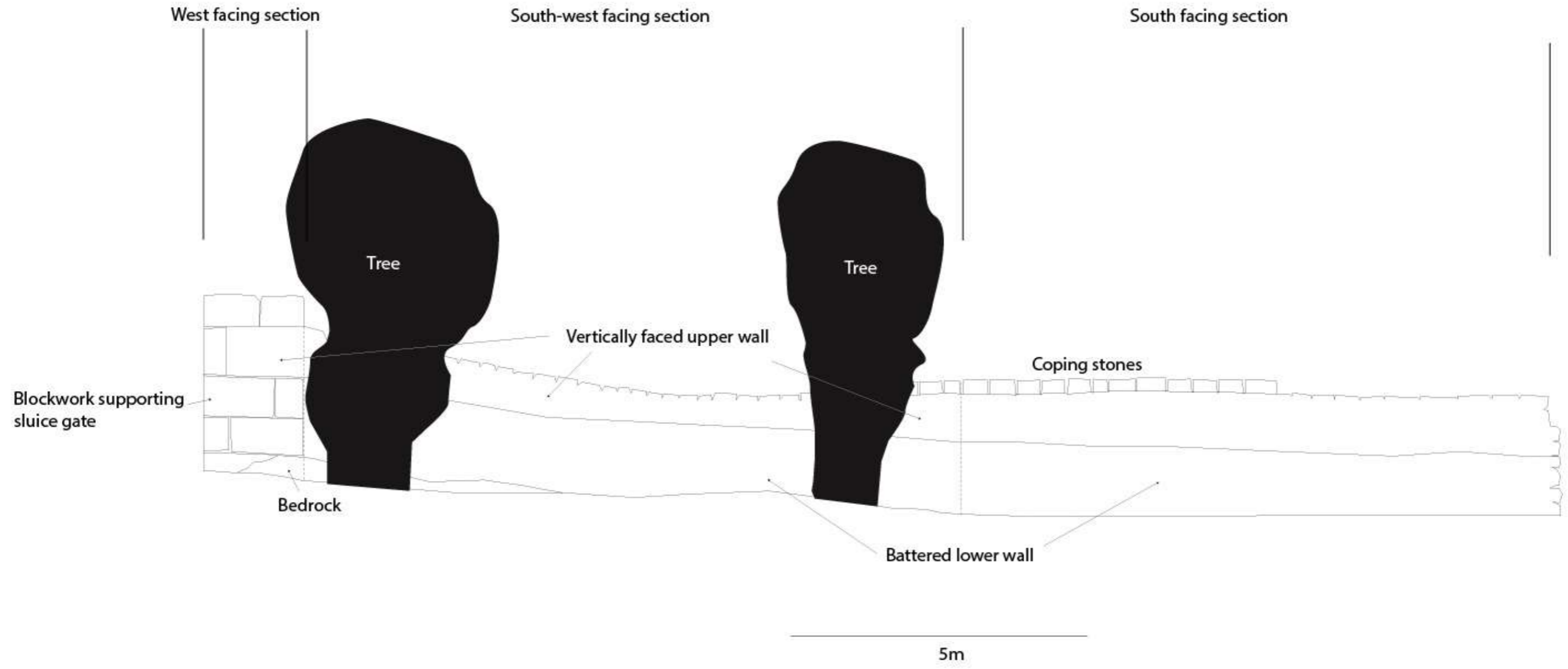
- 5.1. The survey will be undertaken by a single skilled archaeologist under the overall supervision of Tim Malim, CPAT's Principal Archaeologist who is also a member of the Chartered Institute for Archaeologists (CIfA). CPAT is also a CIfA Registered Organisation and as such agrees to abide by their *Code of Conduct* (2020).
- 5.2. All report preparation will be carried out by, or with the assistance of, the same field archaeologist(s) who conducted the fieldwork and completed within two months of the commencement of the survey.
- 5.3. Requirements relating to Health and Safety regulations will be adhered to by CPAT and its staff.
- 5.4. CPAT is covered by appropriate Public and Employer's Liability insurance, as well as Professional Indemnity insurance. A project-specific Risk Assessment and Method Statement (RAMS) will be prepared prior to the commencement of fieldwork.

W Logan

8 September 2021



*Dwg 1. Site plan*



*Dwg 2. South facing elevation of revetment*



Contact Sheet 1

Contact Sheet 2