

# Building recording at Lock 3, Aston Lock, Aston-on-Trent, Derbyshire

Worcestershire Archaeology  
for Arcadis  
July 2019



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# Building Recording at Lock 3, Aston Lock, Trent and Mersey Canal, Aston-on-Trent, Derbyshire



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|                           |  |
|---------------------------|--|
| Local planning authority: | South Derbyshire Local Authority           |
| Planning reference:       | n/a  |
| Central NGR:              | SK 42460 29181                             |
| Commissioning client:     | Arcadis on behalf of Canal and River Trust |
| Client project reference: | -  |
| WA project reference:     | P5522                                      |
| WA report reference:      | 2663                                       |
| HER reference:            | -  |
| Oasis reference:          | fieldsec1-343354                           |
| Museum accession number   | n/a  |

| Issue | Date       | Status              | Prepared by | Checked by  |
|-------|------------|---------------------|-------------|-------------|
| 1     | 09/04/2019 | Draft for client    | Tim Cornah  | Tom Vaughan |
| 2     | 27/06/2019 | Draft for client    | Tim Cornah  | Tom Vaughan |
| 3     | 02/07/2019 | Approved by Curator | Tom Vaughan | Tom Vaughan |
|       |            |                     |             |             |
|       |            |                     |             |             |
|       |            |                     |             |             |

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## **Building recording at Lock 3, Aston Lock, Trent and Mersey Canal, Aston-on-Trent, Derbyshire**

Tim Cornah

Illustrations by Carolyn Hunt

### **Summary**

Building recording was required to meet a planning condition relating to the renovation of Lock 3, Aston Lock, on the Trent and Mersey Canal, at Aston-on-Trent, Derbyshire.

The planning condition specified that the lock should be recorded to Historic England Level 2 standards. This required photography of the lock and annotation of existing survey drawings. This has produced an archive of the lock before any renovations were undertaken.

Analysis of the lock was based upon the recorded fabric. The development of the lock was reconstructed and illustrated on ground plans and elevations. These have been reproduced at the end of the report, along with relevant photographs.

The lock was built in 1770 as part of the Trent and Mersey canal by the engineer James Brindley. It had a water height drop from south to north of approximately 2.4m, with double wooden gates at either end, both of which were modern replacements. Whilst most of the Trent and Mersey has locks of sufficient width to admit only a single narrow boat, Aston Lock and those as far as the Trent to the north-east and Burton-on-Trent to the west are wide enough to allow two narrow boats side by side within the lock at the same time. A brick bridge was also constructed at the same time as the canal, to the immediate north of the lock.

Aston lock was brick built, with the original brickwork visible in the base and some of the side walls. These were supported by vertical timbers and stone detailing. The lock was also constructed with a contemporary bridge to its immediate north. The lock was rebuilt and repaired in successive phases during the 19<sup>th</sup> and 20<sup>th</sup> centuries, culminating with the replacement of the gates in 1997 and 2001.





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## Report

### 1 Background

#### 1.1 Reasons for the project

Recording of a historic structure was undertaken at Lock 3, Aston Lock, Trent and Mersey Canal, Aston-on-Trent, Derbyshire (NGR SK 42452 29165). It was commissioned by Arcadis, on behalf of the Canal and River Trust, who intends to undertake the repair of the lock.

The lock and associated structures are Grade II Listed (list entry no. 1334603), within the terms used by the *National Planning Policy Framework*. The project results from a Listed Building application to Historic England and South Derbyshire Local Authority.

No brief has been prepared by the Development Control Archaeologist, Derbyshire County Council (the Curator), but this proposal aims to conform to the generality of briefs which have been previously issued, and the Curator's requirements, confirmed in correspondence dated 9 January 2019. A detailed specification was produced (WA 2018). The proposed repairs are considered by the Curator to have the potential to affect heritage assets of archaeological interest.

The project also conforms to the *Standard and guidance for the archaeological investigation and recording of standing buildings or structures* (ClfA 2014).

### 2 Aims

The Chartered Institute for Archaeologists defines the aims of building recording as 'a programme of work intended to establish the character, history, dating, form and archaeological development of a specified building' (ClfA 2014).

The aims and scope of the project, as stipulated by the Curator and agreed with the client are for Level 2 recording, to include:

- A photographic record prior to repairs;
- A drawn record prior to repairs (plan and elevations);
- A watching brief after the lock has been drained and during the repairs in order to record any elements that are exposed;
- Reporting to include photos, illustrations and interpretation of the recording.

### 3 Methods

#### 3.1 Personnel

The project was undertaken by Timothy Cornah (BA (hons.), MSc, ACIfA); who joined Worcestershire Archaeology in 2006. The project manager responsible for the quality of the project was Tom Vaughan, (BA (hons.); MA; MCIIfA). Illustrations were prepared by Carolyn Hunt (BSc (hons.); PG Cert; MCIIfA).

#### 3.2 Documentary research

Prior to fieldwork commencing a search was made of the Historic Environment Record (HER).

#### 3.3 List of sources consulted

##### *Cartographic sources*

- 1885 1st edition Ordnance Survey Map 1:10,560
- 1901 Ordnance Survey Map 1:10,560
- 1923 Ordnance Survey Map 1:10,560
- 1938 Ordnance Survey Map 1:10,560

### *Documentary sources*

Published and grey literature sources are listed in the bibliography.

### **3.4 Fieldwork strategy**

A detailed specification has been prepared by Worcestershire Archaeology (WA 2018). Fieldwork was undertaken between 14 January and 2 February 2019.

Building recording consisted of a photographic survey and photogrammetric survey of the lock, analysis of its development, annotation of existing survey drawings and measured survey. All photographs were taken with photographic scales visible in each shot where possible. The photographic survey was carried out with a digital SLR camera. All photographs were recorded on a pro-forma Photographic Record Sheet. Annotation of existing ground plans and elevations, and completion of pro-forma Building Record, complemented the photographic record.

The project conformed to the specification for a level 2 survey as defined in the Historic England document *Understanding historic buildings: a guide to good recording practice* (HE 2016). A level 2 record is a descriptive record. This is a visual record supplemented by the minimum of information needed to identify the building's location, age and type. The record will produce enough information to produce conclusions about the buildings development and use.

The record will include the following elements of survey:

- Photography
  - General view or views of the building in its wider setting or landscape
  - External appearance of the building, using oblique and right angle shots
  - Overall appearance of the principal rooms and circulation areas
- Drawings
  - Roughly dimensioned sketched plan, section, or elevation
  - Measured plans as existing
  - Measured drawings recording the form or location of other significant detail (when required)
  - Measured cross-sections, long sections or elevational sections illustrating the vertical relationships within the building (when required)
  - Measured drawings showing the form of any architectural decoration (when required)
  - Measured elevations (when required)
- Written account
  - A summary of the building's form, function, date and sequence of development, including builders, architects, owners or patrons names where known

### **3.5 Building analysis**

Analysis of the building was based on the study of the photographic record, building recording forms, annotated drawings and photogrammetric survey. It was also informed by the cartographic sources listed above. This allowed plans to be drawn up showing the structural development of the building.

The building as recorded is depicted in Plates 1-11. Ground plans and phased elevations elevations have been reproduced as Figures 1-5.

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### 3.6 Statement of confidence in the methods and results

The methods adopted allow a high degree of confidence that the aims of the project have been achieved.

## 4 Context

The lock top is located at approximately 35m AOD within the flood plain, with a shallow slope towards the River Trent which meanders in a north-eastern direction and is located c 700m to the east of the lock. The geology of the site is Edwalton Member mudstone sedimentary bedrock, overlain by Holme Pierrepont sand and gravel member of fluvial in origin (BGS 2019).

## 5 The structure

### 5.1 Structure description

The lock is described in the Historic England National Heritage List for England (NHLE) as follows.

Aston Lock and Aston Lock Bridge II Lock, gates, leat and canal bridge. 1770, by engineer James Brindley, with later rebuilding. Red brick chamber, partly rebuilt in blue brick, with stone and concrete copings, plus metal and wooden gates, and red brick bridge with stone dressings. Chamber is approximately 12 feet deep and has been largely rebuilt to west side. To either side there are small metal bollards and east side has C20 steps to centre. Both sets of gates have wooden frames with metal plates attached and metal balance beams, weighted with concrete, also with concrete semi-circles plus brick steps to either side. South gates have rack and pinion paddle mechanisms and iron handrails. Northern gates have barrel gearing. Leat runs to west side of the chamber. Bridge to north end has single segmental brick arch on tapering stone and blue brick jambs. North side has stone keyblock inscribed 'JB 1770'. Plain parapets over have chamfered stone copings and the walls curve outwards to each end, finishing in square piers. South side of bridge has small C20 metal bridge attached. Built as part of the Trent and Mersey Canal (List Entry Number 1334603).

The lock chamber is c 4m deep. The lock drops approximately 2.4m from its head gate in the south to below the tail gate in the north.

### 5.2 Historical information

The historic background to the canal and lock is presented in the *Heritage Design and Access Statement* (CRT 2018, 4-5).

The Trent and Mersey, known originally as the Grand Trunk Canal, was constructed between 1766 and 1777 and was an early "pioneering" canal which ran 93 miles linking Hull to Liverpool by connecting river systems. The idea to build the canal was put forward by leading industrialists of the Staffordshire potteries, most notably Josiah Wedgwood who would benefit from the links it would create. It was built by James Brindley and assisted by Hugh Henshall and contained 94 locks over its length.

Lock 1 is at Derwent mouth to the east of the site where the canal meets the Trent, with Lock 2 at the inland part at Shardlow, also to the east. The canal is mostly of a narrow gauge, allowing only single narrow boats through each lock, which are 2.1m in width. East of Burton-on-Trent, the canal is of wider gauge with locks increasing to 4.3m in width, sufficient to allow two boats in each lock and allowing for a higher volume of traffic. This wider gauge continued as far as the lock at Horniglow Wharf in Burton-on-Trent. This greater width also allowed for the passage of Humber Keels, which were flat keeled, blunt bowed barges carrying a single mast with a square sail, although they could be towed by horse through canal systems when necessary (Burton and Pratt 2001). This extra capacity was presumably to meet the needs of the growing cotton industry in the town in the late 18<sup>th</sup> century (Tringham 2003).

The 1<sup>st</sup> edition Ordnance Survey map of 1885 indicates the lock, overflow and bridge within their present position. A building is visible on the western side of the lock, presumably the lock keepers

cottage. The same features are shown again in 1901, but by 1923 the lock keepers cottage had been slightly extended to the south. The 1938 OS map shows the same features as in 1923.

### **5.3 Building development**

Three phases were identified during the investigation of the structure, which are described as follows:

- Phase 1: 1770
- Phase 2: 19<sup>th</sup> to 20<sup>th</sup> centuries
- Phase 3: 20<sup>th</sup> to 21<sup>st</sup> centuries

#### **5.4 Phase 1: 1770**

The original vertically set brick work remained in the concave base of the lock (Plate 3 to Plate 4), as well as extending horizontally set up the lower parts of the walls for much of its length, particularly on the eastern side (Figures 3 and 4). The walls were typically constructed using an English Garden bond, though this varies slightly in some areas. The brick work enclosed a number of timbers both in the base of the lock, as well as in the walls (Figure 5 and Plate 6). These timbers are likely to have been placed after the initial excavation of the lock. It is possible that these were part of a structure piled into the sub-strait below in order to resist inward collapse of the lock walls, as was a common part of lock design in the middle of the 18<sup>th</sup> century. The walls were then built up, widest at the bottom, reducing in width towards the top in a further effort to resist inward collapse (Rolt 1973).

Timber was also used in the construction of the upper half of the cill below the head gates as horizontally laid revetting, with the stone lined outlets for the ground paddle culverts visible below (Figure 5). Stone was also used for the corner of the gate recesses as well as for the coping at the top of the lock walls, although the coping on the western side was later replaced with concrete.

The original proportions and general features of the lock have been broadly retained through the subsequent phases. The original would have had double gates at its head and tail, as seen by the recesses as well as the rounded masonry at the point of the gate pivot (Plate 7 and Plate 8). No quoins survived from this phase but it is likely to have had timber quoins that could be easily replaced.

At the northern end of the lock was a bridge crossing the canal, of red brick with stone copings which remains broadly as constructed, and is Grade II Listed.

#### **5.5 Phase 2 19<sup>th</sup> to 20<sup>th</sup> centuries**

Both side walls of the lock have been extensively repaired to broadly the water line using machine made purple engineering bricks of a probable mid-19<sup>th</sup> century or later date (Figures 4 and 5). This was most extensive on the western elevation, with some of the Phase 1 stonework around the tail gate recess removed at this time.

#### **5.6 Phase 3 20<sup>th</sup> to 21<sup>st</sup> centuries**

Further brick work was replaced, most notably in the centre of the eastern elevation and under the bridge. The latter is likely to have been broadly contemporary with the addition of concrete coping on the eastern side.

Both sets of gates are modern replacements, the head gates were constructed in 1997 and the tail gates in 2001. Each of the Phase 3 head gates contained two paddles per gate lifted vertically by rack and pinion machinery, whilst the tail gates contained a single paddle per gate and also used a rack and pinion lifting method. The same was true of the paddles of the ground culvert which allowed water to bypass the head gates.

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## 6 Discussion

The broad form of the extant canal lock closely resembles its original, as built in 1770. The date is shown on the date stone on the northern side of the bridge. The lock was of a wide gauge, suitable to take two boats at one time or one wider boat such as a Hull Keel, with a drop of about 2.4m from the south to the north. The original fabric was present in the form of red brick in the base and lower walls of the lock, and much of the original stone detailing remained intact. Original timber revetting was visible within the walls and floor of the lock.

The fabric of the walls of the lock in particular were heavily repaired and replaced in the 19<sup>th</sup> and 20<sup>th</sup> centuries, along with the paddle mechanisms and the edging on the western side of the lock. The gates were of late 20<sup>th</sup> and early 21<sup>st</sup> century origin.

## 7 Publication summary

Worcestershire Archaeology has a professional obligation to publish the results of archaeological projects within a reasonable period of time. To this end, Worcestershire Archaeology intends to use this summary as the basis for publication through local or regional journals. The client is requested to consider the content of this section as being acceptable for such publication.

*Building recording was undertaken on behalf for Arcadis on behalf of the Canal and River Trust, of Lock 3, Aston Lock, Trent and Mersey Canal, Aston-on-Trent, Derbyshire (NGR SK 42452 29165).*

*The lock was built in 1770 as part of the Trent and Mersey canal by the engineer James Brindley. It had a water height drop from south to north of approximately 2.4m with double gates either end, both of which were modern replacements. Whilst most of the Trent and Mersey has locks of sufficient width to admit a single narrow boat, Aston lock and those as far as the Trent to the north-east and as far as Burton-on-Trent to the west were wide enough to allow two narrow boats side by side within the lock. A brick bridge was also constructed at the same time as the canal, to the immediate north of the lock.*

*Aston lock was a brick built, with the original brickwork visible in the base and some of the side walls. These were supported by vertical timbers and stone detailing. The lock was rebuilt and repaired in successive phases during the 19th and 20th centuries, culminating with the replacement of the gates in 1997 and 2001.*

## 8 Acknowledgements

Worcestershire Archaeology would like to thank the following for their kind assistance in the successful conclusion of this project, Kate Clover (Senior Archaeological Consultant, Arcadis), Steve Baker (Development Control Archaeologist, Derbyshire County Council), Adam Stamford (Aerial Cam) and Audrey O'Connor (Heritage Advisor, Canals and Rivers Trust).

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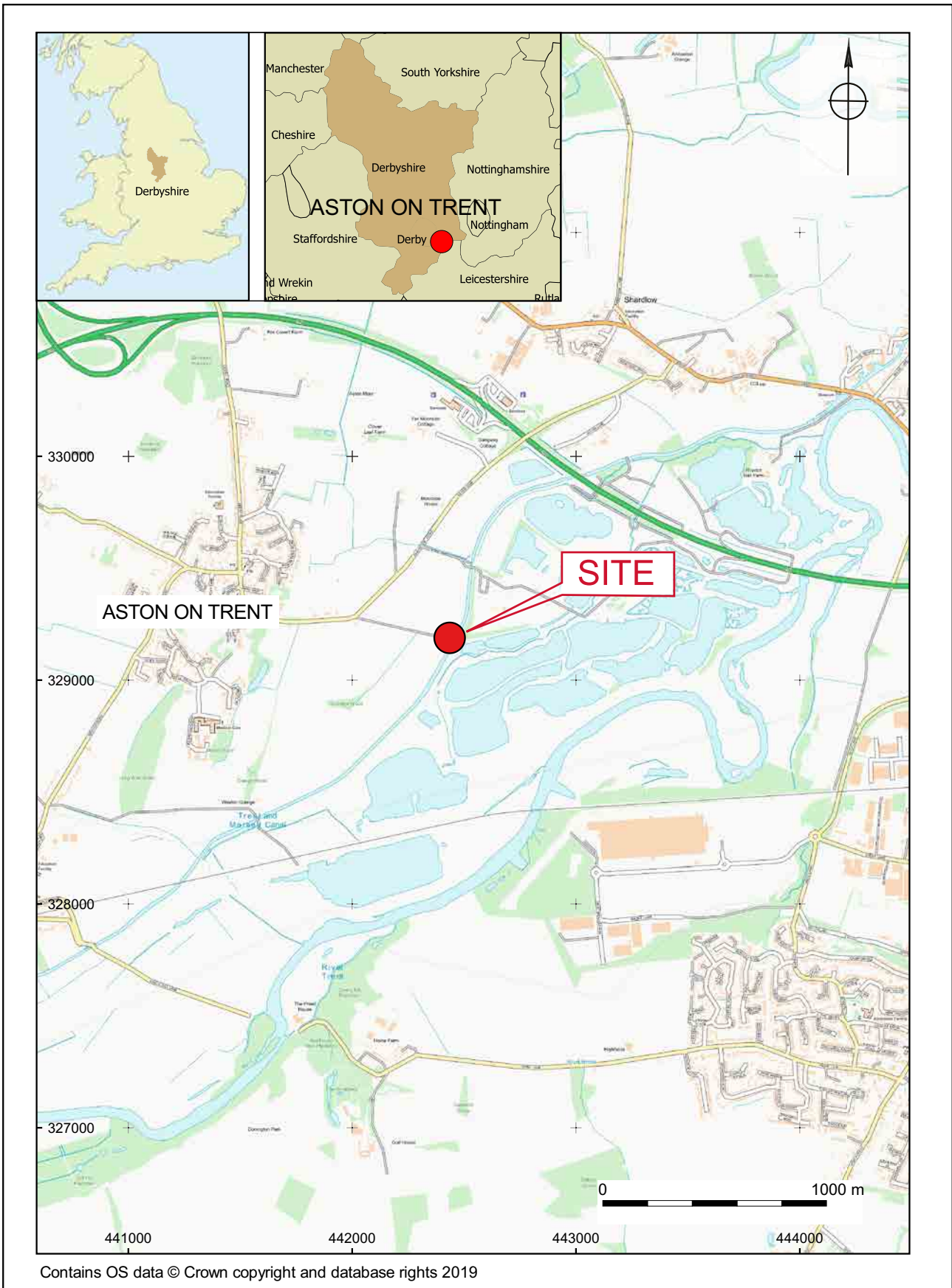
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**Figures**

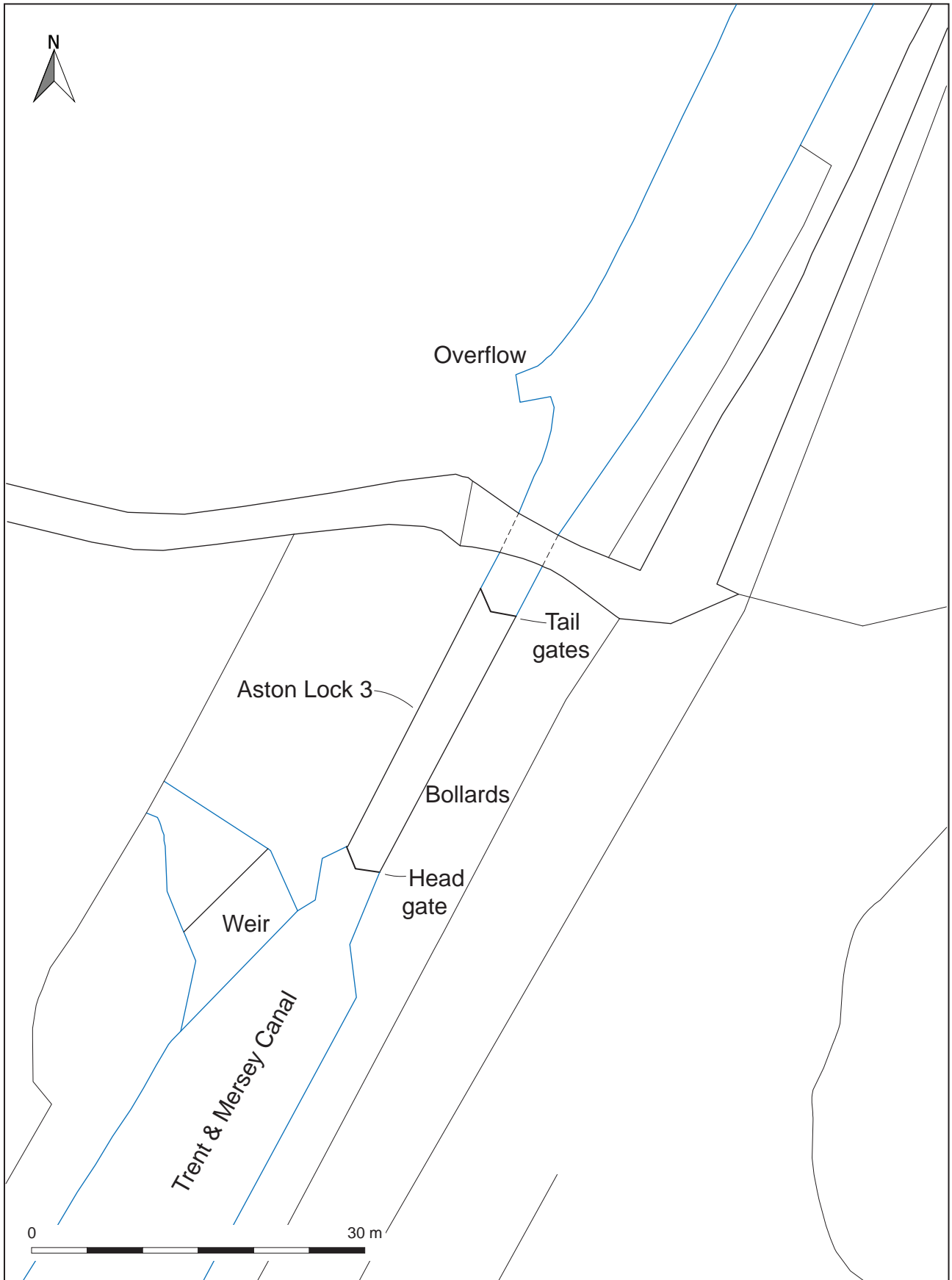




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Location of the site

Figure 1



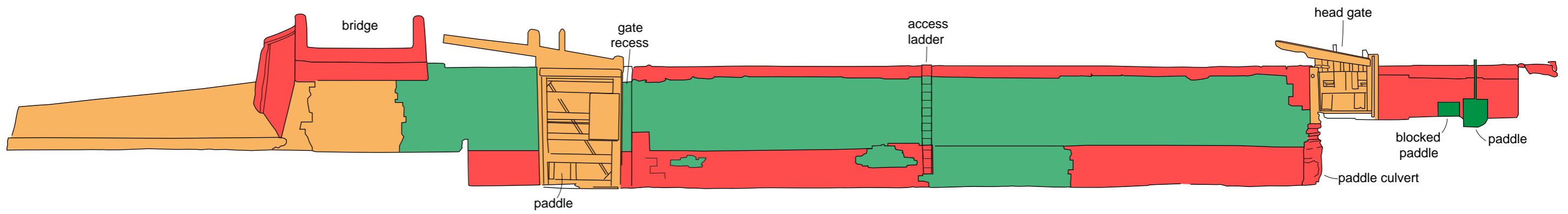
Plan of Aston Lock 3 (based upon Canal & River Trust Drg No TM-149-001/001

Figure 2

# EAST ELEVATION

NE

SW



| Key    |                                |
|--------|--------------------------------|
| Red    | Phase 1: 1770s                 |
| Green  | Phase 2: 19th -20th century    |
| Orange | Phase 3: 20th - 21st centuries |

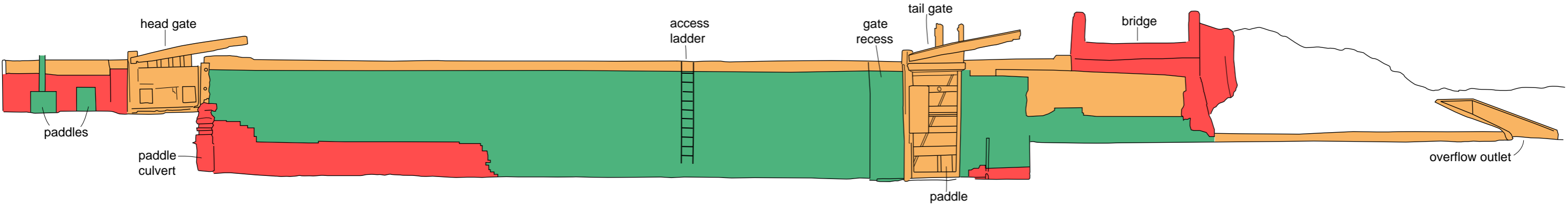
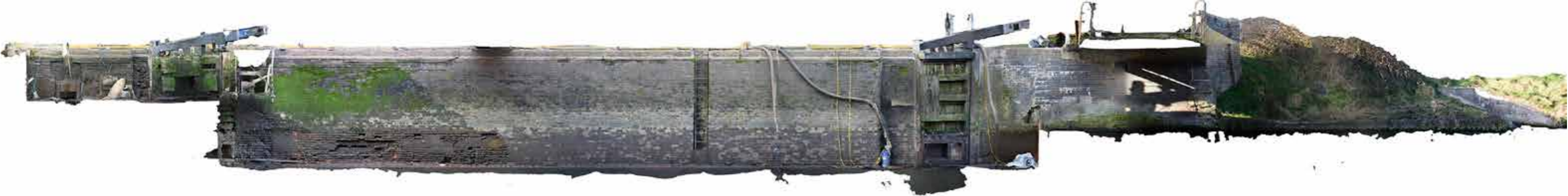
East elevation of lock with phasing (based on photo by AerialCam)

Figure 3

WEST ELEVATION

SW

NE



| Key    |                                |
|--------|--------------------------------|
| Red    | Phase 1: 1770s                 |
| Green  | Phase 2: 19th -20th century    |
| Orange | Phase 3: 20th - 21st centuries |

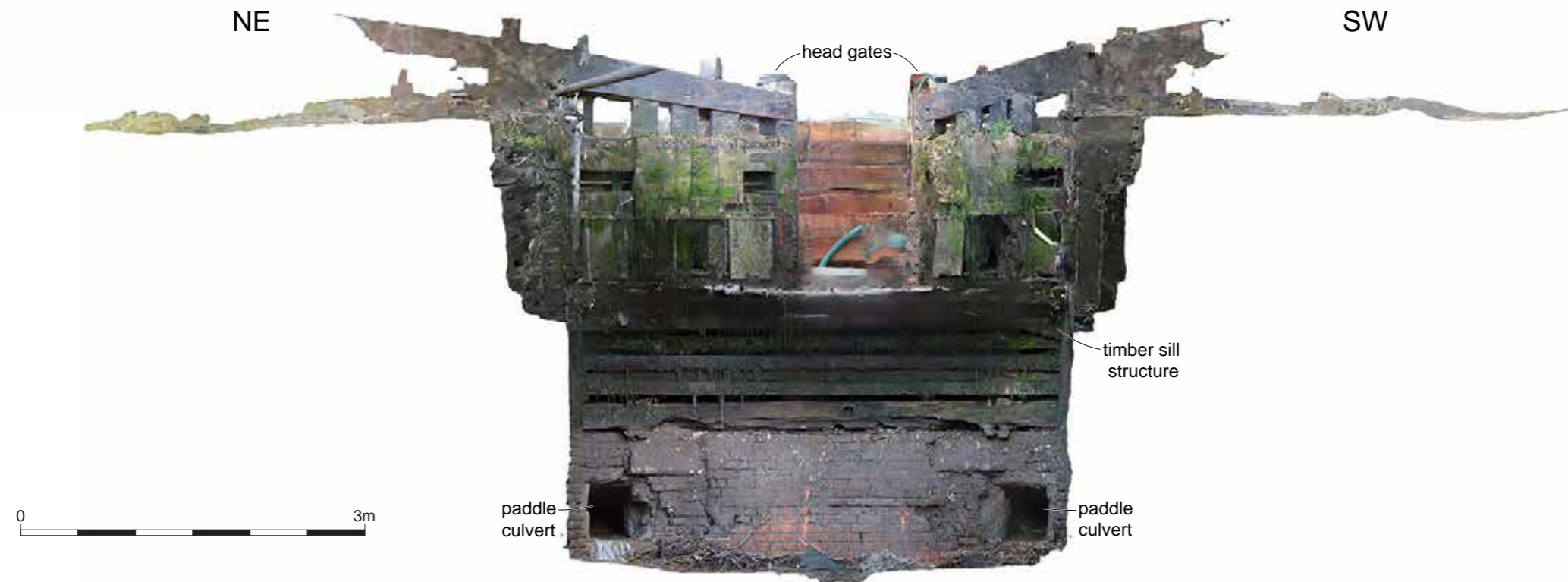
West elevation of lock with phasing (based on photo by AerialCam)

Figure 4

NORTH ELEVATION



SOUTH ELEVATION



North and south elevations of lock (based on photo by AerialCam)

Figure 5

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## Plates



*Plate 1 The lock, looking north*

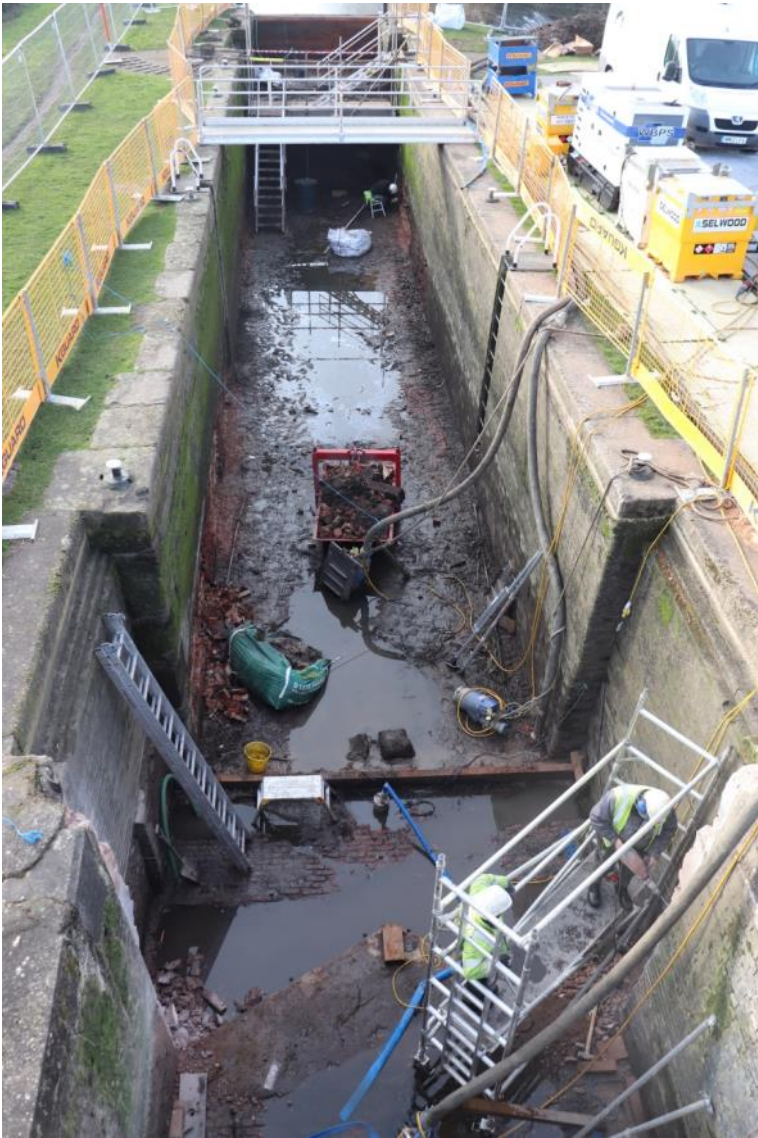


*Plate 2 The lock, looking south-west*

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*Plate 3 The lock, looking south, no scales*



*Plate 4 The lock with the gates removed, looking south-west, no scales*





*Plate 5 The timber cill with ground paddle culverts visible below, looking south-west, 2m scale*



*Plate 6 Vertical timbers within the walls, looking east, 2m scale*

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*Plate 7 Stonework at the pivot of the tail gates, looking north-east, 2m scale*



*Plate 8 Stonework at the pivot of the head gates, looking north-east, 2m scale*



*Plate 9 Tail gate with single paddle, looking north-east, 2m scale*



*Plate 10 Tail gate with single paddle, looking south-west, 2m scale*



Plate 11 Head gate with double paddles, looking south-east, 2m scale



Plate 12 Head gate with double paddles, looking north-east, 2m scale

## **Appendix 1 Technical information**

### **The archive**

The archive consists of:

- 2 Field progress reports AS2
- 2 Photographic records AS3
- 128 Digital photographs
- 8 Digital elevations and plans
- 1 Copy of this report (bound hard copy)

The digital project archive is intended to be placed with ADS.

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