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1 INTRODUCTION

- 1.1 The North Pennines Heritage Trust was invited to submit a tender for a building survey to be undertaken at Bantling limekilns in Derwentside County Durham. The Trust was awarded the survey project in November 2001.
- 1.2 The archaeological brief was prepared by Nail Hammond of Durham County Council. The brief required a level 2 building survey and a basic survey of the surrounding earthworks.

2 LOCATION

- 2.1 The site is located to the south west of Annfield Plain in the North of County Durham at NGR NZ 1508 5188 (see figure 4). The kilns are immediately south of the A693, adjacent to the disused Stanhope and Tyne Railway line which once serviced the limekiln site.
- 2.2 The limekiln structure appears to be in a relatively stable condition and did not produce any significant health and safety problems. No detailed analysis was conducted on the interior of the kilns because of health and safety fears.
- 2.3 The majority of the study area surrounding the limekilns, as defined in the brief, is under thick vegetation.

3 PREVIOUS WORK AND HISTORY OF SITE

- 3.1 No previous archaeological work has taken place on the site.
- 3.2 The kilns appear to have been built between 1835 and 1836 for the Stanhope and Tyne Railway, and were built to supplement the output from kilns owned by the same company in Consett. The kilns were fed with limestone by a siding off the Stanhope and Tyne Railway, the coal was provided by two adjacent collieries, a mine and a series of drifts to the west and east of the site. The Stanhope and Tyne Railway Company was very short lived with the company going bankrupt in the late 1830ies just a few years after the completion of the Kilns.
- 3.3 The limekilns were then bought by the Derwent Iron Company of Consett in 1842, with much of the production of the limekilns going into the production of Iron and steel at Consett. The finished lime appears to have been removed by small carts, as there does not appear to be any provision of any siding at this level or incline and no obvious remains of any substantial tracks at the base of the lime kilns.

4 AIMS

4.1 The completed work involved a level 2 building survey with an earthwork survey on the surrounding land. As much of the area is covered in thick vegetation very little survey work was possible. The aims of the work undertaken on the kiln structure itself are outlined below:

- * to produce a basic photographic and drawn record of the lime kiln structure;
- * to establish, wherever possible, the condition of the remains for future management purposes;
- * to prepare a report for Groundwork West Durham including recommendations for further action.

5 RESULTS

The work was undertaken under the overall direction of Frank Giocco BA Arch. Trust Archaeologist. He was assisted by Philip Cracknell BA AIFA a building surveyor with over twelve years experience and by Walter Fryer, the Trust's building manager. The survey work was carried out using a Geodimeter 440 and Sokkia data logger, and the site was located onto an Ordinance Survey base map supplied by Durham County Council.

5.1 The limekilns are built of very fine ashlar masonry blocks, with the six kilns constructed on an elegant curve set into the hillside (see fig 4) and represent one of the finest banks of mid nineteenth century limekilns in the north east of England. Decorative features, such as a plinth and large inscription were incorporated into overall design, the base of the structure currently sealed beneath debris and vegetation may well contain further decorative features. Although the inscription is now lost some fragments of plaque were rescued by Durham County Council and a photograph does exist showing the commemorative plaque in situ above arch number 3 (see 5.9).

5.2 The structure is almost certainly of one phase, and the only evidence for further modification appears to be the relining of at least two of the kilns. This would be a common occurrence in limekilns that were used intensively for any length of time, as the intense heat would result in the crumbling away of the furnace lining. Each one of the six pots was served by two eyes contained within each of the six arches. Each furnace was also served by two large tuyeres which allowed the air to be drawn into the furnace which was required to reach the temperatures necessary in producing quicklime (see figure 8).

5.3 The set of six limekilns would have been fired in rotation with perhaps one of the kilns being set aside for routine maintenance. The limestone would have been broken up into manageable pieces and mixed with coal at a ratio of 4:1, this mixture of limestone and coal was known as the charge. The charge would

be tipped into the pots directly from railway tubs. Once the kiln had been successfully fired and the limestone converted into quicklime, the contents of the kilns was removed from the elegant arches by the lime burners who normally worked in pairs.

- 5.4 On industrial sized kilns such as Bantling Castle there was normally a platform in front of the arches, which would work alongside a siding or incline allowing the quicklime to be loaded onto tubs with the minimum use of labour. Although the base of the arches at Bantling Castle is covered in rubble and vegetation there is no obvious evidence of such a structure.
- 5.5 The line of the old Stanhope and Tyne Railway is now used as a cycleway, which has been diverted onto the course of the limekiln siding, which in effect has preserved this track bed from vanishing under dense undergrowth.
- 5.6 No evidence survives above ground of any associated buildings, and there are no obvious earthworks.
- 5.7 The limekiln arches are numbered 1 to 6 from the north gable; each arch has been inspected separately (see figure 1). The rest of the structure has been taken as a whole with the breaches dealt with separately.

6 RECOMMENDATIONS

6.1 Arch 1

The arch is in a reasonable condition, the paired eyes are not visible and the right hand eye has two courses missing above the lintel. The NPHT suggest replacing the stone above the right eye and raking out and re-pointing the arch interior. The stone could be salvaged from the immediate site and reused.

6.2 Arch 2

The second outer arch has sagged slightly with one of the face stones cracked and missing over half its length back towards the bowl of the kiln. The inner arching is sound. The stonework above the lintels over the eyes is mostly missing allowing material from the bowls to fall into the eye chamber.

- 6.3 As a result of the sagging of the outer arch, the west face of the stonework has also sagged with a breach at the west side. The breach measures approximately 1.5 m wide at the bottom widening to approximately 4m at the top.
- 6.4 An extra complication in this area is the fact that due to the sag in the outer arch the stonework on the west face has moved out of alignment with the section of wall immediately adjacent to it to the north. The NPHT suggest this section of wall be taken down and re-built on a true alignment with the adjacent section, and that at the same time the breach should be re-built with stone salvaged from the immediate site.

6.5 The first two arches and the north gable are leaning slightly northwards with a visible crack on the west face approximately 1.2 metres in from the north-west corner of the structure. This northward movement appears to be very gradual, and the NPHT would suggest a monitoring system to record any further movement.

6.6 Arch 3

The arch is completely collapsed from the back edge of the pot and through the front wall, the debris at the foot of the collapse is preventing further movement in this area. The NPHT recommend leaving the rubble in situ, which would continue in supporting the remains behind.

6.7 The exposed walls of the breached section should be cleared of any vegetation and infill. The walls should then be pointed with a lime mortar to form a stable seal.

6.8 Arch 4

The outer arch is badly sagged and the stonework on the face above is also sagging. There is a breach in the facing stonework above and to the left of the arch. The outer arch is corbelled off the first inner arch, which is also sagging. The NPHT suggest taking down stonework above the outer arch (an area of approximately 6m square), and re-setting the arch in its true alignment and rebuilding the stonework including the breach.

6.9 Arch 5

This arch is in reasonably good condition apart from the eyes. The lintels and stonework above the west eye are missing and the stonework above the right hand eye is missing. The rubble inside the arch is preventing any further collapse of material from inside the bowl. The NPHT would suggest locating the original lintel and stone in the debris inside the arch, re-setting the lintel and rebuilding stonework above left eye and right eye.

6.10 Arch 6

The arch is in good condition with only a very slight sag. No action is necessary. For detailed elevation and section drawing see figures 2 and 3.

7 THE OVERALL STRUCTURE (west elevation and north and south gables)

7.1 It is proposed that all vegetation and treat roots should be removed with a propriety weed killer to prevent re-growth. The NPHT recommend the rebuilding the breaches, rake out joints where necessary and point with a lime putty mortar. The exposed tops of the walls should have vegetation removed and treated, any loose material e.g. old mortar is to be removed and the tops of

walls cored with random rubble set in a lime putty mortar to form a seal to prevent ingress of water into the stonework.

8 THE POTS

- 8.1 All six pots are in a very poor state of repair with little or no stonework visible and very overgrown with vegetation. The rubble inside the pots offers its own protection against further collapse. The NPHT recommend a minimal amount of work in this area limited to the removal of vegetation and tree roots.
- 8.2 If the structure is to be accessible to the general public, a fence should be erected at the top of the structure consisting of treated wooden posts and rails.

9 CONCLUSION

- 9.1 The site represents a very fine and well preserved set of early 19th century limekilns, which are worthy of sympathetic conservation to ensure their preservation for future generations.
- 9.2 Very little information was gathered from the surrounding area on possible buildings associated with the running of the limekilns. This may be due to the fact that there were never any permanent stone or brick built structures built to serve the limekilns. Any structures consisting entirely of timber would leave very little visible remains. The only way to clarify this would be to carry out further archaeological fieldwork, but at this stage this is not recommended.

10 BIBLIOGRAPHY

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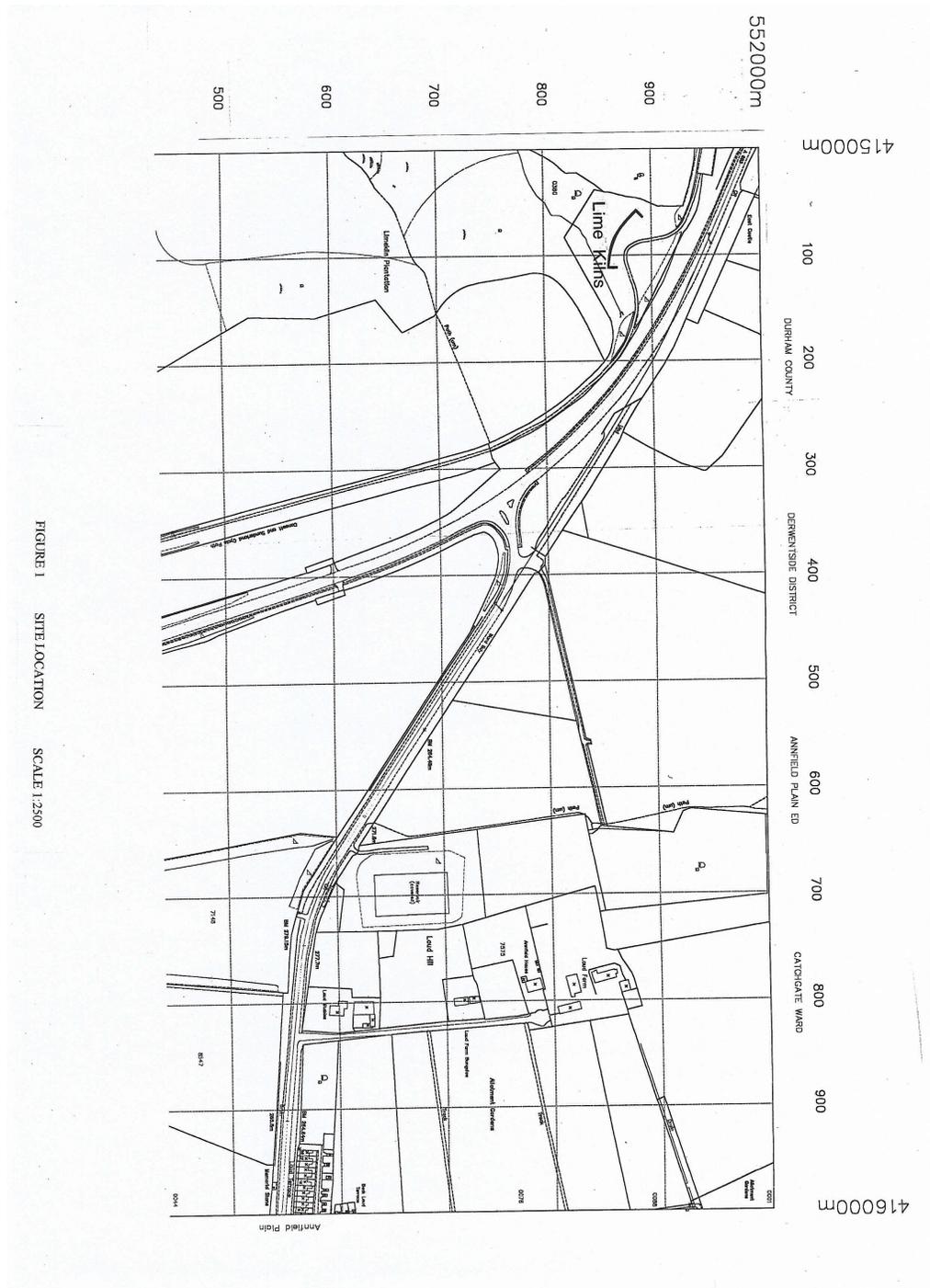


FIGURE 1

SITE LOCATION

SCALE 1:2500

FIGURE 1 SITE LOCATION

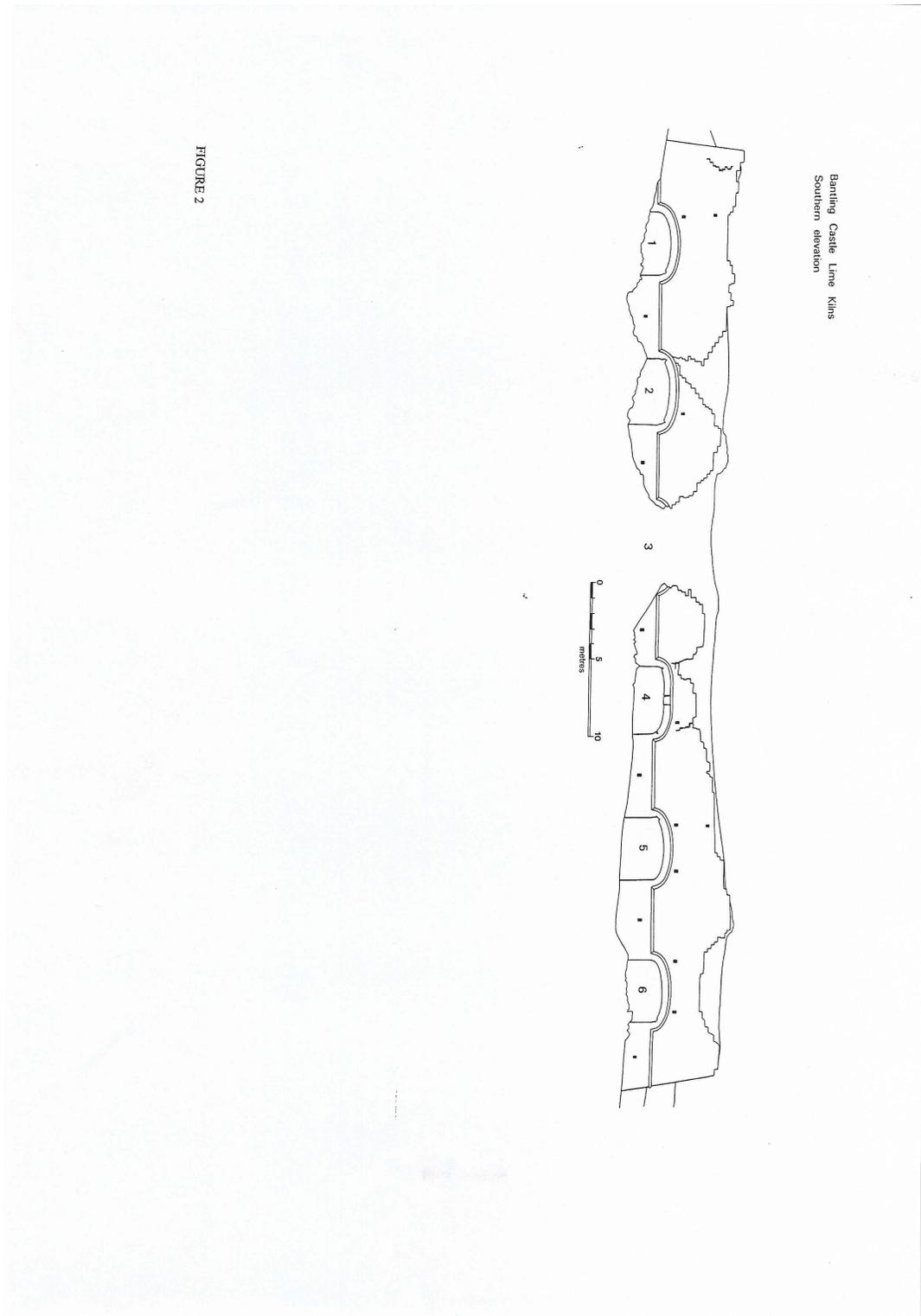


FIGURE 2a

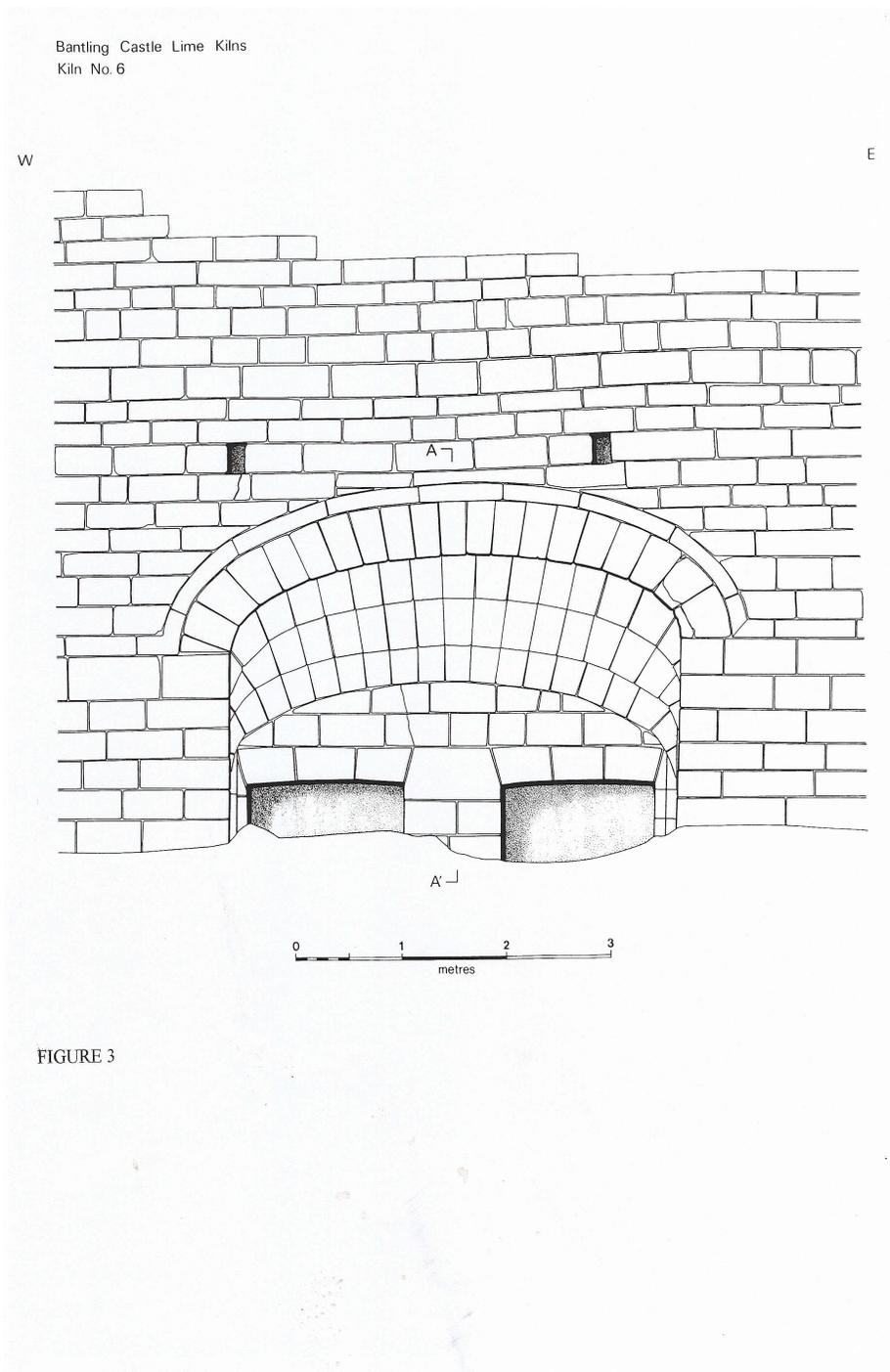


FIGURE 3
DETAIL OF ARCH 6

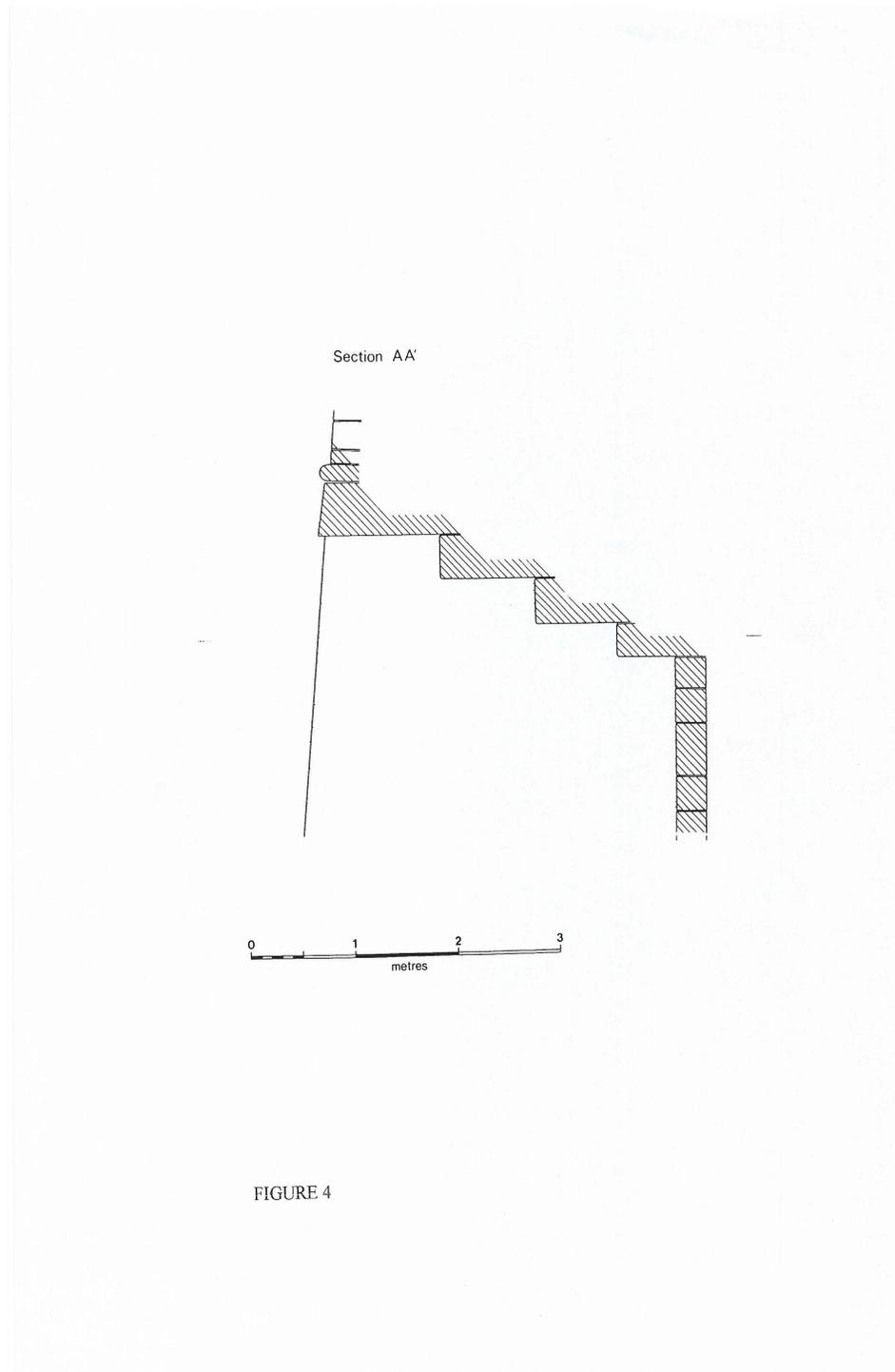


FIGURE 4

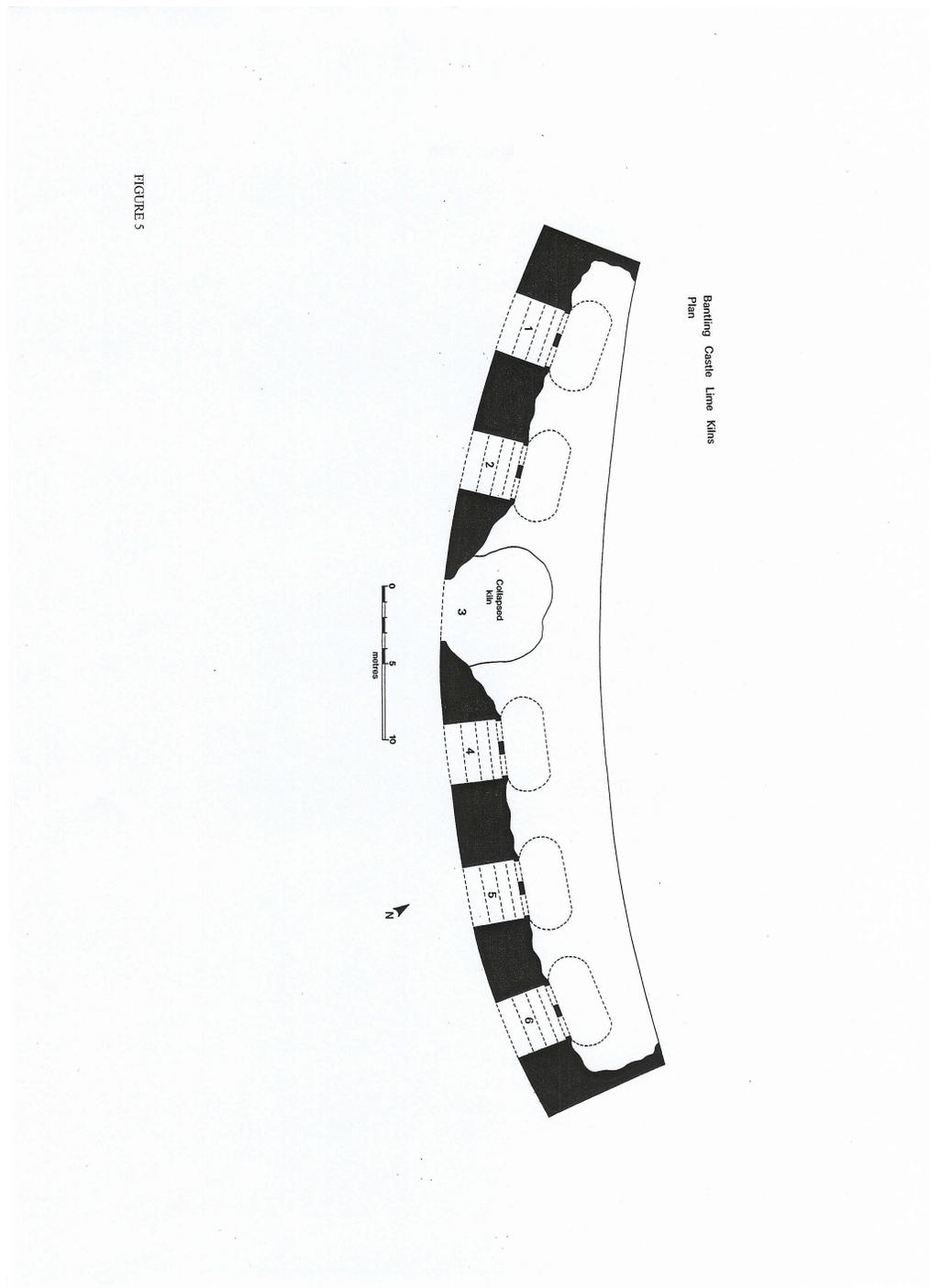


FIGURE 5

FIGURE 5a



FIGURE 6 DETAIL OF ARCH 6



FIGURE 7 REMAINS OF KILNPOT ABOVE ARCH 6

