

BEASLEY WEIR DULVERTON EXMOOR NATIONAL PARK WEST SOMERSET

Results of Historic Building Recording



The Old Dairy
Hacche Lane Business Park
Pathfields Business Park
South Molton
Devon
EX36 3LH

Tel: 01769 573555
Email: mail@swarch.net

Report No.: 150202
Date: 02.02.15
Author: B Morris

**Beasley Weir
Dulverton
Exmoor National Park
West Somerset**

Results of Historic Building Recording

For

Catherine Dru

By



SWARCH project reference: DBW15
OS Map copying Licence No: 100044808
National Grid Reference: SS9201426917
OASIS record number: southwes1-202322
Project Director: Bryn Morris
Fieldwork Managers: Bryn Morris
Project Officer: Bryn Morris
Historic Building Survey: Bryn Morris; Jenny Watling
Report: Bryn Morris
Expert Review: Martin Watts
Report Editing: Natalie Boyd
Graphics: Bryn Morris; Jenny Watling

February 2015

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Summary

South West Archaeology Ltd. was instructed to undertake historic building recording at the former hydro-electric plant at Beasley Weir, Dulverton, Exmoor National Park, West Somerset, by Catherine Dru (the Client) prior to the partial demolition of the existing structures and the creation of a new 78kW hydro-electric facility. The first building on the site was constructed by the Dulverton Electric Lighting Company in c.1912-14 and was decommissioned in c.1950; the site was then modified and used as a fish-breeding station until the 1980s. The site at present comprises a corrugated iron shed standing on a mass-concrete plinth adjacent to the weir and fish-breeding tanks. The standing remains are relatively complex, with five main phases of alteration and adaptation.

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Acknowledgements

Thanks for assistance are due to:

Catherine Dru (the client)
 Martin Watts
 Chris Elliot (Western Renewables Energy)

1.0 Introduction

Location: Beasley Weir
Parish: Dulverton
County: Exmoor National Park, West Somerset

1.1 Project Background

South West Archaeology Ltd. (SWARCH) was commissioned by Catherine Dru (the Client) to undertake historic building recording at Beasley Weir, Dulverton (Figure 1). The historic building survey was undertaken in order to understand the date, form, function and development of the structure prior to its partial demolition and replacement with a modern 78kW hydro-electric facility.

1.2 Topographical and Geological Background

Beasley Weir is located at the base of the valley of the River Barle south of Dulverton, on the eastern side of the B3222 at an altitude of 129m AOD. The base of the valley is flat and covered by alluvial deposits, but its sides rise steeply to the east and west. The soils of this area are the alluvial soils of the Conway Association (SSEW 1983), overlying the siltstones and mudstones of the Baggy Sandstones Formation (BGS 2015). The weir and associated structures are built directly on the bedrock, which is exposed in the riverbed.

1.3 Archaeological Background

A building appraisal was undertaken by Context One (2011) in support of the proposed application, which highlighted the potential of the site; no other work relating to the site has been undertaken.

1.4 Methodology

The building survey was undertaken by Dr Brynmor Morris and Jenny Watling on 22nd January 2015, with additional recording on 27th January; this work took place in accordance with a Project Design drawn up in consultation with Shirley Blaylock (Exmoor National Park Conservation Officer Historic Environment), and English Heritage and ClfA guidelines on the recording of standing buildings and structures. A level 4 photographic survey was undertaken; the drawn component utilised an existing topographic survey, but elevation drawings at 1:50 were generated on site.

As the survey took place in winter, and the site/structures are located adjacent to/within a river, this placed very clear limitations what could safely be recorded; this is with particular regard to the elements of the former hydro-electric plant that extended along the weir to the north.

NOTE THAT the long axis of the building is orientated north-east to south-west, but that for the sake of simplicity all references in this report are to the cardinal directions (i.e. the north elevation is actually north-west facing, the east elevation is actually north-east facing etc.).

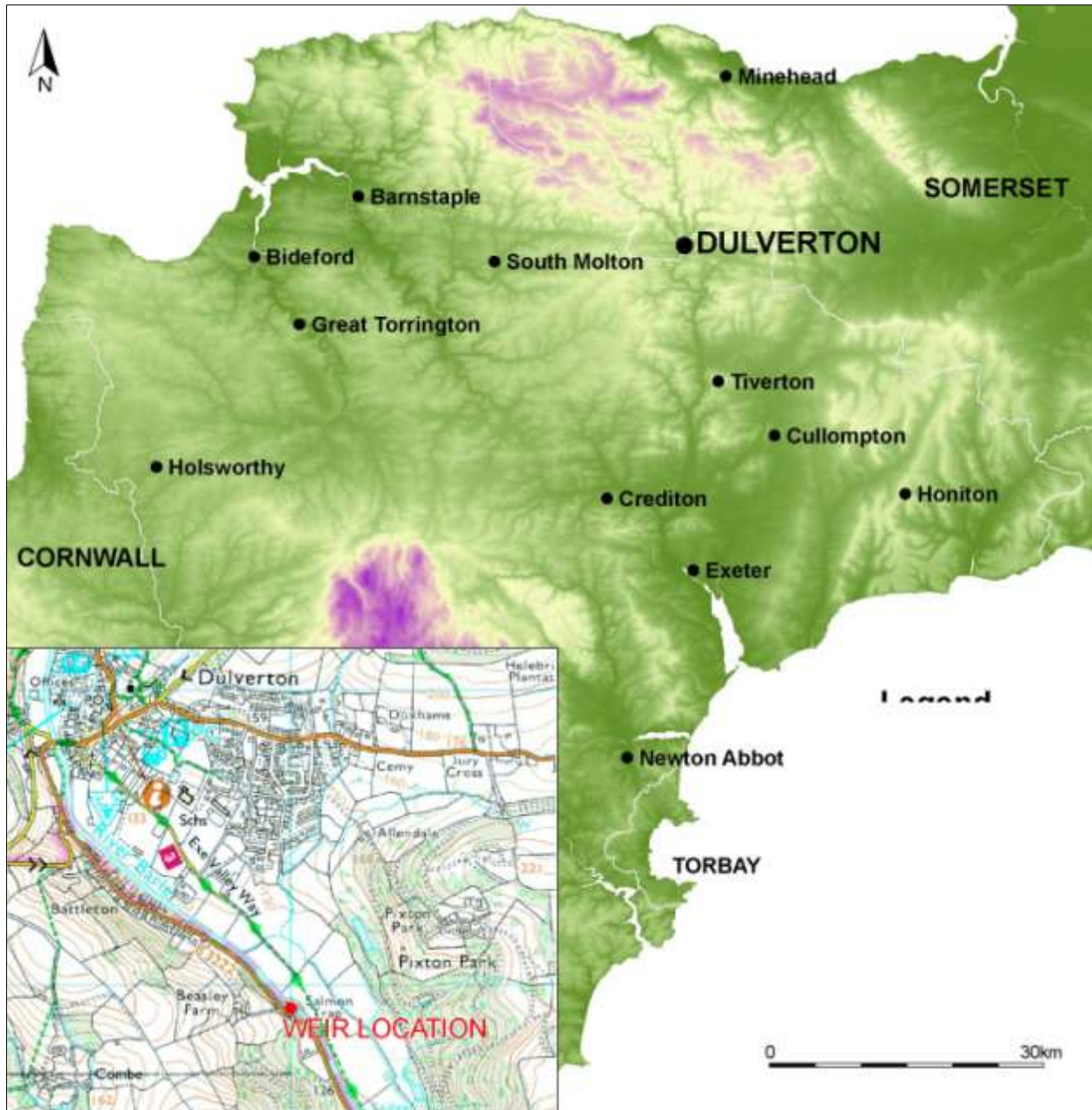


Figure 1: Location map.

2.0 Historical Background

2.1 A Brief History of Beasley Weir

On the eastern side of the B3222, about 0.8km south of Dulverton and overlooking a weir on the River Barle, sits a rusty Dutch barn and lean-to. This building, hard by the road, was once a small hydro-electric power station generating electricity for the nearby town of Dulverton. Prior to the creation of the National Grid in the 1930s, electricity supplies for industrial and domestic use depended on the creation of local companies who generated power via a variety of means. In parts of Devon, but particularly Exmoor, the potential of water power was quickly recognised; the first such hydro-electric plant was installed at Lynmouth in 1890.

The development of the site post-dates the OS 2nd edition maps, and pre-dates subsequent revisions; on that basis cartographic analysis cannot provide any meaningful information about the site.

The history of Beasley Weir hydro-electric power station is a relatively short one, but is nonetheless subject to a number of inconsistencies (see Context One 2011, 4-5). The Dulverton Electric Lighting Company was incorporated in 1904 under one Richard Barrow, using a waterwheel thought to have been located at the former Lower Mill (though see below) with a 75v 30amp Crompton Alternator and a Pool oil engine as backup (Warren 1978). In by c.1914 the concrete weir and hydro-electric plant on the River Barle below Beasley Farm was constructed, utilising two Armfield River Turbines. These turbines were produced by a company based in Ringwood, Hampshire; the early records of that company are held in the Hampshire Record Office, but go back no further than 1919. However, there is a note in a shop book (HRO: 38M 90/D2) that Armfield supplied moving guide vanes for a 13½ inch River Patent Turbine to the Dulverton Electric Co. in 1920. The first River Turbine was installed in 1911 but no patent was issued for the design to Armfield during the period 1900-1913 (Richards 2005). The factory was requisitioned during WWI, so the Beasley turbines would have to have been installed between 1912 and 1914.

The “River” Patent Turbine.

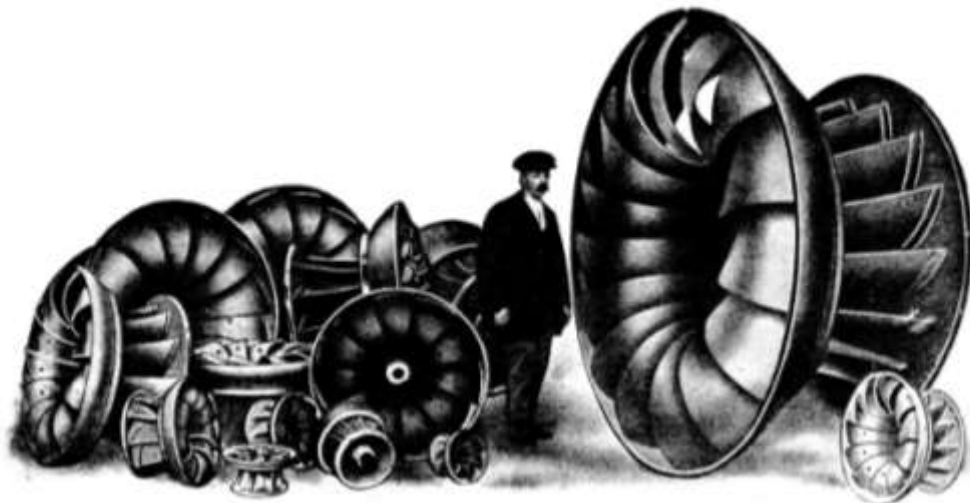


Figure 2: Illustration from an Armfield catalogue showing the size of the rotors (the largest is 60", the smallest 7½") used in the River Turbine series (courtesy of Martin Watts).

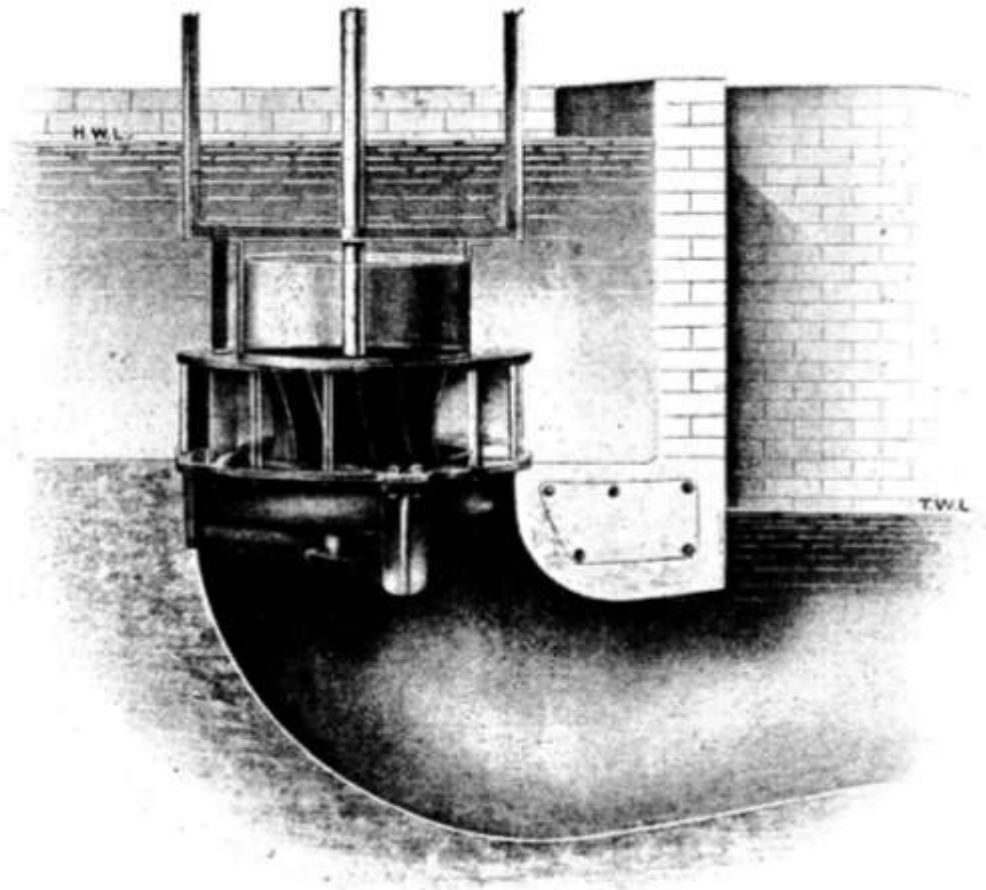


Figure 3: Single rotor, upright shaft, open flume pattern River Turbine (Type 1) with cylindrical gate for constant water supply, from the same catalogue (courtesy of Martin Watts).

The Dulverton Electric Lighting Company merged with the Exe Valley Electric Company in 1930, and it was probably at this time that the two Armfield River Turbines were replaced with a single vertical-shafted Escher Wyss turbine. This required a considerable amount of adjustment at the plant, as is clear from the building survey (below). The plant continued to function until 1938, when the National Grid reached Dulverton, but the site was maintained as an emergency backup during WWII. It was decommissioned in the early 1950s, and fish tanks were installed by the Rivers Authority (now the Environment Agency). These remained in use until the 1980s, whereupon the site began its slow decline.

This account is based on Siraut (n/d), Warren (1978), Context One (2011) and Martin Watts (*pers. comm.*)

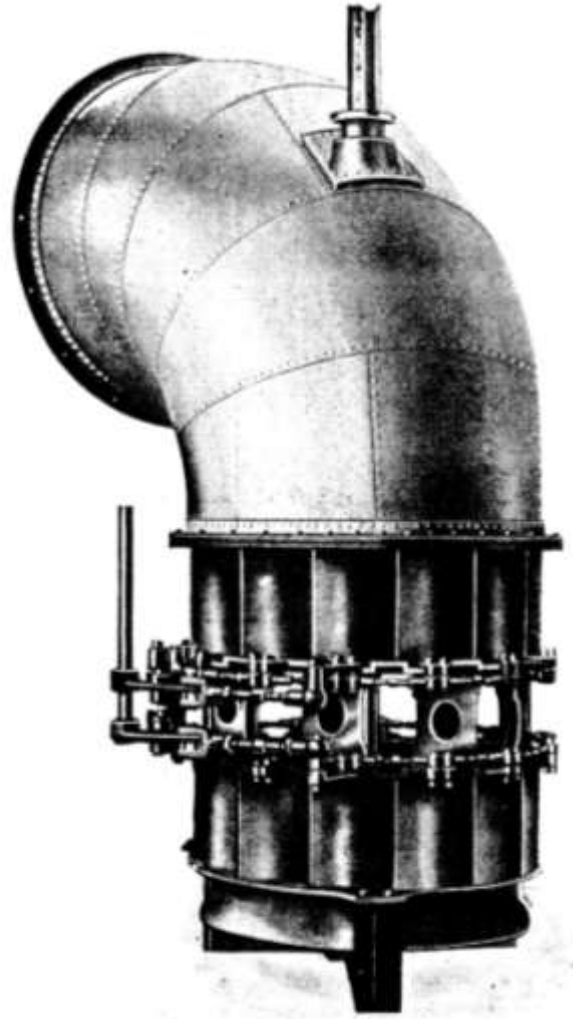
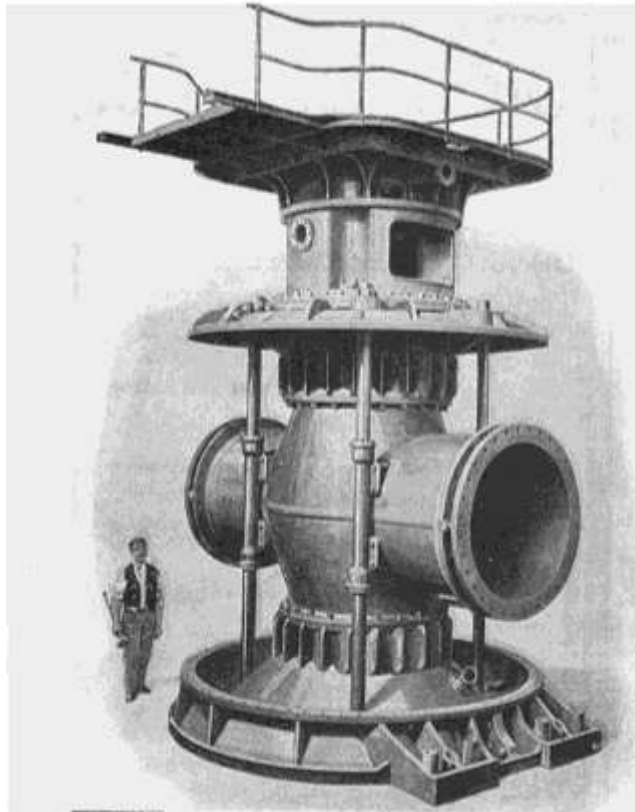


Figure 4: Double rotor, upright shaft, open flume pattern, River Turbine (type 2) with moving guide vanes operated by adjustable links, from the same catalogue (courtesy of Martin Watts).



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Figure 5: Advert for Escher Wyss illustrating the type of turbine they produced; while this model ('10,000 HP supplied to the Canadian Niagara Power Co.') is unlikely to be the same as the one installed at Beasley Weir, the sloping base of the machine hints at the pyramidal concrete block in the floor of the turbine chamber.

3.0 The Building Assessment

3.1 Summary

The former hydro-electric plant that stands between the B3222 and the River Barle south of Dulverton is a relatively complex composite structure with evidence for five phases of use and re-use. The surviving building is a rectangular iron or steel-framed corrugated iron 'Dutch' barn with mono-pitch lean-to to the south (Building #1) and pitched extension to the east (Building #2). Building #1 has a very thick internally-battered stone rubble western gable wall with brick above along the road. The building stands on a multi-phase concrete platform elevated above the weir. A pitched extension to the east (Building #2) stands above a reinforced shuttered concrete turbine chamber. Water is directed into the chamber via a cast-iron sluice gate in the north elevation. To the south there is a pair of rectangular concrete fish-rearing tanks linked by a central passage, overlooked by a purpose-built platform. Abutting the building to the south-west there is a deep square concrete tank of unknown purpose, linked by a large-diameter pipe to a void beneath Building #1. To the east and south there are a series of concrete or stone-and-concrete walls marking the location of leats that pre-date the fish tanks.

The history of the structure is complex, and it is unclear how the earlier turbines actually functioned within the building. The function of the tank located on the south-western side of Building #1 is unknown, as is the possible sluice gate located within the Phase 2 weir.

In addition, there is some disagreement between the secondary sources as to precisely which turbines were in use at the plant at what time.

3.2 Significance of the Buildings

The site is of *local* significance, and forms part of the history of local electricity generation on Exmoor. The surviving structure is complex, and contains elements that cannot easily be explained, but no machinery relating to the generation of electricity survives, with most surviving mechanical elements relating to the use of the site as a fishery. In addition, more complete and more readily-intelligible examples (e.g. Castle Drogo) survive elsewhere.

3.3 Historic Phasing of the Buildings

3.3.1 'Pre-Beasley'

The Dulverton Electric Lighting Company began life in 1904, and moved to Beasley Weir in c.1909. However, the concrete plinth beneath Building #1 incorporates a large block of weathered concrete (visible in the south elevation) that appears to represent the stub of an earlier structure; this could have belonged to the waterwheel.

Machinery: Waterwheel with 75v 30amp Crompton Alternator with Pool oil engine as supplementary power (Warren).

3.3.2 Phase 1 c.1912-14

The first hydro plant is constructed, consisting of a solid rectangular concrete platform with a very strong (1m wide) stone rubble wall built along the roadside. A steel or iron framed 'Dutch' barn with mono-pitch lean-to was constructed over the platform. The precise arrangement of the building/turbines cannot be determined with any clarity, but may have extended as far as the eastern wall of the spillway.

Machinery: two Armfield River Turbines (Siraut)

Machinery: two mixed-flow vertical-shafted Armfield turbines (Warren)

There is a note in a shop book in Hampshire Record Office (38M 90/D2) that Armfield supplied moving guide vanes for a 13½ inch River Patent Turbine to the Dulverton Electric Co. in 1920.

3.3.3 Phase 2 c.1930

The second hydro plant was constructed next to the first, consisting of a rectangular reinforced concrete chamber 5×2.7m across and 3.4m deep, open at the surface. The flow of water into the chamber was controlled by two sluice gates in the north (upstream) wall; water exited via a square opening c.0.9m square in the south wall, located 0.75m above the floor of the chamber. The eastern wall of this chamber extended beyond the chamber, south, to the edge of Building #2 above, and to the north some distance along the weir, terminating at a large block/possible sluice gate. The spillway east of the chamber was created, utilizing the remains of an earlier wall. Subsequent modifications include a concrete floor supported by iron girders, laid over the chamber, with a single opening in the centre for the vertical shaft of the turbine. A pitched corrugated-iron building with timber studwork was built over the chamber.

Machinery: two vertically-driven turbines (Siraut)

Machinery: an Escher Wyss turbine type (Martin Watts)

3.3.4 Phase 3 c.1950

The hydro plant was dismantled and the machinery removed. The turbine chamber was modified, with the north (upstream) side remodelled from a vertical face to a sloping face. This contained a single opening controlled by a single sluice gate. The wall extending along the side of the weir was reduced to the height of the weir. The turbine was removed during this process.

3.3.5 Phase 4 c.1950s

The Phase 3 sluice was replaced by a larger opening with a contemporary gate ('Farrer 36" Birmingham'). Two large rectangular tanks were constructed to the south, with a central passage, with water levels controlled by opposing sluice gates at either end of the tanks. An observation platform was constructed over the spillway, accessed from the Phase 3 structure. Floor levels within Building #2 were raised to match those in Building #1, and the Phase 2 turbine chamber sealed from above. The large girder spanning the opening to the turbine chamber on the south side was inserted to help support the new floors.

3.3.6 Phase 5 c.1980

Fish breeding at the site ceased, and the building and associated infrastructure began to fall into ruin.

3.4 Plans and Elevation Drawings

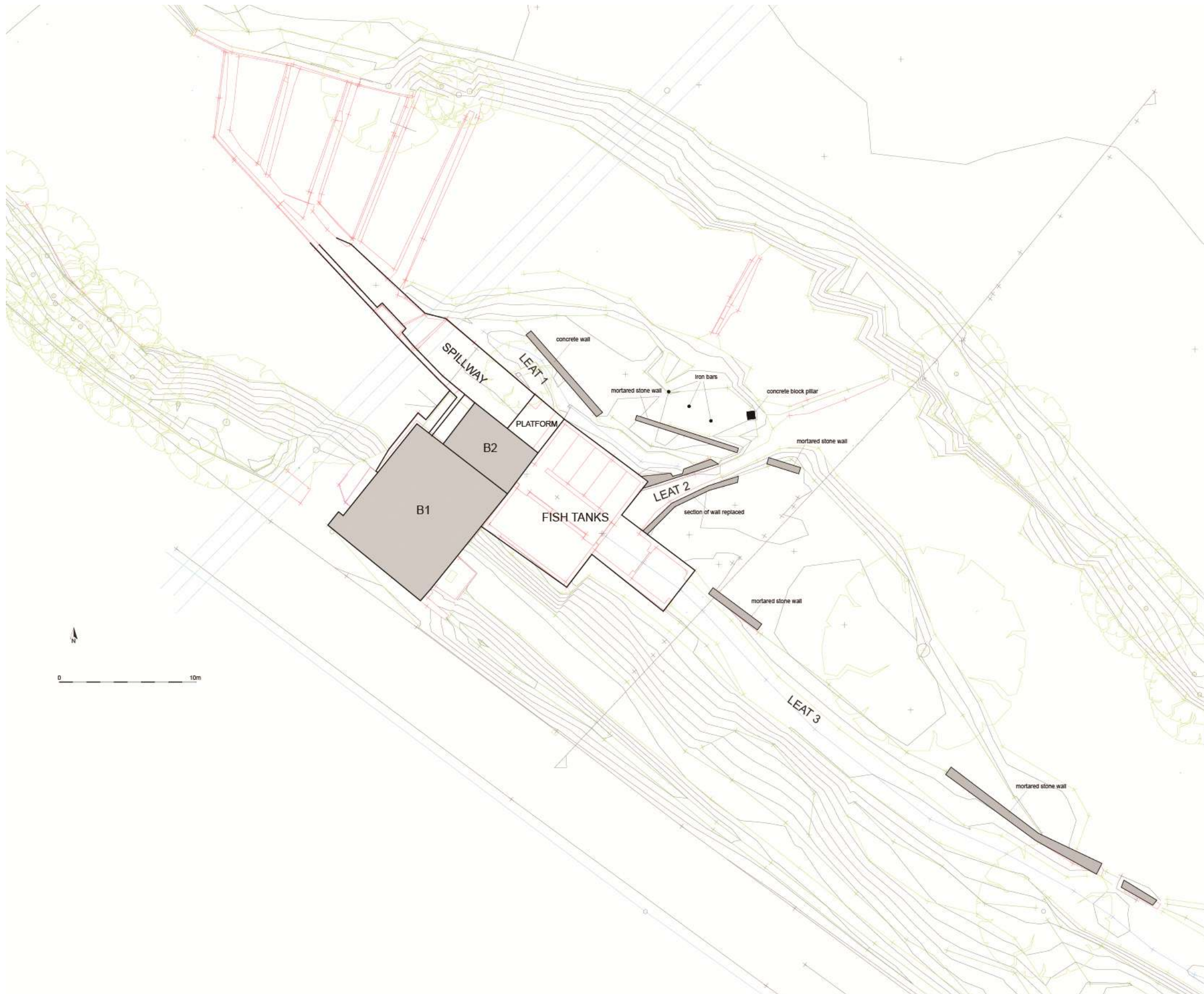


Figure 6: Overall site plan, showing the location of features mentioned in the text (based on the supplied topographical survey).



Figure 7: Plan of B1 and B2, overlain on the site topographical survey.

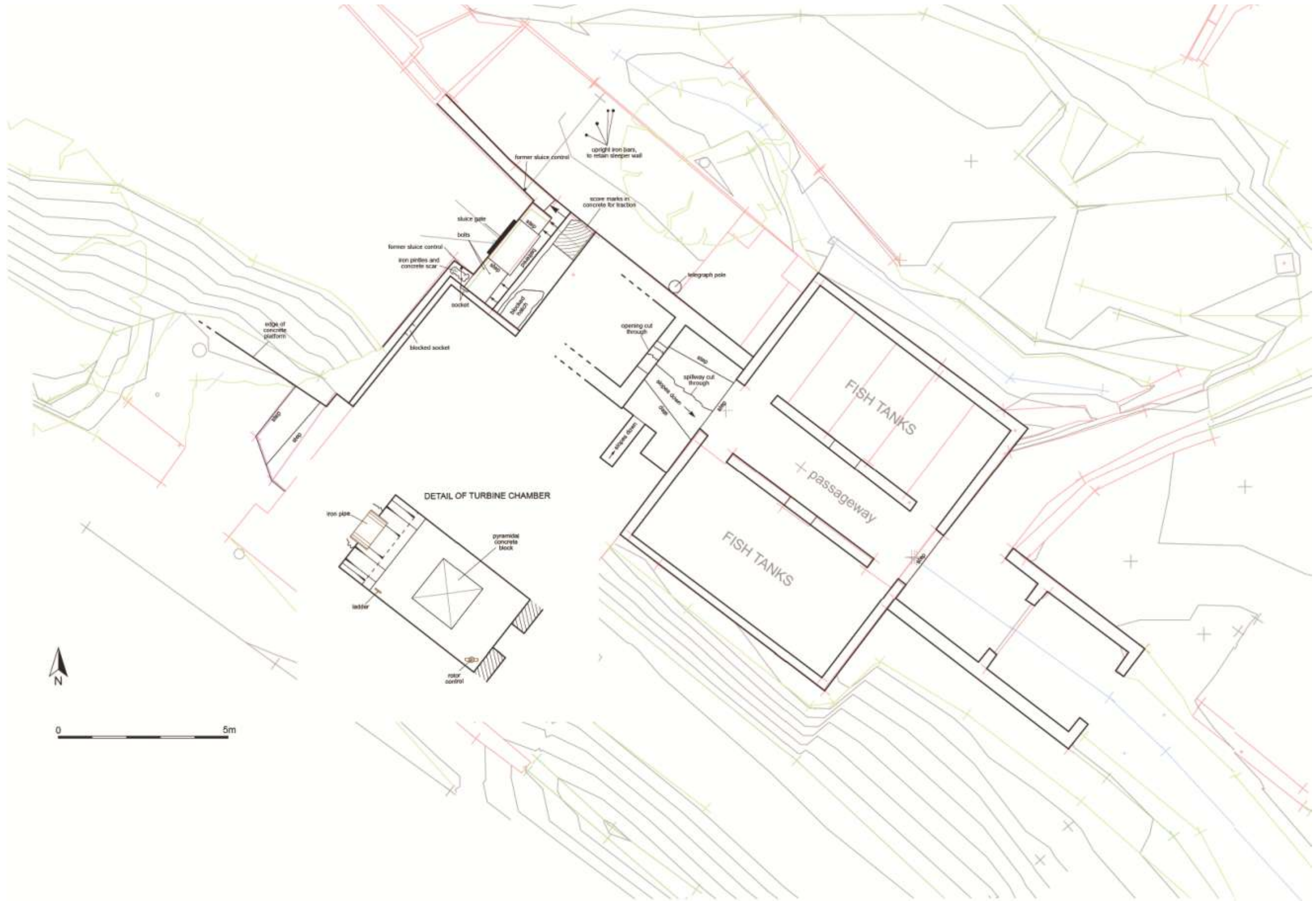


Figure 8: Plan of the turbine chamber and other features, overlain on the topographical survey.

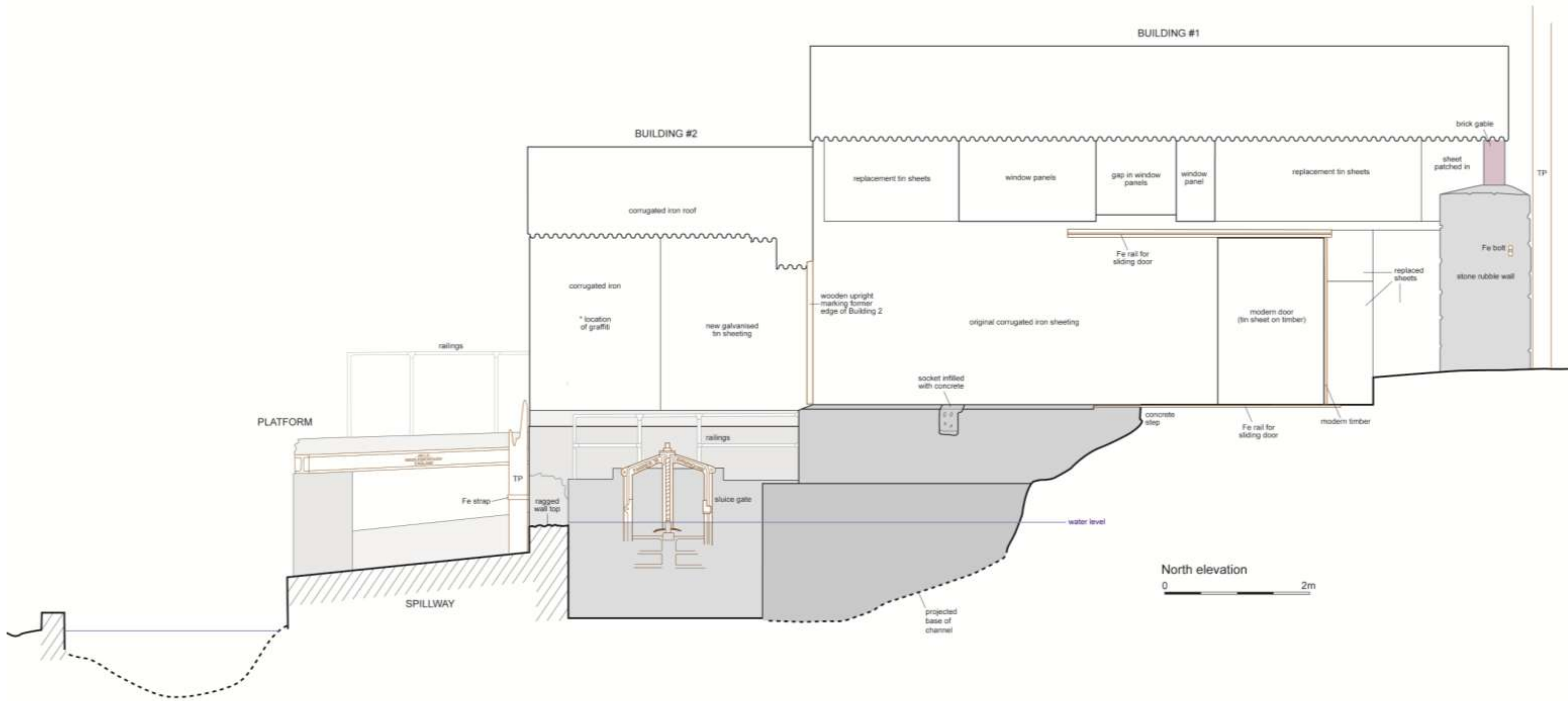


Figure 9: North-facing elevations.

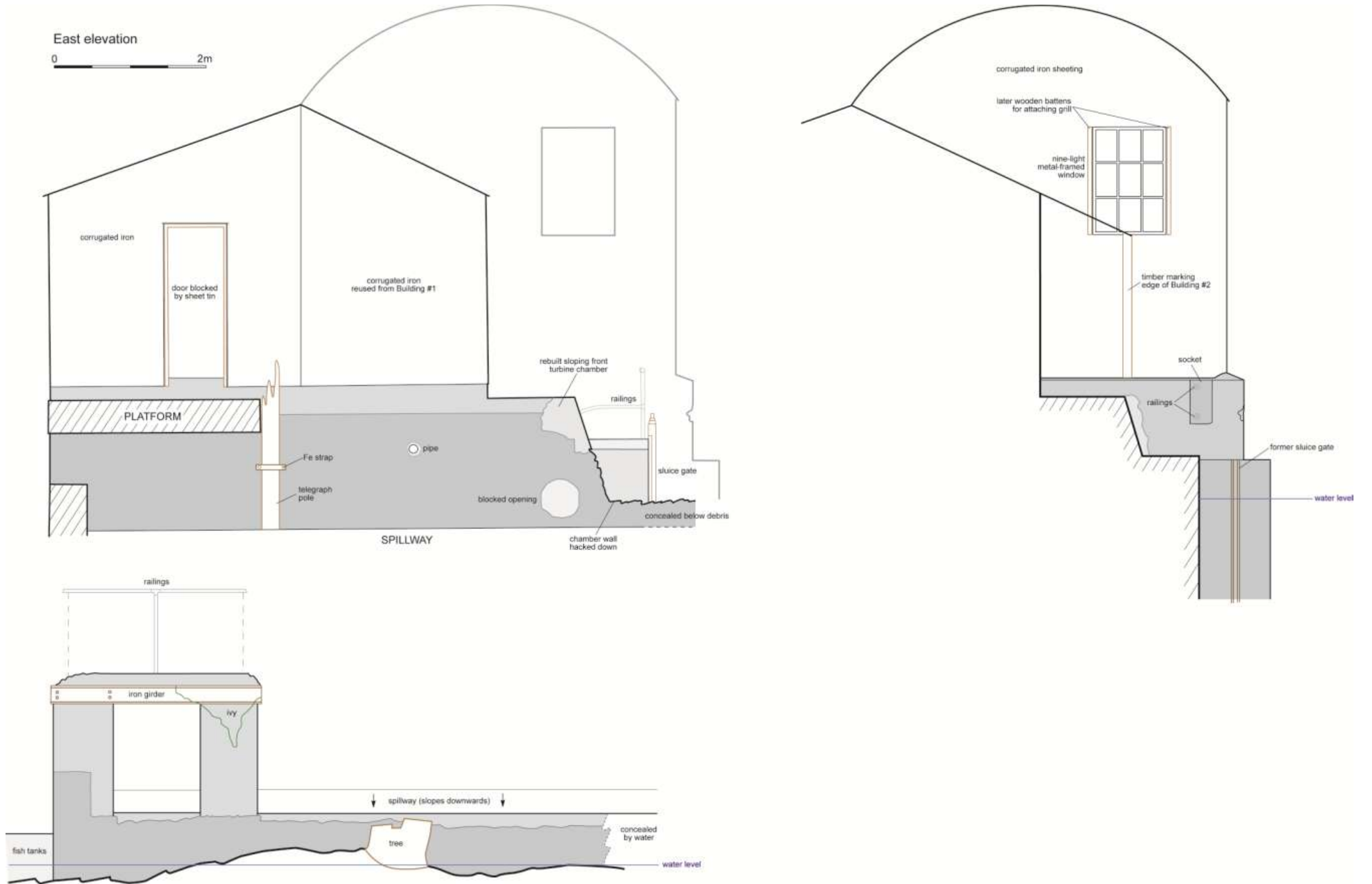


Figure 10: East-facing elevations.

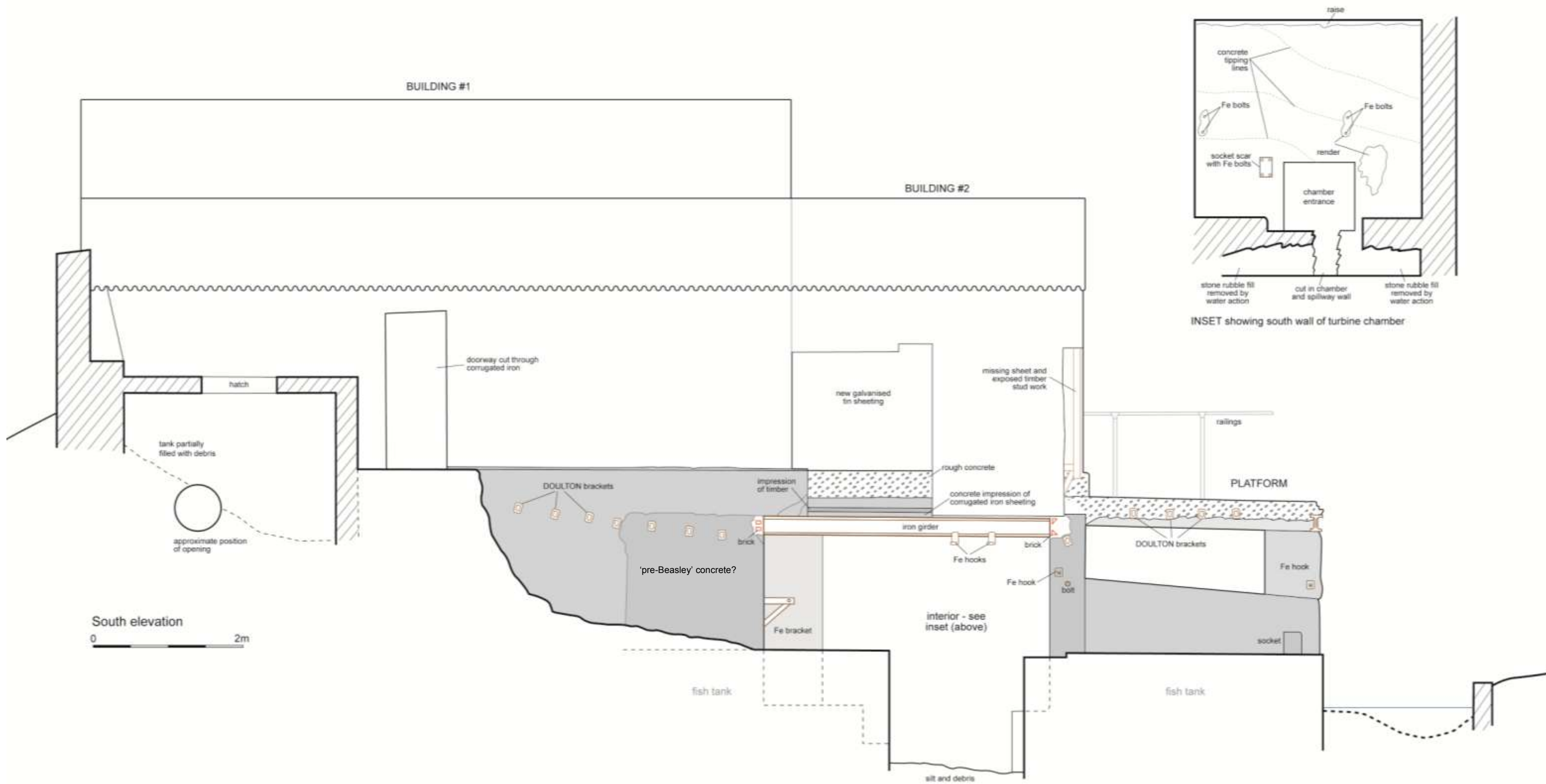


Figure 11: South-facing elevations.

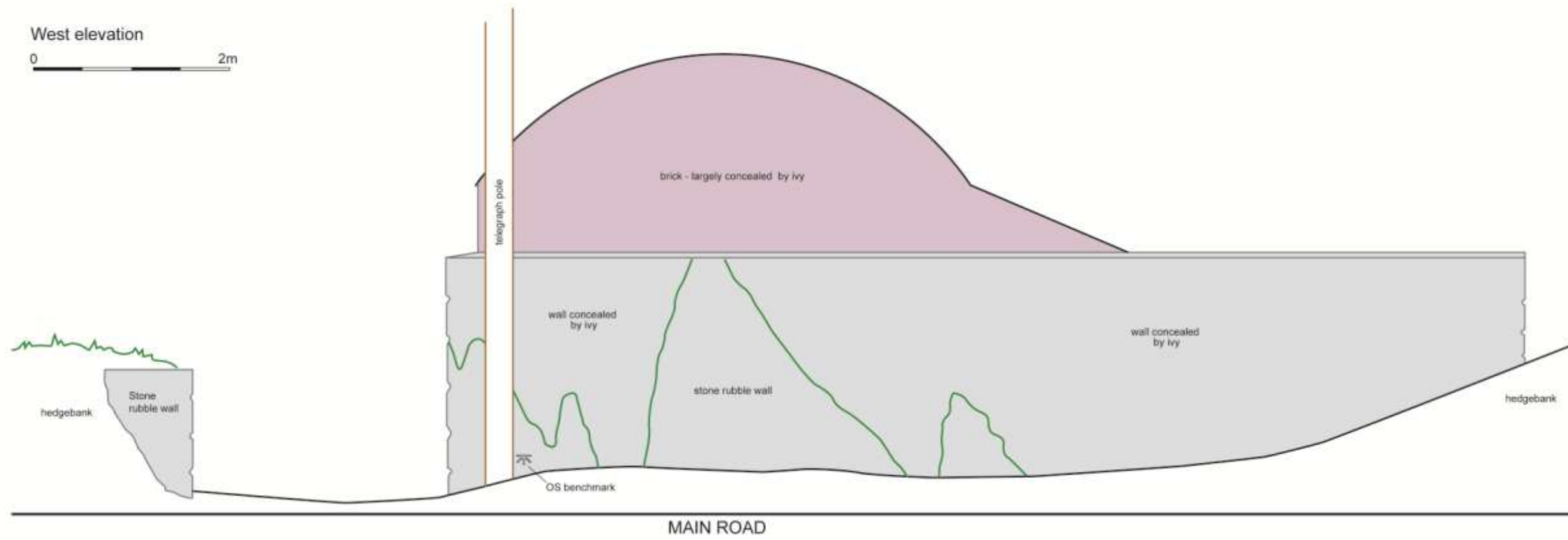


Figure 12: West-facing elevation.

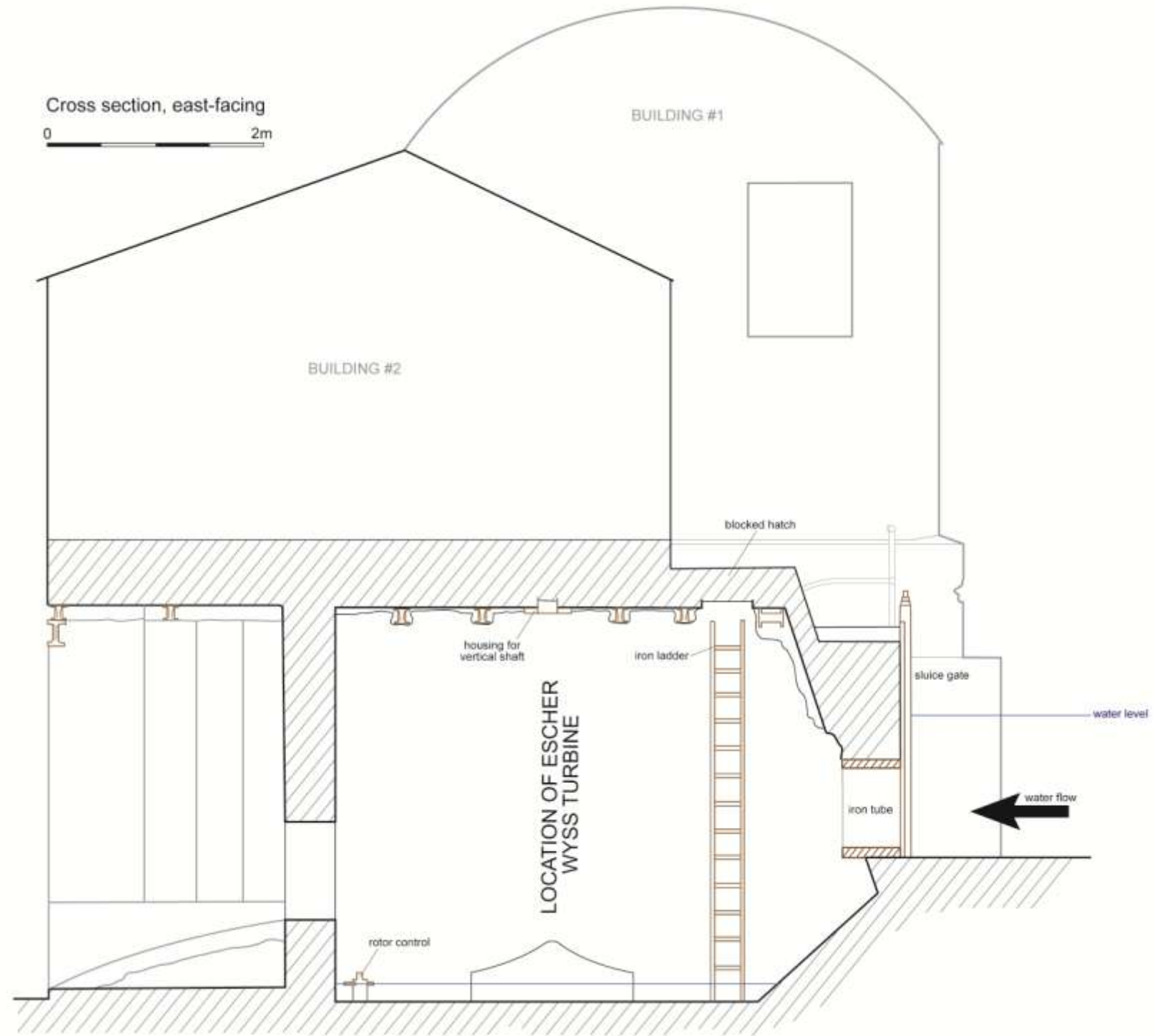


Figure 13: Cross-section through the Phase 2 turbine chamber with Phase 4 sluice gate.

4.0 Conclusion

4.1 Conclusion

The surviving structures at Beasley Weir form a complex and much-altered group, with at least five phases of use and re-use. Some fittings in the turbine chamber relate to the Escher Wyss turbine, but most of the fittings relating to the generation of electricity have been lost.

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Appendix 1

PROJECT DESIGN FOR HISTORIC BUILDING RECORDING AT BEASLEY WEIR, DULVERTON, SOMERSET/EXMOOR NATIONAL PARK

Location:	Beasley Weir
Parish:	Dulverton
County:	Somerset/Exmoor National Park
NGR:	SR9226027145
Proposal:	Demolition of existing structure and construction of a small hydro-electric plant associated infrastructure with repairs to the weir/fish pass
Planning Application Reference:	6/9/11/130
Date:	21.01.15

1.0 INTRODUCTION

This document forms a Project Design (PD) which has been produced by South West Archaeology Limited (SWARCH) at the request of Catherine Dru (the Client). It sets out the methodology for historic building recording at the former hydro-electric site at Beasley Weir, Dulverton, Somerset/Exmoor National Park. The PD and the schedule of work it proposes have been drawn up in consultation with Shirley Blaylock, Exmoor National Park Conservation Officer (Historic Environment).

2.0 ARCHAEOLOGICAL BACKGROUND

The hydro-electric plant was built c.1909 and run by the Dulverton Electric Lighting Company. A steel or iron ('Dutch barn' type) building clad in corrugated iron sheeting was constructed on a large concrete plinth overlooking the river and two waterwheel 50kW Armfield turbines with 75v 30amp Crompton Alternator were installed. These were later replaced by two vertically-shafted turbines producing 50kW each. By 1930 the Dulverton Electric Lighting Company had merged with the Exe Valley Electric Company. The site, as the Beasley Power Station, continued in use until 1938, and was kept operational for emergencies during WWII. The plant was decommissioned in the 1950s and a series of concrete fish tanks were constructed by the then Rivers Authority (now EA), which remained in use until the 1980s. The surviving building has clearly been extended and the concrete structure shows clear phasing that relates to its successive uses. Plans by the landowner to repair the weir and re-commission the hydro-electric plant would entail the demolition or alteration of the building, its associated concrete elements and the fish tanks.

3.0 AIMS

- 3.1 To ensure a record of the historic elements of the buildings prior to the commencement of the development;
- 3.2 To analyse and report on the results of the project as appropriate.

4.0 METHOD

4.1 Historic building recording:

A record shall be made of the historic fabric of the building affected by the development. This work shall conform to an appropriate level (Level 4) of recording as set in *Understanding Historic Buildings: A guide to good recording practice* (English Heritage 2006). The existing measured topographic survey will be used, but the elevations will be the subject of a new measured survey.

5.0 REPORTING

5.1 A report will be produced and will include the following elements:

- 5.1.1 A report number, date and the OASIS record number;
- 5.1.2 A copy of this PD;
- 5.1.3 A summary of the project's background;
- 5.1.4 A description and illustration of the site location;
- 5.1.5 A methodology of the works undertaken, and an evaluation of that methodology;
- 5.1.6 Plans and reports of all documentary and other research undertaken;
- 5.1.7 A summary of the project's results;
- 5.1.8 An interpretation of the results in the appropriate context;
- 5.1.9 A summary of the contents of the project archive and its location (including summary catalogues of finds and samples);
- 5.1.10 A location plan and overall site plan including the location of areas subject to archaeological recording;
- 5.1.11 Detailed plans and elevation drawings with adequate OD spot height information; these would be at an appropriate scale to allow the nature of the elements depicted to be shown and understood;
- 5.1.12 A written description of the standing structure including an interpretation of their character and significance;
- 5.1.13 A consideration of the evidence within its wider context;
- 5.1.14 A comprehensive photographic catalogue of the site, showing the site layout and significant features and detailing. All photographs would contain appropriate scales, the size of which would be noted in the caption;
- 5.1.15 Specialist assessment or analysis reports where undertaken; Martin Watts will advise as to the interpretation of the site and how it functioned.
- 5.2 The full report will be submitted within three months of completion of fieldwork. The report will be supplied to the HES on the understanding that one of these copies will be deposited for public reference in the HER. A copy will be

provided to the HES in digital 'Adobe Acrobat' PDF format, which may be available from the HER through a website at some future date.

- 5.3 A copy of the report detailing the results of these investigations will be submitted to the OASIS (*Online Access to the Index of archaeological investigations*) database under a record number to be obtained.

6.0 ARCHIVE DEPOSITION

- 6.1 An ordered and integrated site archive will be prepared in accordance with Management of Research Projects in the Historic Environment (MoRPHE) English Heritage 2006 upon completion of the project. If artefactual material is recovered the requirements for archive storage shall be agreed with the Museum of Somerset under an accession number.
- 6.2 Where there is only a documentary archive this will be deposited with the Somerset Heritage Centre; a copy of the report will also be supplied to the English Heritage Archive, Swindon.
- 6.3 A summary of the contents of the archive shall be supplied to the Conservation Officer (Historic Environment).

7.0 PERSONNEL

The project will be managed by Bryn Morris; the desk-based research and the historic building recording would be carried out by SWARCH personnel with suitable expertise and experience, assisted by Martin Watts. Relevant staff at the ENPA will be consulted as appropriate. Where necessary, appropriate specialist advice will be sought (see list of consultant specialists in Appendix 1 below).

Bryn Morris

South West Archaeology Ltd the Old Dairy, Hacche Lane Business Park, Pathfields Business Park, South Molton, Devon EX36 3LH
Telephone: 01769 573555 email: mail@swarch.net

List of specialists

Building recording

Richard Parker

11 Toronto Road, St James, Exeter. EX4 6LE, Tel: 07763 248241

Conservation

Alison Hopper Bishop

The Royal Albert Memorial Museum Conservation service, a.hopperbishop@exeter.gov.uk

Richard and Helena Jaeschke

2 Bydown Cottages, Swimbridge, Barnstaple, EX32 0QD, Tel: 01271 830891, mrshjaeschke@email.msn.com

Curatorial

Thomas Cadbury

Curator of Antiquities Royal Albert Memorial Museum, Bradninch Offices, Bradninch Place, Gandy Street, Exeter, EX4 3LS

Tel: 01392 665356

Alison Mills

The Museum of Barnstaple and North Devon, The Square, Barnstaple, North Devon, EX32 8LN, Tel: 01271 346747

Bone

Human *Professor Chris Knusel*, University of Exeter, Tel: 01392 722491, c.j.knusel@ex.ac.uk

Animal *Wendy Howard*, Department of Archaeology, Laver Building, University of Exeter, North Park Road, Exeter EX4 4QE

Tel: 01392 269330, w.j.howard@exeter.ac.uk

Lithics

Dr Martin Tingle

Higher Brownston, Brownston, Modbury, Devon, PL21 OSQ martin@mtingle.freemove.co.uk

Palaeoenvironmental/Organic

Wood identification *Dana Challinor* Tel: 01869 810150 dana.challinor@tiscali.co.uk

Plant macro-fossils *Julie Jones* juliedjones@blueyonder.co.uk

Pollen analysis *Ralph Fyfe* Room 211, 8 Kirkby Place, Drake Circus, Plymouth, Devon, PL4 8AA

Pottery

Prehistoric *Henrietta Quinnell*, 39D Polsloe Road, Exeter EX1 2DN, Tel: 01392 433214

Roman *Alex Croom*, Keeper of Archaeology

Tyne & Wear Archives & Museums, Arbeia Roman Fort and Museum, Baring Street, South Shields,

Tyne and Wear NE332BB

Tel: (0191) 454 4093

alex.croom@twmuseums.org.uk

Medieval *John Allen*

Post Medieval *Graham Langman*, Exeter, EX1 2UF, Tel: 01392 215900, su1429@eclipse.co.uk

Appendix 2
Photographic Survey



Figure 14: South and West elevation of B1, from the road; viewed from the SW.



Figure 15: As above (scale 2m).



Figure 16: West elevation of B1, viewed from the west (scale 2m).



Figure 17: As above.



Figure 18: As above.



Figure 19: West and north elevation of B1, viewed from the NNW (scale 2m).



Figure 20: As above.



Figure 21: As above.



Figure 22: Roadside hedgebank and stub of wall; viewed from the south (scale 2m).



Figure 23: As above, viewed from the south-east (scale 2m).



Figure 24: As above, viewed from the south-west (scale 2m).



Figure 25: North elevation of B1, viewed from the WNW (scale 2m).



Figure 26: As above, viewed from above and to the north-west (scale 2m).



Figure 27: As above.



Figure 28: As above, detail of the new door and external steps (scale 2m).



Figure 29: Detail of the door and rails in the north elevation; viewed from the north (scale 2m).



Figure 30: Detail of the lower door rail; viewed from the west (scale 2m).



Figure 31: Detail of the FARRER sluice gate at the eastern end of the north elevation; viewed from the north-west (scale 1m).



Figure 32: As above, no scale.



Figure 33: North-east angle of B1, showing the former sluice gate slot; viewed from the east (scale 1m).



Figure 34: As above, from above, showing the sluice gate and associated pintles; viewed from the east (scale 1m).



Figure 35: The current sluice gate, viewed from above (scale 1m).



Figure 36: As above, showing an iron girder in the streambed; viewed from the south (scale 1m).



Figure 37: The eastern side of the former sluice gate; viewed from the south (no scale).

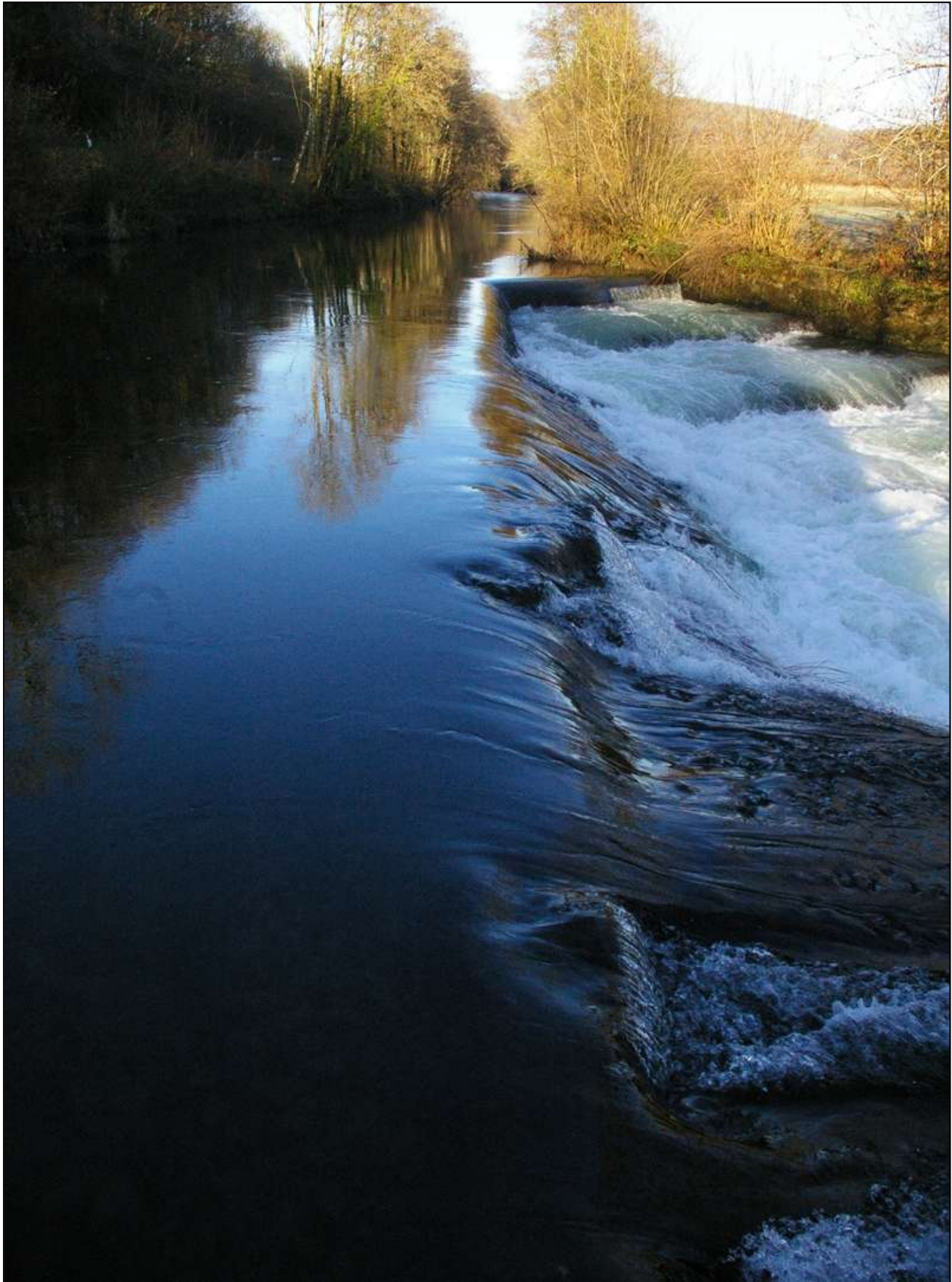


Figure 38: View along the weir from building; viewed from the south (no scale).

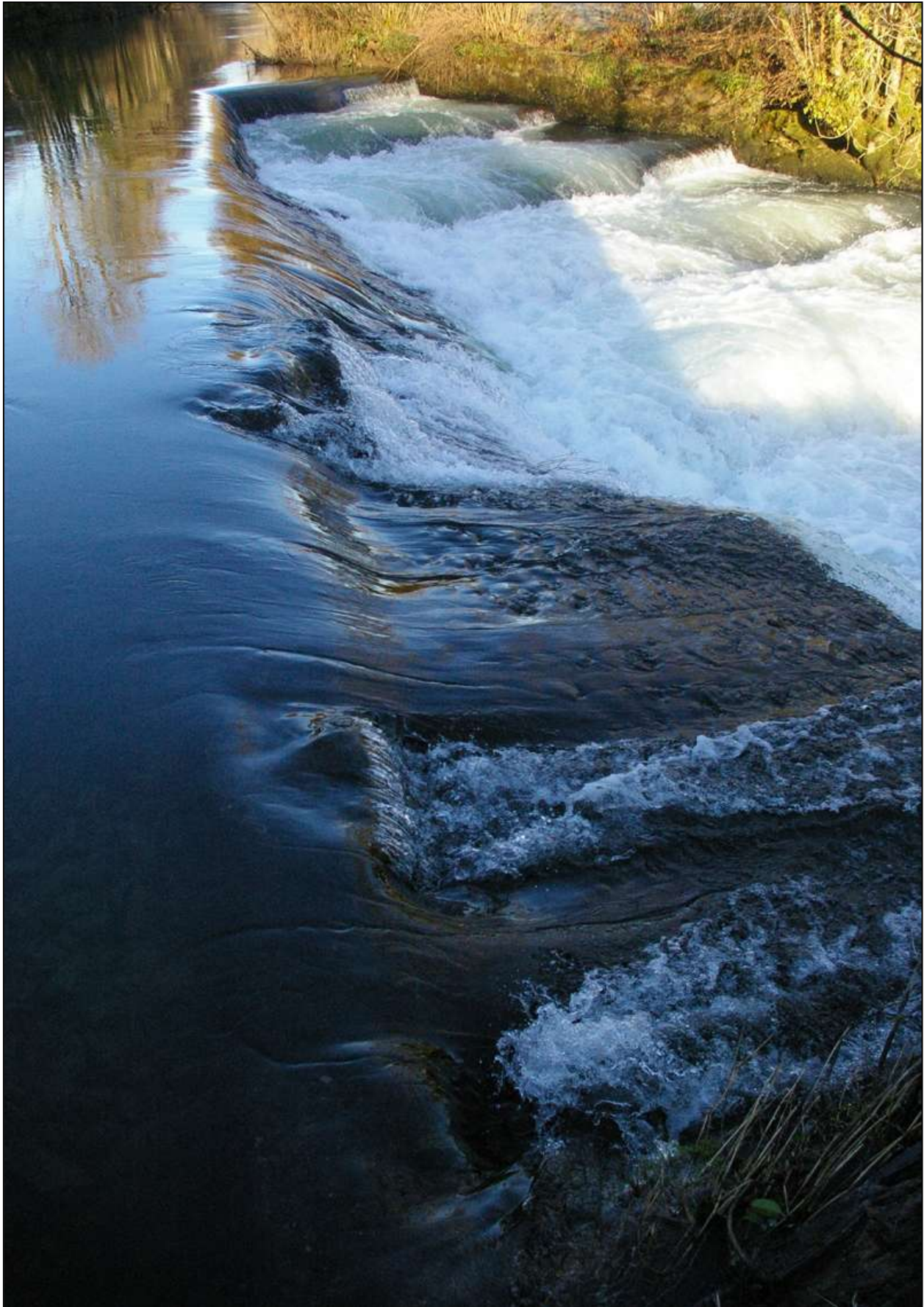


Figure 39: as above, showing part of the spillway.



Figure 40: Detail of the weir, showing the possible broken stubs of iron fittings and a possible sluice gate; viewed from the south (no scale).



Figure 41: As above, viewed from the SSE (no scale).



Figure 42: Base of the east elevation of B1, showing rebuilt sloping concrete front; viewed from the east (scale 1m).



Figure 43: The east elevation of B1, viewed from the east (scale 2m).



Figure 44: Detail of the window in the east elevation; viewed from the east (no scale).



Figure 45: Detail of the concrete floor in front of the north elevation of B2; viewed from the east (scale 2m).



Figure 46: The north elevation of B2, viewed from the north-east (scale 2m).



Figure 47: As above, showing the location of the graffiti (indicated); viewed from the north (no scale).



Figure 48: As above, detail of the graffiti, upper part; viewed from the north (no scale).



Figure 49: As above, lower part.



Figure 50: The eastern elevation of B2, viewed from the east (scale 2m).



Figure 51: As above, showing more of the spillway.



Figure 52: From the same location, looking north along the spillway to the weir (no scale).



Figure 53: The east elevation of B1 and B2, the platform and the spillway; viewed from the east (scale 2m).



Figure 54: The east elevation of B2, viewed from the north-east (scale 2m).



Figure 55: As above.



Figure 56: The platform, viewed from the north (scale 2m).



Figure 57: As above, detail of the name on the girder [...HAN IO... MIDDLESBOROUGH ENGLAND] (no scale).



Figure 58: The underside of the platform, viewed from the NNW (no scale).



Figure 59: The east elevation of the platform, viewed from the east (scale 2m).



Figure 60: Detail of the east face of the south pillar, showing it built over and around the southern wall of the spillway; viewed from the east (scale 2m).



Figure 61: The spillway, viewed from the east (scale 2m).



Figure 62: As above, showing the wall of Leat 1 in the foreground (scale 2m).



Figure 63: Leat 1 and its wall, viewed from the SSE (scale 2m).



Figure 64: The south elevation of the platform, viewed from the south (scale 2m).



Figure 65: As above.



Figure 66: As above.



Figure 67: As above, detail of a hook and plate on the southern pillar; viewed from the south (scale 2m).



Figure 68: Detail of the platform, showing the DOULTON brackets; viewed from the south (scale 1m).



Figure 69: Detail of one of the DOULTON brackets (scale 1m).



Figure 70: The south face of the east wall of the turbine chamber, showing the later iron fittings and inserted iron girder; viewed from the south (no scale).



Figure 71: The south elevation of B2, viewed from the south-east (scale 2m).



Figure 72: The base of the south elevation of B1 where the ground level steps down; note the DOULTON brackets in the wall. Viewed from above and to the south-west (no scale).



Figure 73: The south elevation of B2, viewed from the south (scale 2m).



Figure 74: As above, viewed from the south-east (scale 2m).



Figure 75: Detail of the south-east angle of B2, showing the raises in the concrete; viewed from the south (scale 1m).



Figure 76: The west end of the south elevation of B1, showing the location of the concrete tank here; viewed from the south-east (scale 2m).



Figure 77: The south wall of the turbine chamber, showing the opening; viewed from the south (scale 2m).



Figure 78: As above.



Figure 79: As above.



Figure 80: The west wall of the turbine chamber, showing the potentially earlier mass concrete plinth; viewed from the south-east (scale 2m).



Figure 81: As above, view of the sloping cavity between the 'buttresses'; viewed from the east (scale 2m).



Figure 82: The east wall of the turbine chamber, viewed from the south-west (scale 2m).



Figure 83: The floor of the outer part of the turbine chamber, showing the former spillway; viewed from the south-west (scale 2m).



Figure 84: The interior of the turbine chamber, viewed through the opening in the south wall (no scale).



Figure 85: The 1950s sluice gate, viewed from the south (scale 2m).



Figure 86: The ladder against the west wall, leading to a blocked hatch; viewed from the south-east (scale 2m).



Figure 87: As above.



Figure 88: The iron collar for the vertical shaft of the turbine, in the ceiling of the chamber; viewed from the east (no scale).



Figure 89: The stub of the rotor control in the south-west corner; viewed from the north-east (no scale).



Figure 90: The blocked opening in the ceiling above the rotor control; viewed from the east (no scale).



Figure 91: The pyramidal concrete block on the floor of the chamber; viewed from the south-west (scale 1m).



Figure 92: As above, viewed from the north-west (scale 1m).



Figure 93: View along the fish tanks from the entrance to the turbine chamber; viewed from the north (no scale).



Figure 94: As above, viewed from the south (scale 2m).



Figure 95: The fish tanks adjacent to the south elevation of Building #2, viewed from the east (no scale).



Figure 96: From the same location, looking south-west (no scale).



Figure 97: View along Leat 2 from the southern end of the fish tanks; viewed from the north-west (no scale).



Figure 98: View of the control chambers to the south of the fish tanks; viewed from the NNE (no scale).



Figure 99: View of the eastern fish tanks, from the platform; viewed from the north (no scale).



Figure 100: As above.



Figure 101: As above, looking south-west.



Figure 102: As above.



Figure 103: Detail of one of the filter screens at the site.



Figure 104: View along Leat 1, viewed from the north (no scale).



Figure 105: The ragged end of the wall flanking Leat 3, just south of the fish tanks; viewed from the NNW (scale 2m).



Figure 106: View back along Leat 3 to Building #2; viewed from the south (no scale).



Figure 107: Masonry wall at the end of Leat 3, viewed from the north-east (scale 2m).



Figure 108: As above, from the north-west.



Figure 109: The wall flanking Leat 1, viewed from the south-east (scale 2m).



Figure 110: Wall 1, viewed from the north-east (scale 2m).



Figure 111: Wall 1, showing it cut by Leat 2; viewed from the south-east (scale 2m).



Figure 112: View along Leat 2, from the east (scale 2m).



Figure 113: As above, from the south-east (scale 2m).



Figure 114: Block of concrete next to Wall 1, with the concrete pillar in the background; viewed from the south-west (scale 1m).



Figure 115: The interior of B1, viewed from the east (scale 2m).



Figure 116: As above, showing detail of the west wall (scale 2m).



Figure 117: Scars on the west wall of B1, viewed from the east (scale 2m).



Figure 118: Detail of the graffiti on the west wall of B1; viewed from the east (scale 2m).



Figure 119: The south end of the west wall; viewed from the east (scale 2m).



Figure 120: The south-west wall of B1, the north wall of the adjacent tank; viewed from the north (scale 2m).



Figure 121: The south wall of B1 and B2; viewed from the north-west (scale 2m).



Figure 122: The east wall of B2, viewed from the west (scale 2m).



Figure 123: The north wall of B2; viewed from the south (scale 2m).



Figure 124: The east wall of B1; viewed from the west (scale 1m).



Figure 125: As above.



Figure 126: The north wall of B1, viewed from the south-west (scale 2m).



Figure 127: Detail of one of the paint scars on the north wall of B1; viewed from the south (scale 1m).



Figure 128: The interior of B1 and B2, viewed from the north-west (scale 2m).



Figure 129: View of the interior of the lean-to of B1, viewed from the ENE (scale 2m).



Figure 130: The former door (scale 2m).



Figure 131: As above.



Figure 132: As above.

Appendix 5

Detailed Building Record

BUILDING 1		General Description
Function/Summary:		Probably Phase 1 turbine building; tall four-bay 'Dutch' barn with mono-pitch lean-to to south. No FF but references to FF in the following description refer to features above head height (c.2m).
Dating Evidence:		Relative phasing.
B1 Exterior		
B1 Elevation NORTH		Description
Fabric Description:		Corrugated iron sheeting bolted to a steel or iron frame; the west gable wall projects beyond the face of this elevation by 0.46m, and wraps around the corrugated iron sheeting here. The lower line of tin sheets (up to 2.65m off floor level) is painted black, over an earlier coat of light green paint. The upper line painted only black and are in better condition. The upper level may be a later replacement possibly for windows. Sheets to the east of the door are bowed inwards, possibly from flood pressure.
Roof Covering		Corrugated iron sheets.
Opening – Windows:		In the centre of the elevation at FF level are five sheets (two missing) of clear corrugated plastic sheeting, now brittle and opaque. The corrugated iron sheeting to either side along the whole elevation is only painted black indicating the whole elevation at this level formerly featured clear plastic sheeting.
Openings – Doors	1	A single doorway to the right of centre, 1.50m by 2.31m. Current door has a modern timber frame with a thin flat galvanised steel sheet over, replacing a sturdy steel or iron-framed door with bolted corrugated iron covering. The tin was painted green then black, replaced at the base. An inset hinged door 0.76m by 1.52m with latches at top and bottom, with lock plate and a single diagonal cross brace. The other two panels of the door had two diagonal cross-braces. Larger door had a big bolt to secure it to the floor and hung from/ran on iron rails, running to the east.
Drainage/Guttering		Iron brackets survive, but guttering lost; some of the brackets for the downspout at the eastern end of the elevation survive.
Plinth:		The ground drops away quickly and steeply to the east revealing two concrete plinths that the building stands on over the river. The plinths step out 1.07m below internal floor level. Upper plinth is mass concrete with no real detail, slightly weathered. Socket 0.4m by 0.29m in the centre of the visible section, later filled with very coarse mix of concrete (large rounded gravels). Structural crack on the build line 0.55m below internal floor level. Lower plinth steps out 0.22m, mass concrete more weathered and rounded river gravels obvious on surface. Hints of a floor level of concrete 0.15m thick at the top of this section.
Significant Details:		Iron bolt and plate 0.3m in from the roadside and 1.58m above current ground level. There is a sloping concrete 'skirt' at the base of the iron sheeting to throw the water off/ prevent it from going inside. Two steps down to the door abutt the wall/sheeting and are probably later. A concrete platform at a higher level extends 4.4m from the building overlooking the weir. A short section of wall matching the west gable provided for a secure entry onto the site, 2.64m wide, no fittings survive.
Relationships:		
Comments:		Largely one phase; lower plinth possibly earlier.
B1 Elevation EAST		Description
Fabric Description:		Corrugated iron sheeting bolted to a steel or iron frame; painted black over green. Sheeting partly removed by structure two.
Roof Covering:		Gable end.
Openings – Doors:		None.
Opening – Windows:		Single original window with iron frame, rectangular with nine lights, glass all broken. Mesh grill added and attached to thin wooden battens bolted to the corrugated tin.
Plinth:		Sits on a concrete plinth which features a large shallow socket 0.24m by 0.58m and 0.07m deep. Metal railings above the current sluice attach here. Lower plinth visible here and projects 0.5m beyond the upper plinth. It incorporates the iron slot of a sluice gate, with four iron pintles in the plinth above and concrete indicating the presence of a mechanism

		here.
Drainage/Guttering		None.
Significant Details:		Pre Phase 3 sluice gate.
Relationships:		Elevation predates Phase 2-4.
Comments:		
B1 Elevation SOUTH		Description
Fabric Description		Long section of corrugated tin painted black over green bolted to the frame; one lost sheet replaced with a thin galvanised sheet. This wall abuts the west gable wall, but here it abuts the batter and the wall does not wrap around. The battered west wall projects 0.34m beyond this elevation. The west gable wall narrows at this point to 0.4m (tree stump here obscures the detail).
Roof Covering		Corrugated iron, badly corroded, no guttering but brackets survive. One roof light of corrugated plastic sheet, one sheet wide.
Blocked Openings - Doors		One opening cut through the tin, 0.8m by 1.9m high, remnant of simple hinge apparent.
Plinth:		The ground drops away abruptly to the east (in the direction of the fish tanks). The upper part is as described for the north elevation. This encapsulates a big block of very weathered mass concrete 1.88m across. Of a similar fabric to the plinth on the north side; well-sorted rounded pebbles. The top of this concrete is 0.6m below the internal floor level. It may represent a pre-Armfield turbine/waterwheel phase of use.
Other details:		Across the lower part of the elevation there are 7 'Doulton' flat brackets in a slight curve down, bolted to the concrete. Abutting the south-west corner (and forming the lower internal face of that wall) is a mass-walled concrete 'tank' with integral concrete roof/top. This tank has a rectangular hatch in the middle of the northern side 0.62m by 0.5m and a circular opening in the south east corner 0.3m in diameter. With bolts or bolt holes set around the lip. The tank is 2.36m N-S and 2.96m E-W and 1.24m high (from internal floor level). Lid/top is 0.2m thick. Internally the tank contains rubbish and debris but it is at least 2.3m deep. Concrete shuttering marks visible on the interior. There is a circular opening running under the floor of Building #1 to the north, with remnants of an iron collar to the outside of the opening. Opening is c.0.4m in diameter, top of opening is 1.45m below the top of the tank and 0.2m below the floor level adjacent. To the south there is another concrete platform, but it is almost wholly concealed by vegetation.
Drainage/Guttering		None; iron brackets survive.
Relationships		Concrete plinth for Building #1 appears to encapsulate an earlier structure. Tank in SW corner may post date the battered wall.
Comments		
B1 Elevation WEST		Description
Fabric Description:		Gable end with brick over stone rubble, the stone rubble is fairly large, quarried, blocky stone in an off white mortar, it is very coarse but well sorted inclusions. Wall extends to the south of the Building at a reduced thickness (0.4m) though foundation (concealed) may be thicker. No evidence for a break of build but ivy and moss makes identification difficult, likewise for any details.
Details		Two small metal plates at gable height on the north side and telegraph pole at the North West corner, surviving fitment at the top with four holes beneath.
Roof Covering		Gable wall.
Openings: Doors		None.
Openings: Windows		None, but most of elevation concealed by ivy; should be a small blocked opening in the brickwork in the centre of the gable.
Drainage/Guttering		None.
Significant Details:		OS benchmark on wall next to telegraph pole.
Relationships:		One phase.
Comments:		
B1 Interior		Description
Function:		Building contained the generators/machinery running the site.
Figure Numbers:		
Fabric description:		Iron or steel frame with corrugated iron sheets bolted to the frame from the north wall and part of the east and south walls. Internally painted a light green up to gable height, except the newer sheets (blocking the window in the north wall), which are unpainted.

North Wall:		2 clear and 4 other less certain paint 'scars' where rectangular boards were fixed to the wall. The top right 'scar' retains bolts with ceramic isolators and part of a laminate ply board with rounded edges, which would suggest the original board was 0.51m long by 0.46m tall. There is a plug socket on the iron/steel upright just below this board and a severed cable runs from above, along the iron frame to the north west corner of the building (to telegraph pole?). Wires also hang down from above which runs to (later) lights strung between the trusses in this part of the building (these lights look late and shoddy – electric lighting to shed after hydro stops). Electric wire ducting (20mm metal pipe) runs from this point along the eaves to the western truss, across this truss to the south, down the lean-to to give lighting to the two bays of the lean-to, with a third light set below the eaves of the 'Dutch' barn.
East Wall:		Partly gone, though frame and corrugated sheets as above, south half of the wall opens into Building #2. Sheeting reused on east-facing elevation of Building #2.
South Wall:		As above; on the central bay the lower iron cross piece has been removed to allow for a narrow doorway; modern timber repairs with galvanised sheet. On the western side of the wall there is a block of mass concrete which forms the lower part of the wall; there is no indication of a lower cross piece here.
West Wall		Battered <u>concrete</u> wall with whitewash over. In centre of 'Dutch' barn a raised concrete platform 0.2m thick by 1.8m long and 0.92m wide on strong iron brackets, of shuttered concrete set on thin fibre board. Surfaces painted dark green but underside whitewashed. Presumably a raised platform for batteries to prevent flood damage? There is an outline in the whitewash above of a rectangular shape 13 bricks high. A blocked opening (in brick) above the platform 3 bricks up 2 bricks high and 1 brick wide. Scars for another but smaller set of brackets to the north of this and in the lean-to a pair of surviving iron brackets. Numerous other small holes or iron pintles in this elevation, some are integral, others are later. Also there are timber pegs with holes for less substantial fittings.
Floor:		All one level, all concrete but there are patches which are difficult to interpret. There is a rectangular scar in the floor 1.45m by 1.0m in the north-east corner with scars for the buried ducting running around the north and east sides and running off in those directions. South of this is a hole in the floor with wiring coming up through, five live and two neutral cables. A similar 1.45m by 1.05m rectangular scar in the south-east corner of the building under the roof light with a possible 0.3m by 0.7m scar between them. The concrete in the south west corner is in poor condition and sounds hollow – probable void corresponding with the opening observed in the tank to the south.
Ceiling:		
Opening – Doors:		On north elevation (see external description).
		On the south elevation (see external description).
Graffiti:		On the north elevation there is recent graffiti 'D12', on the east: 'L_IRA F CK OFF' and on the west a smiley face and an '8' and also what looks like a perspective drawing and a 'sunburst' made of handprint outlines.
Opening – Windows:		One window on south elevation (see external description).
Significant Details:		Floor retains some detail about the placement of machinery.
Dating Evidence:		Relative phasing.
Comments:		
BUILDING 2		Description
Function/Summary:		Pitched corrugated-iron extension to the original building; wooden studwork with nailed corrugated sheets; some sheets reused from Building #1. Built to cover the Phase 3 turbine chamber.
Dating Evidence:		Relative phasing.
B2 Exterior		
B2 Elevation NORTH		Description
Fabric Description:		Corrugated iron, painted green then black, partly replaced with thin galvanised tin sheet. Wall is set back from its original position.
Roof Covering:		Corrugated iron, formerly extending to the front of the sloping concrete, where there would have previously been an internal step down by 0.3m. No guttering.
Openings –		None.
Graffiti:		'C STAN 1960' 'CT T L 02 RR' 'FX YE' and year dates from '1950' to '1960'.
Significant Details:		Concrete in front of elevation; patch for the sealed inspection hole to the west and regular scoring (for traction) to the east. The sloping front is later, with a subsequent stepped concrete front built on and containing the new sluice mechanism. There is a steel railing around the sluice gate. The sluice gate is cast iron, labelled 'FARRER 36' BIRMINGHAM'; the

		screw in the gate exists but the turning handle and mechanism have been removed. The wall to the north along the weir has been reduced in height and runs out to a rectangular block of masonry with two cut/snapped iron girders sit either side of what could be a second sluice gate (too difficult to reach and not clear from the building).
Relationships:		Postdates Phase 1 building, multiple phases evident in the concrete to the front.
Comments:		
B2 Elevation EAST		Description
Fabric Description:		Gable wall of corrugated tin, north side of black and green reused sheets (from Building #1) and the south side are painted black only.
Roof Covering		Corrugated iron.
Openings – Doors:	1	One narrow door leading to the adjacent platform.
Openings :	1	One blocked opening just below the point where the new sloping front was added, 0.3m in diameter and 0.2m up from lower spillway.
Plinth:		The building sits on a concrete plinth: the side of the turbine chamber is shuttered mass concrete, this has a raise of 0.43m at the top.
Significant Details:		An iron pipe 0.08m in diameter has been inserted into the wall towards the north end 0.36m below the line of the raise. To the north, the wall has been hacked down to the level of the weir. Strapped to the wall next to the platform is a telegraph pole.
Relationships:		
Comments:		
B2 Elevation SOUTH		Description
Fabric Description:		Corrugated sheets, black paint only, missing sheets replaced with thin galvanised steel, missing sheets reveals the depth of the concrete floor (0.54m) and an impression of the timber cross piece the sheets were formerly nailed to.
Roof Covering:		Corrugated Iron.
Opening – Doors:		None.
Openings – Windows:		None.
Significant Details:		An iron girder spanning the opening to the turbine chamber beneath, this girder is a repair and is forced into the walls adjoining with repair in rounded red brick. Two iron hooks/brackets hang off the base of this girder. There is a fitting of some sort near the corner of the building, presumably for an external light.
Relationships:		
B2 Elevation WEST		Description
Fabric Description:		Open to B1.
Relationships:		The corrugated iron sheeting from the eastern gable of B1 was reused (reversed) in the eastern gable of B2.
B2 Interior		Description
Function:		Now unclear, concrete floor represents final phase of use.
Figure numbers:		
Fabric description:		Walls of timber studwork, bolted to the floor by angled metal plates; there is a mishmash of repairs.
Walls - North		Wall shortened and partly re-sheeted with galvanised steel sheets.
Walls - East		Shortened at the north end, two different types of studworks: to the north it is simple, uprights with horizontal cross-members, to the south there are also diagonal braces. Mix of paint styles, to the north is a bright green while to the south is a darker green, with what looks like an inserted extra sheet to the north of the door.
Walls - South		Single cross member and tin extends beyond down below floor level. Graffiti on this wall includes a number of apparently random lines, a smiley face with breasts and the words 'WEE' and 'TOILET'.
Walls - West		Open to B1.
Floors		Concrete; single phase good condition, irregular scar to south-centre of unknown origin; large rectangular scar, 1.67m by 2.2m, to north; this floor has been raised in Phase 4, so all scars relate to fish-breeding.
Ceiling		Corrugated iron, badly corroded, on timber purlins.
Opening – Doors	1	Open to B1 to the west; narrow doorway leading onto platform to east; door missing and opening sealed by modern galvanised steel sheet.
Opening – Window		None.
Significant Details		None.
Dating Evidence		Relative phasing.
Comments		No features of value survive.
PLATFORM		Description

Function/Summary:		Platform built above the spillway, iron girders stretch from B2 to two thick pillars to east. Iron girders are integral with a shuttered concrete slab, excessively strong. 6 iron bolts on the underside do not appear to correspond to anything on the surface. The upper part of the concrete is comprised of a very coarse aggregate mix, including a willow pattern plate sherd.
Significant Details:		Steel railing (above as with the sluice gate). Along the south side of the platform there are a series of iron fittings; square socket and flat brackets with bolts marked 'Doulton', five are still present but there are holes for a further two apparent. Pillars at eastside 0.78m by 0.78m square, southern pillar built over end of spill way, of coarse weathered concrete.
Dating Evidence:		
TURBINE CHAMBER		Description
Function/Summary:		Turbine chamber.
Dating Evidence:		
Exterior		
Elevation NORTH		Description
Fabric Description:		Belongs to turbine chamber; mass concrete, shuttered with clear tipping lines from the west. Aggregate material includes shell.
Openings		0.95m by 0.95m square opening at ground level into turbine chamber, scars or cement patches on both sides marking location of blocked 3" iron pipes, with iron bolts partly sawn off. Another set of paired iron bolts located 0.32m and 0.5m above the opening, and a steel plate.
Openings – Windows:		None.
Roof Covering:		Shuttered concrete held up by iron girders crossing east-west; has been raised.
Drainage/Guttering		None.
Significant Details:		
Relationships:		
Comments:		
Elevation SOUTH		Description
Fabric Description:		Open to fish tanks.
Roof Covering:		
Drainage/Guttering		
Opening – Windows:		
Significant Details:		
Relationships:		
Elevation WEST		Description
Fabric Description:		Formed of mass concrete, very weathered, shuttered. Two buttresses with a sloping/battered wall between. North buttress is damaged at the top. Between the buttresses there is a void, roughly hacked-out and in-filled with shuttered concrete. To the south, iron brackets for a shelf 0.34m by 0.37m across.
Roof Covering		As above.
Blocked Opening – Door:		None.
Significant Details:		West wall may be pre-Phase 1 waterwheel in date.
Relationships:		
Elevation EAST		Description
Fabric Description:		Shuttered concrete, part of turbine chamber. Some cement patching and a scar of an upright of some sort that predates the girder spanning the opening.
Roof Covering		As above.
Relationships:		
Floor		Description
Floor:		Original form: funnel with flanking walls and sloping spillway at the level of the opening in the north wall. Now: spillway cut through down to 0.55m below opening and cut made in base of opening 0.30m wide to reduce the internal water level. Cutting through the spillway reveals it is thin (0.12m) and reinforced with flat iron bars 0.045m across and 5mm thick (opportunistic reuse). Below this concrete is aggregate stone that has been undermined and removed by water action. Cutting the spillway also reveals a lower concrete floor of unknown date; this floor level drops down to fish tanks by c.0.25-0.3cm.
Interior		Description
Summary/Function:		Turbine chamber 5.1m by 2.7m across and 3.45m deep, of reinforced shuttered concrete.
Figure Numbers:		
South Wall:		Square opening 0.75m above the floor of the chamber 0.95m by 0.95m. In the corner, to

		the entrance side, blocked 0.1m steel pipes visible as cement scars on exterior.
East wall:		Large flat iron strap cut through (to bolts on telegraph pole on the exterior) in top right corner. A pipe is located in the centre-left top, and a blocked opening is visible as on exterior. Water coming in via hole at the base of the wall to the north.
North Wall:		Sloping replacement shuttered concrete. A wide iron tube has been forced through, 0.6m long and 0.9m diameter (with sluice on the other side). Reinforcing bars in the concrete visible where the new sluice has been forced through.
West Wall:		Iron ladder on the right hand side to blocked hatch.
Floor:		Concrete floor, but obscured by mud and waste. In the centre of the chamber is a block of concrete 1.0m square rising to a pyramidal top, directly below the shaft hole in the ceiling. In the south-west corner stub of iron control mechanism projects from the water by 0.2m, 0.15m diameter with two 'wings'. Entire floor may have been lowered as there is a skirt of concrete like a skirting board around the chamber.
Ceiling:		Iron girders run east-west, shuttered concrete on a raise. Iron course for the vertical shaft in the ceiling. In the south-west corner a 0.5m-0.6m diameter blocked hole above the control mechanism and two 0.15m by 0.15m sockets in ceiling above the south wall either side of the opening.
Openings – Doors:		Hatch in west wall; blocked hatch in ceiling.
Openings – Windows:		None.
Significant Details:		The function of the pyramidal block is unknown.
Dating Evidence:		Relative phasing.
Comments:		
SPILLWAY		Description
Function/Summary:		Sloping concrete 'skirt' casting water away from the structures housing the turbines; extends along the weir to the north, on slightly differing levels (probably due to erosion), and sound hollow (again, due to erosion). Terminates at a short thick wall to the south, and partially blocked east of the sluice gate by timber railway sleepers held with thick iron bars. Water drops down into a leat immediately adjacent to the east.
Significant Details:		The concrete spillway could reuse an earlier wall.
Dating Evidence:		Relative phasing.
FISH TANKS		Description
Function/Summary:		Two large rectangular tanks 7.5m by 3.9m sharing a central passageway 1.8m wide; sluice gates to either end onto the passageway, with a 'window' between. Walls of mass concrete, with pre-formed reinforced concrete beams and slats. Walls are at least 1.50m high, with a depth of detritus/silt below that. To the south, the passageway opens out into a second set of smaller chambers, controlled by sluices, with water running into these chambers from the east, and exiting to the south. No sluice gates survive.
Significant Details:		At least four coarse metal filter screens present in and around the tanks.
Dating Evidence:		Relative phasing; documentary.
LEAT WALLS		Description
Function/Summary:		South and east of the fish tanks are the fragmentary remains of leats taking water away from the site. These are marked by walls/cut into the rock.
Leat 1		East of the spillway, and defined by a narrow low concrete wall extending along the eastern side of a waterchannel; it is at an angle to the west wall of the spillway, and thus may be earlier.
Leat 2		East of the southern part of the fish tanks, partly rock-cut to the east, defined by concrete walls to the west; repairs evident to the south wall, and the north wall is being actively eroded.
Leat 3		Extending south of the site and intermittently defined to the east by a mortared stone wall. Ragged end to the north adjacent to the fish tanks.
Wall 1		East of the site, seemingly cut by Leat 2; a low narrow mortared stone wall.
Pillar		East of the site, north of Leat 2 and adjacent to the river; a short pillar of 3" wide concrete blocks with poured concrete within the interior; stands 0.6m high on a concrete base.



The Old Dairy
Hacche Lane Business Park
Pathfields Business Park
South Molton
Devon
EX36 3LH

Tel: 01769 573555
Email: mail@swarch.net