# Two Estates Project

## Clackmannanshire Field Studies Society

**in partnership with**

**The Inner Forth Landscape Initiative**

# Alloa Estate Project

# The Alloa Pond

Supported by The National Lottery® through the Heritage Lottery Fund

heritage lottery fund

**Table of Contents**




Project Team: Murray Dickie, Susan Mills and Eddie Stewart.



Published and printed by The Clackmannanshire Field Studies Society [SCIO], 2017

27/09/17

## 1. Introduction:

The Clackmannanshire Field Studies Society obtained a National Lottery grant through the Heritage Lottery Fund in partnership with the Inner Forth Landscape Initiative to undertake a four year research project on aspects of the development of the Two Estates of Alloa and Clackmannan, with particular emphasis on the 18th and 19th centuries. The grant enabled local volunteers to be trained and supported to research a number of topics. Residents in the new houses constructed on the banks of the river Black Devon around Alloa Park Drive developed an interest in the environment of the adjacent Pond Wood, in particular, the remains of an 18th Century fish pond created as part of the development of the Alloa Estate in the mid-to late 19th century.

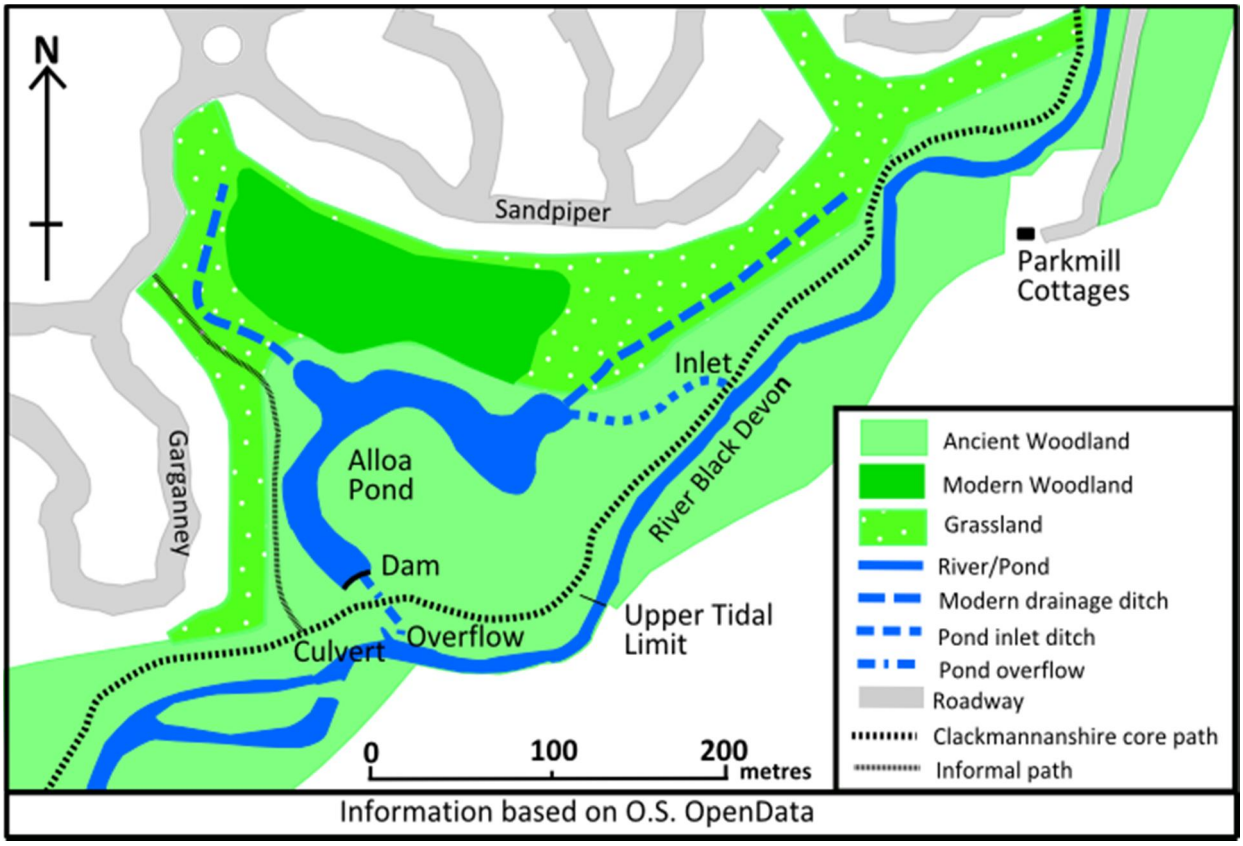
## 2. Acknowledgments:


- Alex Birrell, Alan Blue, Margaret Blue, David Bytheway, Robert Dingwall, Lindsay Duncan, Fiona Graham, Irene Hamilton, Julie Leverton, Bill Middleton, Kate Middleton, Margaret Schofield, Marilyn Scott, David Seaton, Jenni Stewart, Evelyn Wilson, Maggie Wilson and Andrew Wood;
- The Clackmannanshire Field Studies Society Executive and Members for proposing and supporting the project;
- The Clackmannanshire Development Trust who provided encouragement, accommodation and supported research and training;
- The National Lottery, through the Heritage Lottery Fund, for their funding;
- The Inner Forth Landscape Initiative for management and training support;
- Local landowners and residents who have supported our survey work and provided us with local information;
- Ordnance Survey OpenData whose easily accessible maps provided us with a base set of locations for rivers, streams and the boundaries of modern urban areas;
- The National Library of Scotland whose on-line and library-based Ordnance Survey and geological maps provided the bulk of our locational data; their on-line tools, which hugely simplified measurement and location and their staff, who were always knowledgeable and helpful;
- The National Records of Scotland's amazing collection of family papers, plans and maps, on-line catalogue and supportive staff and the many families, organisations and individuals who made this material available;
- Google Earth for their satellite imagery and powerful tools;
- Microsoft for the satellite imagery; and
- Inkscape for their freely available, professional quality vector graphics software which was used to create maps and illustrations.
- With particular recognition of the considerable commitment of Robert Dingwall, David Seaton, Margaret Schofield, Marilyn Scott, Eddie Stewart and Andrew Wood in field and research work.

## 3. Location:

Alloa Pond is located on the North bank of the river Black Devon just upstream from the upper limit of ordinary spring tides. The river runs through an area of ancient woodland which was once part of the Alloa Estate. The woodland is now bordered to the North by an area of modern housing.

**Figure 1. Alloa Pond, location map.**




The pond can be accessed from the Clackmannanshire core path number eight, which runs along the north bank of the river Black Devon. The eastern end of this path is accessible from Alloa Park Drive (NS 90076 92472). Follow the access road to Parkmill Cottages and turn right onto core path number 8 when you reach the north bank of the river Black Devon. The path crosses the inlet ditch for Alloa Pond on two wooden beams. Continue westwards on the path for another 250 metres until you reach the outlet ditch and drain culvert. The pond dam lies some 30 metres to the north of the core path.

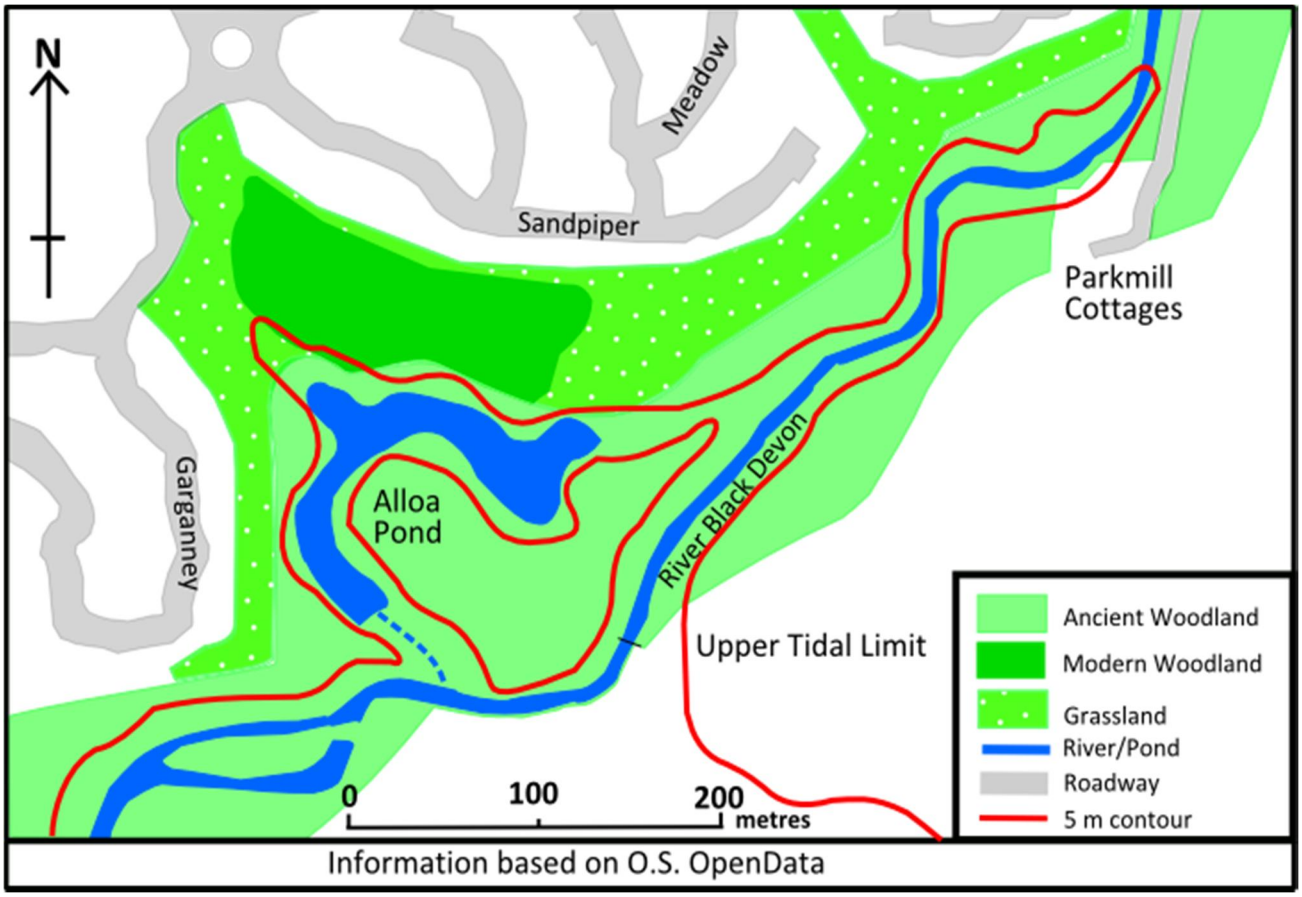
**Figure 2. Path crosses culvert.**

## 4. The Physical Background:

The river Black Devon comes down from Forestmill (NS 953959) in a series of gorges, before reaching the Carse of the Forth at a point (NS 906924) just below the Mary Bridge (NS 908922). In most of these gorge sections the river has cut down to the sandstone bedrock. Once on to the Carse it has meandered over time, leaving behind a number of old banks and sections of its former course.

There are several maps which show evidence of former courses. A plan of Alloa Estate drawn for the 6th Earl of Mar circa 1710, **(1)** shows a number of old, cut-off meanders. A meander shown on the 1710 map is also indicated on Stobie's map of Perth and Clackmannan **(2)** of 1783 and a later plan of the Alloa Park surveyed in 1814 **(3)** shows similar old sections of the course of the river.

**Figure 3. Alloa Pond, five metre contour on modern base map.**




The five metre contour in the vicinity of the pond **(4)** shows that the river once ran to the north of its present course and, when the course changed, it left behind a natural hollow which formed an "oxbow lake". This natural hollow created the opportunity for the formation of a pond feature.

## 5. The Area in the Late 17th and early 18th Centuries:

Charles, 5th Earl of Mar supported the Jacobite cause in the rebellion of 1688 and suffered considerable losses to his estates. Although restored to his offices by King William III in 1689, he died suddenly in May 1689, leaving his estate heavily encumbered with debt. John, 6th Earl of Mar, succeeded to the family estates, including Alloa, in that year and set out to retrieve the family fortunes. **(5)** A map of the Firth of Forth drawn in the 1680's by John Adair **(6)** shows Alloa Tower and mansion house, with an extensive area of simply laid out gardens to the south and east and the Brothie burn running through them. John, the 6th Earl, produced designs for Alloa House in 1700 **(7)** and began a series of architectural and landscape improvements circa 1706 when he laid out the house and gardens. There is a note of the work in a letter from William Hutton, the manager of **(8)** the Earl's colliery, **(9)** where he mentions the improvements to the house and gardens. A major part of the Earl's landscape plan was the creation of a number of vistas from the site of Alloa Tower and mansion house. These established pathways through parkland and woodland to the South and East. A map by John Adair of the "Frith of Forth", **(10)** post 1701, shows the major lines of these vistas.

The plan drawn up in 1710 **(11)** shows the 6th Earl's ambitious design for a complex set of gardens and vistas in the French style. At the time the plans were drawn, parts of the designs had been carried out and others were planned but not completed. On the 1710 plan a number of vistas are shown, including one sighted towards the Lookaboutye Brae near Clackmannan. The map shows this vista crossing the river Black Devon where there is a bridge indicated, connecting the main part of the Alloa estate with a small area of estate which lay on the east side of the river Black Devon. There is a record of an agreement between the Earl and the owners of the Clackmannan estate regarding a bridge across the Devon. **(12)** Correspondence in 1771 between the 6th Earl and his brother, Lord Grange, indicates that the Earl was contemplating cashing in his life pensions from Queen Anne and making a bid to buy the Clackmannan Estate from William Dalrymple. **(13)**

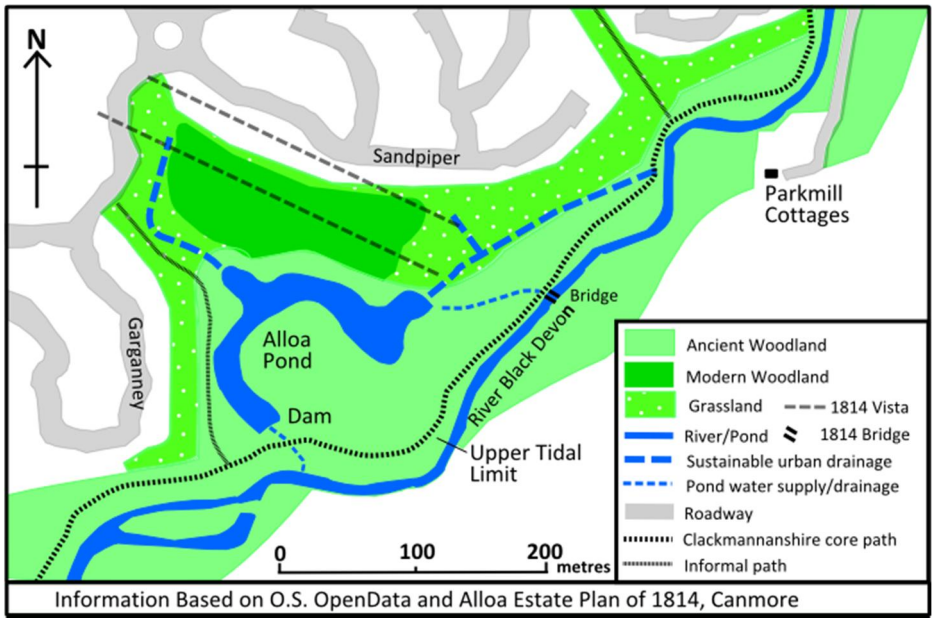
Unfortunately, the 6th Earl of Mar supported the Jacobite cause, and, following the failure of the 1715 rebellion, went into exile on the Continent and spent his remaining years abroad. Although the estate was forfeited to the Crown, the 6th Earl kept in touch with his family, making numerous suggestions as to its improvement. The Alloa estate was purchased by the 6th Earl's brother, Lord Grange, in 1724 **(14)** and came into the possession of his son, who had married Lady Francis Erskine, the daughter of the 6th Earl. **(15)** Roy's map of 1747 shows the gardens still in existence then. These were greater in extent than those shown on Adair's post 1701 map but less than that planned by the 6th Earl. **(16)** All of these maps show a vista lined up on the Lookaboutye Brae near Clackmannan. Stobies's map of 1783 **(17)** and a sketch of the water works associated with plans for a new distillery for a Mr Haig at Clackmannan, in 1830 **(18)** also show the bridge crossing the Black Devon. Comparing all of these sources with the OS second edition 25 inch map the site of the bridge is located at NS 8990192100.

## 6. Development and Decline in the Early 19th Century:

The improvements undertaken by the 6th Earl of Mar were not fully maintained and gradually lost. A painting by David Allan shows John Frances Erskine, 7th Earl of Mar and his family with Alloa Tower and the adjacent Alloa House in the background. **(19)** The Tower and House are viewed from the west and the area to the west of the buildings are shown as a sheep pasture. There is no trace of the ornamental gardens, with only the odd statue still standing. The painting is undated but shows the Earl with his wife, Frances Floyer, who died at Alloa in 1798, aged 53. Allan's painting also shows five of their children – the youngest being a babe in arms. The oldest would be John Thomas Erskine born 1772 and the next oldest boy, Henry David Erskine, born 1776. It also shows two daughters (unknown birth dates). This would suggest that the painting was completed sometime between 1780 and 1790.

Alloa House, built immediately adjacent to Alloa Tower, was burned down in August 1800. **(20)** A plan of the Alloa estate in 1814 **(21)** shows little trace of the formal gardens to the south west of the Tower and only traces of the vistas through parkland. The vista lined up on Lookaboutye Brae is clearly marked, as is the bridge on it across the river Black Devon. A new gate is marked at the western edge of the estate leading into Broad Street (NS 885923). An older, well laid out garden is shown opposite the old brig over the Brothie Burn (NS 889927) and an area is marked out for a new garden in the northern part of the estate (NS 900924). This plan shows that Alloa Pond has been developed as a water feature (NS 896920).

**Figure 4. Vista and Bridge in 1814 on a modern base map.**



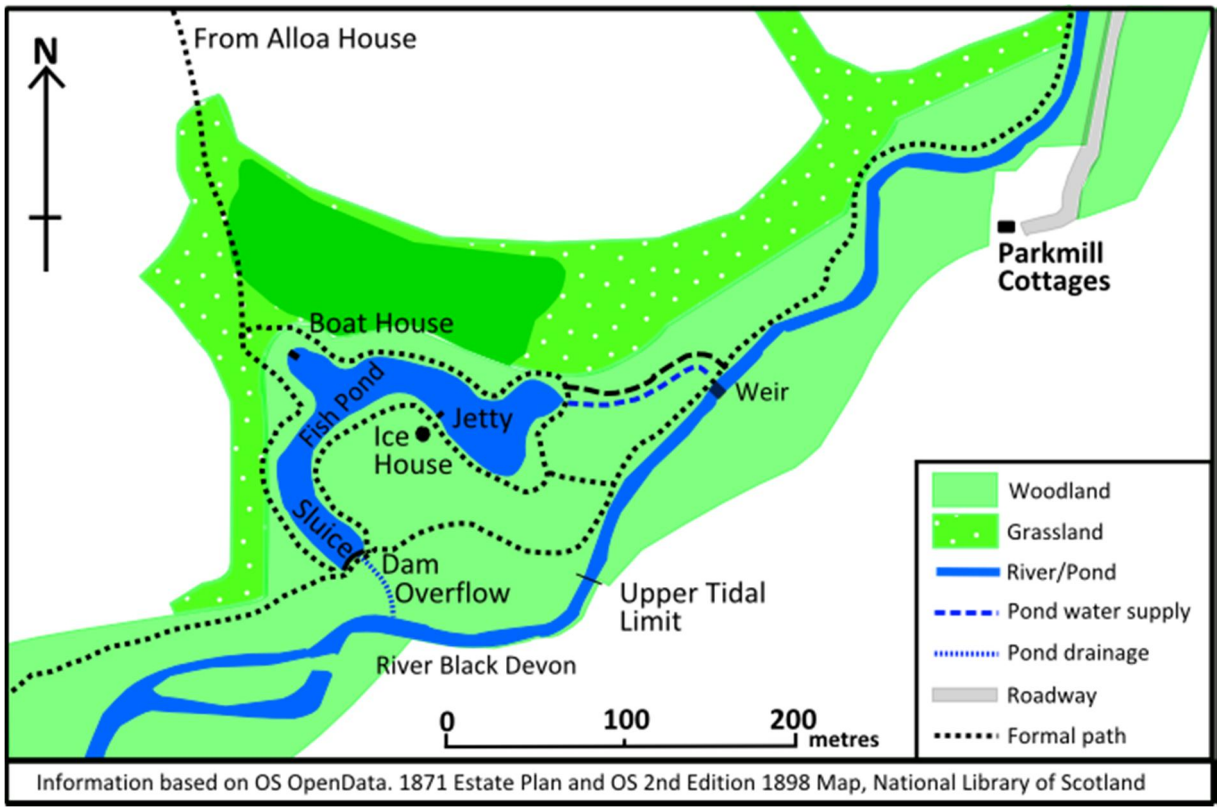

There is a straight line edge to the south end of the pond suggesting that it was retained by a dam wall. The plan does not give any indication of how the pond was filled or drained.

By the time the first edition of the Ordnance Survey map was surveyed in 1863, the area of the pond is shown as being marsh and the vista and the bridge site are not indicated. **(22)**

## 7. Redevelopment in the period 1838 to 1880:

Old Alloa House was replaced on a new site (NS 8915192508) between 1834-38 by a classical mansion built for the Earl of Mar and Kellie and substantial improvements were made to the estate, including building a substantial wall around it. **(23)** During this period Alloa Pond was further developed. A coloured estate plan of 1871 shows the pond, labelled "Ornamental Pond", with a small island. The plan also shows a substantial weir across the river Black Devon, an inlet sluice just upstream from the weir, the pond dam, the overflow channel and a network of paths. **(24)** The map does not have a scale, but is accurately drawn. Comparison with the 2nd edition 25 inch map of the area **(25)** indicates that the weir was some 12 metres in breadth across the width of the river and some eight metres in length. The bridge across the river Black Devon is no longer shown.

**Figure 5. Alloa Fish Pond, 1871 – 98 on a modern base map.**




The OS Second Edition 25 Inch map of 1899 **(26)** indicates that the pond had been further developed. The pond was now labelled as a "Fish Pond" and had a jetty, boathouse and ice house. The OS map also shows the location of an inlet ditch from the river Black Devon, a curved retaining dam on the south end, with a semi-circular sluice, an overflow drainage channel conveying water back to the river and a drainage culvert next to the river. A network of formal paths had been extended, with a link path from Alloa House. There was also a path along the west bank of the river Black Devon. By 1898 redevelopment was completed and the OS Second Edition, revised 25 inch map of 1920 shows the area unchanged, **(27)**

## 8. The Pond in the early 21st Century:

A group of local residents from the new housing developments to the north of Alloa Pond developed an interest in Alloa Wood and Alloa Pond. As well as being interested in exploring the pond and its associated features, the group was interested in looking into how the pond had been filled. With volunteers from the Clackmannanshire Field Studies Society's Two Estates project, several survey visits were made to the pond between 2015 and 2017. The first visit in February 2015 was at a time when the level of water in the pond was low and a low tide in the river Forth ensured that the level of water in the river Black Devon was also low.

The level of water in the pond was some one and a half metres below the top of the dam wall and the nature of the vegetation on the banks of the pond suggested that the water in the pond had been at this level for some time. There was no indication of any substantial flow of water into the pond.

**Figure 6. The pond dam, 2015.**

**Figure 7. The pond dam overflow, 2015.**

The dam consisted of a level, earthen bank with a pond-facing arch built of well cut, ashlar blocks of sandstone. There was a channel built into the dam with a ditch leading into the river Black Devon. This channel was a stepped overflow designed to ensure that the level of water behind the dam did not rise above a certain level.

Under the water level close to the centre of the dam wall there was evidence of a drainage sluice. A circular metal drainage outlet was set at a depth of about two metres some two metres to the south west of the edge of the overflow channel. This appeared to connect to a stone-built outlet at the edge of the river Black Devon. Although the level of water in the dam was quite low, there was a distinct flow from the outlet.

**Figure 8. The pond drain, 2015.**

The north end of the pond was connected to the bank of the Black Devon by a substantial ditch. The ditch starts at the bank of the river from a well-built stone sluice which has a slot cut to hold a sluice gate.

**Figure 10. Metal grill at inlet sluice.**

There is a hinged metal grill on the river side of the sluice. This would have kept debris from entering the sluice gate.

This arrangement suggests that this sluice was the input for water to the pond.

The riverside face of the stone structure containing the sluice is a plain stone wall. There is no evidence of any structure being attached to the wall, or any slots which might suggest that it had been built to support some form of temporary dam or weir.

**Figure 11. Remains on the East bank.**

Following the ditch towards the upstream end of the pond confirmed that it continued as a simple earth-cut ditch. Close to the pond a corrugated iron pipe had been inserted into the ditch and earthed over to provide a pathway across.

**Figure 9. Niche for gate.**

There is a similar stone-built structure on the opposite bank of the river Black Devon which also has a plain, unbroken surface.

**Figure 12. Path over inlet lade at pond.**

The detail of the 1871 estate plan was not available at this time and there had been considerable debate about a source of water for the pond. Suggestions had been made that it might have been filled at a high tide. A second visit was made to the pond in February 2015, when there was a record high tide. At its highest point, the tidal waters reached (NS 8995092144) some 200 metres upstream from the ordinary spring tides level. Although the water level was substantially higher than normal and drowned many of the riverbank trees, it was still about a metre below the level of the sill of the input sluice gate. It was clear that a high tide was not the means of getting water into the pond. In order to get water in the river Black Devon to flow through the input sluice to reach the overflow lip, the level in the river would have had to have been raised by about one and a half metres.

**Figure 13. River with highest tide**

The coloured plan of the Estate of Alloa drawn in 1871 **(28)** finally revealed that the fish pond had been filled then by means of a weir across the river Black Devon. This raised the level of water in the river and created a source of water for the pond. The plan shows that water was constantly flowing through the inlet and overflow ditches.

The site of the icehouse was located on the edge of the pond (NS8972392074). The remains consisted of an earthen bank some 12 metres in external diameter and about a metre in height and had a lower part on the eastern side (opposite the bank of the pond). The bank surrounded a debris-filled hollow about a metre in depth.

**Figure 14. Remains of ice house.**

The site of the boat house and jetty remained uncertain.

The pond was visited in December 2015, following a period of heavy rainfall. The developer of the new housing had constructed two large drainage ditches to convey run-off water to the pond. The pond level was high, reaching some 40 centimetres below the level of the overflow step in the dam.

**Figure 15. Dam well filled by runoff from urban drainage.**

The increased depth of water in the pond had led to an increased pressure at the outlet at the base of the dam and the flow of water through the outlet channel was greatly increased. It appeared that there was some mechanism which controlled the flow of water out of the dam and that it was partly open or leaking.

**Figure 16. Drain volume increased.**

**Figure 17. Water flowing out of inlet sluice due to a high level in the pond.**

At the northern end of the pond, the bottom of the inlet ditch was under the level of the water in the pond. As a result, water was flowing into the ditch and then down into the river Black Devon through the inlet sluice. The inlet sluice had become a drain for the pond.

## 9. Detailed Surveys:

During 2017 a number of detailed surveys of the area were undertaken.

### 9.1 The Dam:

Alloa Pond is located within an ox-bow lake, a natural, horse-shoe shaped depression, formed when the river Black Devon changed its course. The downstream end of the feature has been filled in and levelled off, creating a large, level apron across the end of the hollow. This feature forms an earthen dam across the south end of the ox-bow lake, allowing the level of the water to be raised.

**Figure 18. Earthen apron and dam.**

A curved stone retaining wall had been constructed on the upstream edge of this apron. This acts as a facing to the earthen dam.

**Figure 19. Sandstone facing to the earthen dam.**

This facing wall is built in the shape of an arch, with its apex pointing towards the pond. This structure both protects and adds strength to the earthen dam

**Figure 20. Arch shaped facing and overflow.**

There were several different types of joint mortar, suggesting that the wall had been repaired on a number of occasions. An overflow has been built into the southern end.

The facing wall is made of well finished sandstone ashlar blocks, laid in distinct courses. The blocks have been set in a lime and sand mortar and joints on the pond side have been filled with a cement-like mortar.

**Figure 21. Well cut ashlar blocks.**

**Figure 22. Test pit behind the facing wall.**

A small test pit was dug behind the stone facing wall of the dam. This revealed that the wall is composed of two layers of sandstone blocks. While the facing is composed of well finished ashlar blocks, the rear portion is made of rougher blocks and ends about 30 centimetres below the surface of the apron.

**Figure 23. Second wall top revealed.**

**Figure 24. Rough coping stones.**

There is a line of rough sandstone coping stones set on on top of the facing wall. These stones have similar mason's cut marks to the facing ashlarblocks.

The plan and elevation of the Pond Wood dam show the relationships between the sandstone facing, overflow, drainage valve, access slab and access chamber. While we can see the start and end of the drainage system, we have not been able to trace the track between the two ends.

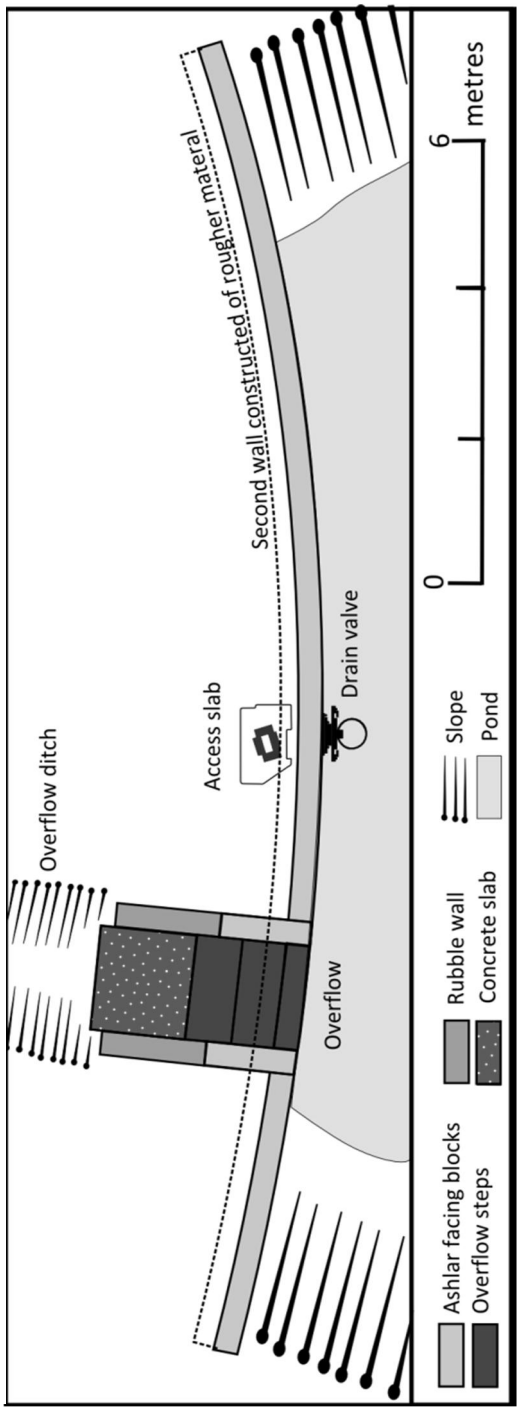



**Figure 25. Plan of the pond dam.**

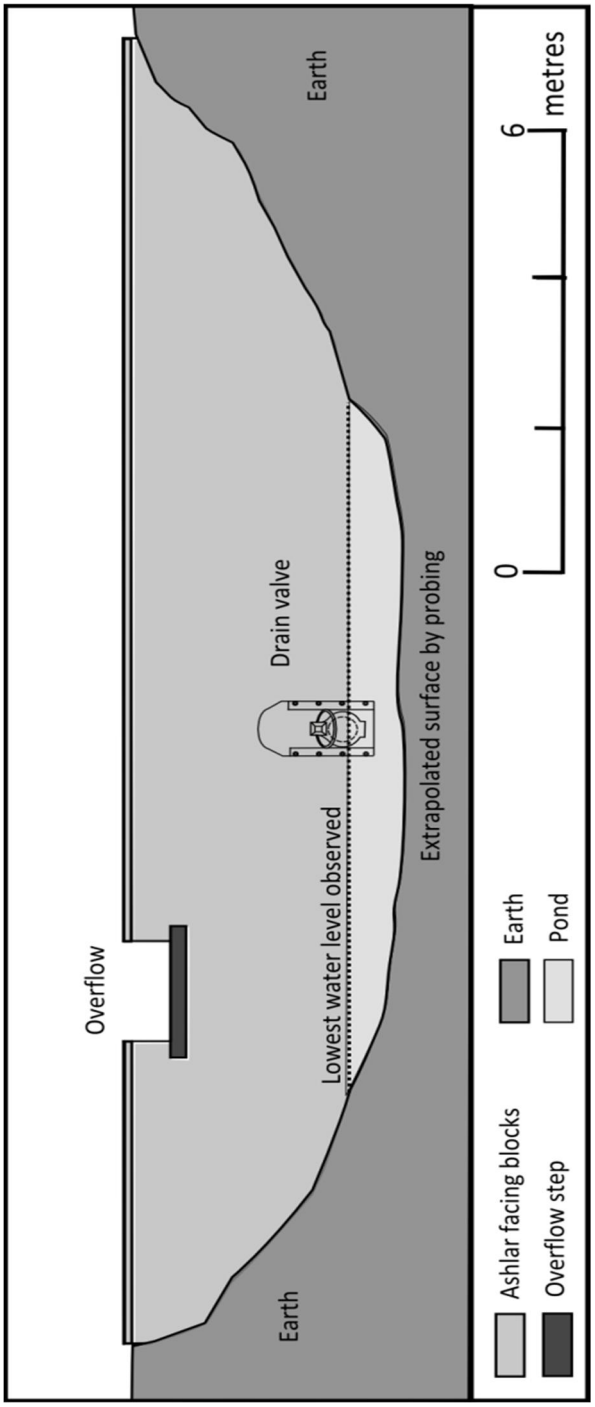



**Figure 26. Elevation of the pond dam.**

### 9.2 The Overflow and Ditch:

An overflow channel has been built into the wall of the dam to ensure a controlled level of water in the pond behind the dam. There are two short supporting walls on either side of the channel, with three sandstone steps leading down from the pond into the drainage ditch. At one time there has been a short, concrete run-off slipway running off the bottom sandstone step.

**Figure 27. Overflow in the dam.**

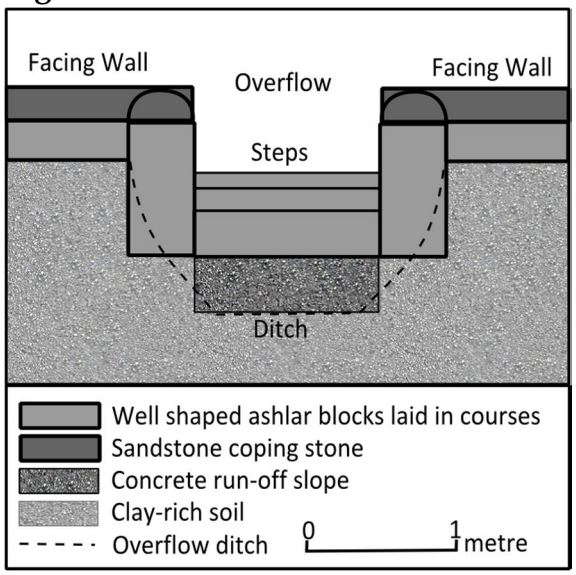
**Figure 28. Three steps of the overflow.**

The overflow shows signs of repair with several different types of cement-based mortar used. The concrete slipway has been broken in half and here are signs of water having removed earth from underneath and around it.

The overflow leads into a ditch cut ino the earthen apron in front of the dam and leads to the North bank of the river Black Devon. The ditch has been filled in in two places to allow the path around the pond and the path along the bank of the river Black Devon to cross it and now cannot act as a drainage channel for the overflow.

**Figure 29. The overflow ditch.**

**Figure 30. Overflow front elevation.**



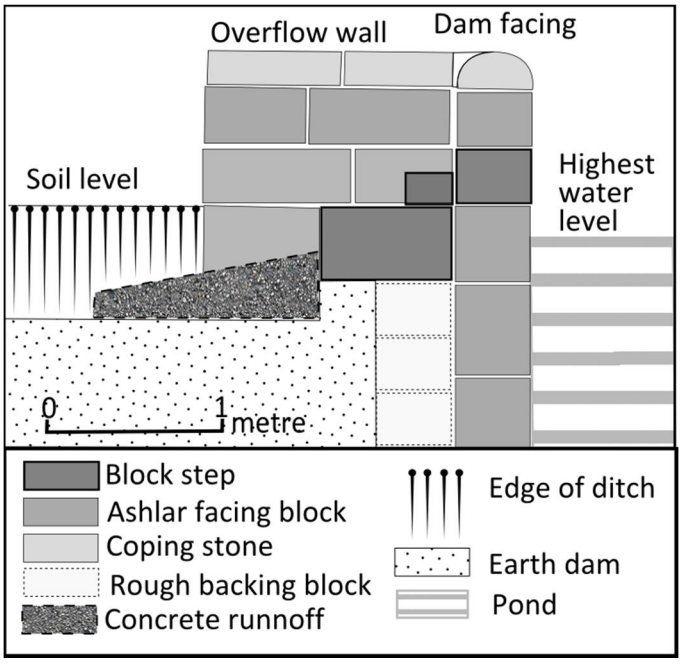

The level of the top step of the overflow has been surveyed with respect to the lip of the base of the inlet sluice. The top step sits some 40 centimetres above the level of the base of the inlet sluice.

If the lip of the weir in the river Black Devon was constructed some 50 cms above the level of the base of the inlet sluice, then some 10 cms of water would flow continuously through the overflow, maintaining a fresh supply of water in the pond.

As the overflow channel has been filled in where the paths cross over, it is clear that the overflow has not been running for some considerable time. It is likely that the removal of the weir and the retention of the inlet ditch meant that there was never going to be a high enough level of water in the pond to flow through the overflow.

Instead, the inlet ditch has now effectively become the pond drain.

**Figure 31. Overflow side elevation.**



### 9.3 The Dam Sluice:

**Figure 32. Overflow and drain location.**

The sluice mechanism lies two metres North West of the overflow. Low water in the dam during the late spring of 2017 revealed the detail of most of the sluice mechanism. This took the form of a vertical plate, attached to a metal pipe leading into the facing wall of the dam.

**Figure 33. The sluice from above.**

Figure 34 shows that the metal plate has two very substantial side slides bolted on and there is a metal plate with a large, hinged metal ring sitting in the slot between these slides. This type of sluice valve is very common. The main inlet tower and the tower on the settling pond at Gartmorn Dam both have similar sluice valves controlling the outflow of water. The great advantage of this type of valve is its simplicity of construction and the fact that it has no or very few moving parts below water.

Unfortunately, the level of water in the pond did not drop far enough to show all the details of the bottom of the sluice valve mechanism. In addition, water coming in from the new drainage ditches is very murky.

**Figure 34. Front of the sluice.**

**Figure 35. Underwater survey.**

Frustrated by the level of water never falling far enough to reveal the full extent of the sluice valve, an underwater fingertip study was undertaken. As part of the health and safety provisions for the survey, light weight plastic gloves were used as the water quality was poor. These prevented cuts, but allowed a sensitive exploration of the sluice mechanism.

The volunteer who undertook the fingertip survey drew up his experiences as shown below. These detailed sketches, together with the photographs taken over several years, allowed us to produce a plan and elevation of the sluice assembly with reasonable confidence as to its accuracy.

**Figure 36. Volunteer's sketches as a result of underwater fingertip survey.**

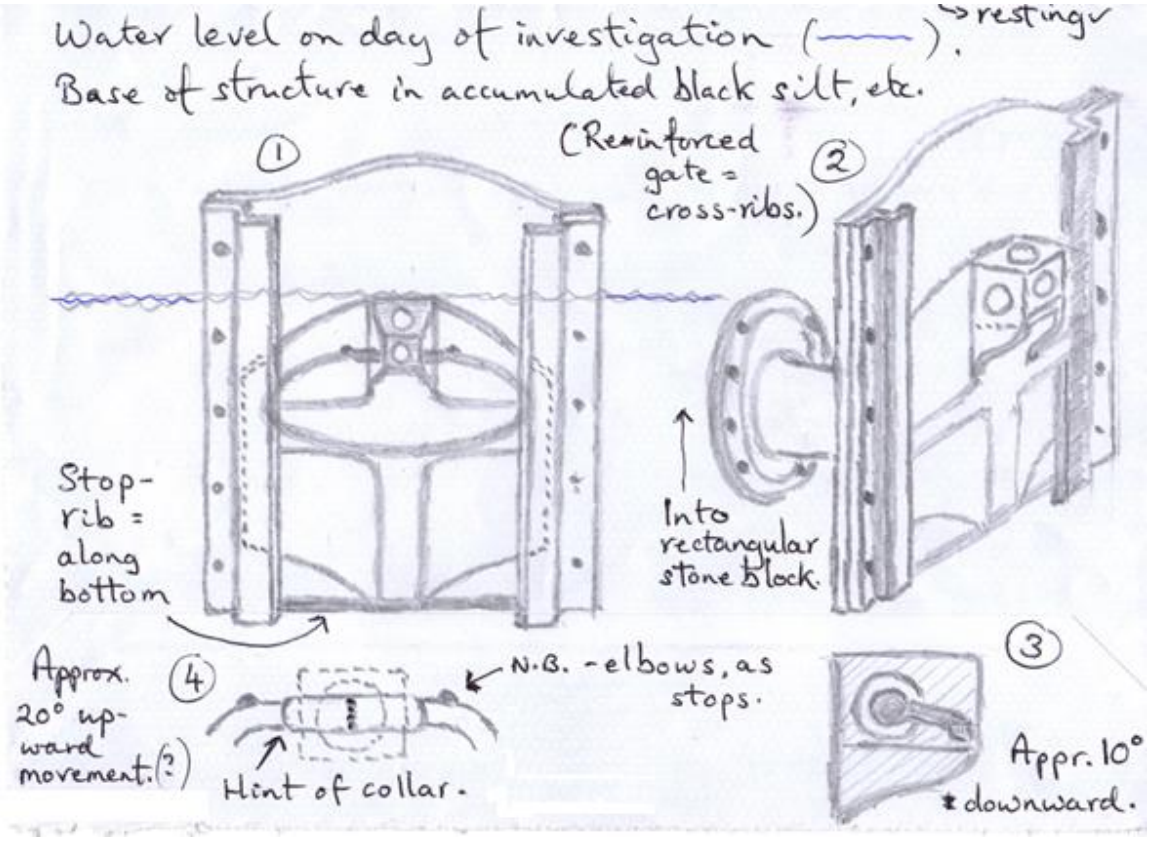
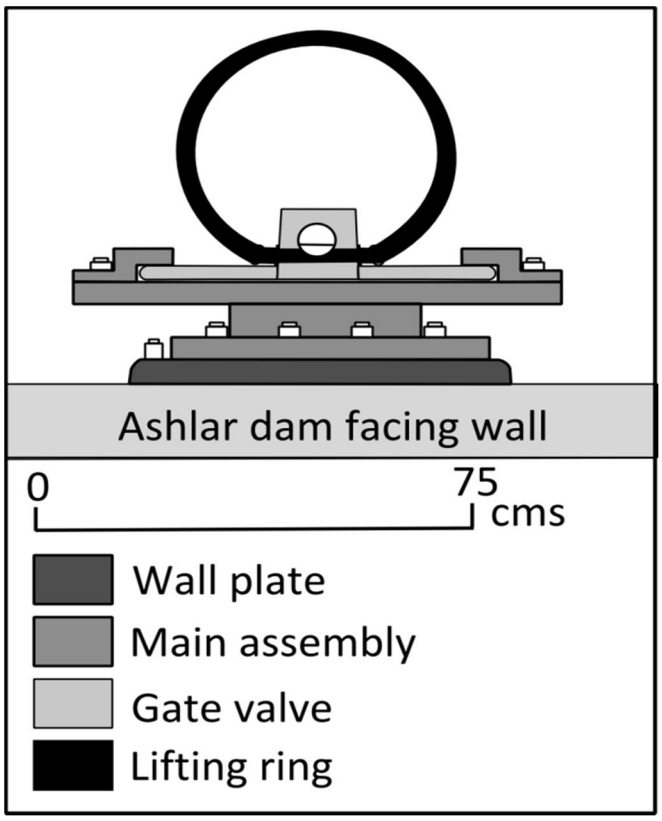


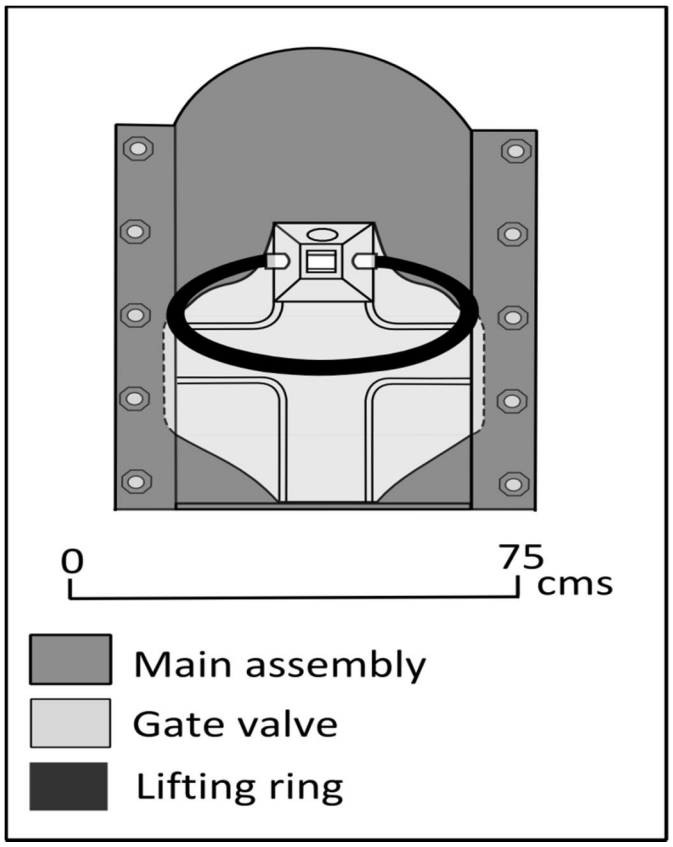
**Figure 37. Sluice from above.**




From all our observations, a rectangular metal plate is set into the facing wall of the pond dam. This is secured with cement and a small number of bolts. A main circular fitting with a short length of pipe links to a front rectangular section. This main cast assembly is bolted on to the plate. The front section has two slides bolted on to the vertical edges. A metal sluice valve with a ring fitting sits within the two slides. The large ring is attached to a small, extension casting on the sluice valve, possibly with a metal collar. There are two small bulbs where the ring has been welded to fit into the collar. The ring allows the gate valve to be easily accessed under several metres of water.

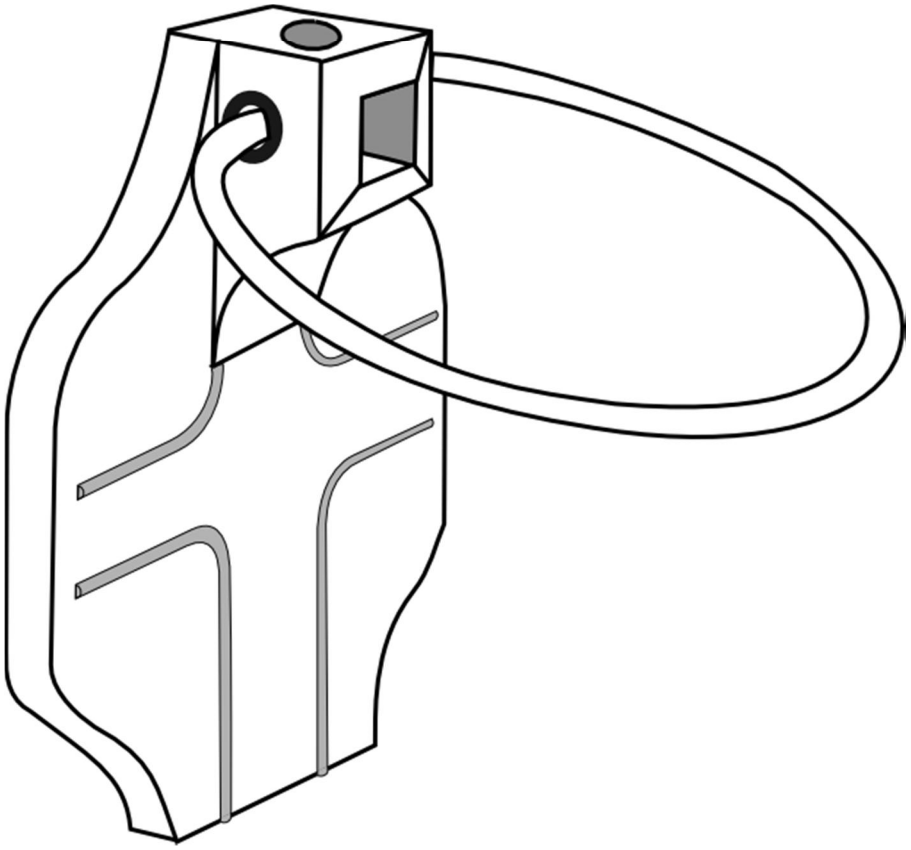
When the ring is pulled up, the gate valve slides up in the slots and exposes the drain pipe behind in the dam wall, releasing water into the drain. When the ring is pushed down, the gate valve slides over the pipe, closing off the flow of water out of the pond. As the pond was described as a "fish pond" on the 1898 OS maps, it is possible that there might have been some form of grille or filter in front of the assembly to ensure that no fish were able to escape through the pipe when the valve was opened.

**Figure 38. Front view of sluice.**



The drawing below shows what has been revealed by the falling water level and what we think the gate valve looks like below this point (traced by fingertip exploration below the water).

**Figure 39. Side view of gate valve.**



The main vertical assembly has a cast ridge across the bottom, upon which the gate valve sits. The gate valve has a pattern of cast ridges on the front. The horizontal ridges end just short of the vertical slides. This would have kept the gate valve centred in the slides, with the minimum amount of friction. The gate valve is shaped to have only a small portion of its sides within the slides, again reducing the friction when it is moved. From the position of the gate valve, it is clear that the valve is sitting in the closed position. This raises questions as to the source of water flowing out of the dam drain.

Further observation when the water level drops below the mechanism will be required to confirm these observations.

We noticed that there was a large slab located in the earthen apron of the dam. Just behind the facing wall. The slab was located close to the point immediately above the pond drain.

**Figure 40. Location of the access slab.**


The large sandstone slab lies just behind the dam facing wall, roughly in line with the centre line of the outlet pipe in the base of the dam wall. This slab has the remains of two metal pins on the dam side, possibly to enable it to be lifted.

Suspecting that the slab might cover a valve, it was carefully moved to one side.

**Figure 41. The drain valve access slab.**

**Figure 42. The access slab removed.**

The pit was sounded to a depth of 89 inches (2.26 m). There was standing water in a cavity at the bottom and what looked like the remains of a metal bar or rod. The slab was carefully replaced and the earth back filled

This revealed an extremely small access pit, lined with carefully dressed sandstone blocks. The dressing pattern was similar to that on the facing blocks of the pond dam.

**Figure 43. The access pit.**

**Figure 44. Blocks in access pit.**

Detail in the access pit was difficult to see. In order to give more detail a USB endoscope camera was used. This showed that the blocks below the highest level were much rougher and butt-jointed to form the sides of the pit.

Going further down into the pit, the courses can be seen to be much more roughly arranged, but still formed of shaped sandstone blocks.

**Figure 45. Courses in access pit.**

More than halfway down the pit there was evidence of water leaking in from the earth dam.

**Figure 46. Leak in access pit.**

Although badly corroded, the remains of the vertical metal rod which had been noted in the bottom of the access pit are fairly clear. It would appear that it was, at one time, of a square cross section.

**Figure 47. Metal rod in the base of the access pit.**

The plan on the right shows the relationship of the drain housing to the outlet sluice. The sandstone blocks which line the housing lie at an angle to the dam walls and are off-centre compared to the centre line of the outlet sluice. We are not sure what the purpose of this mechanism was, but the depth of the drain housing corresponds to the depth of the centre of the sluice mechanism, so the two are likely be related in terms of function.

**Figure 48. Plan of drain housing**

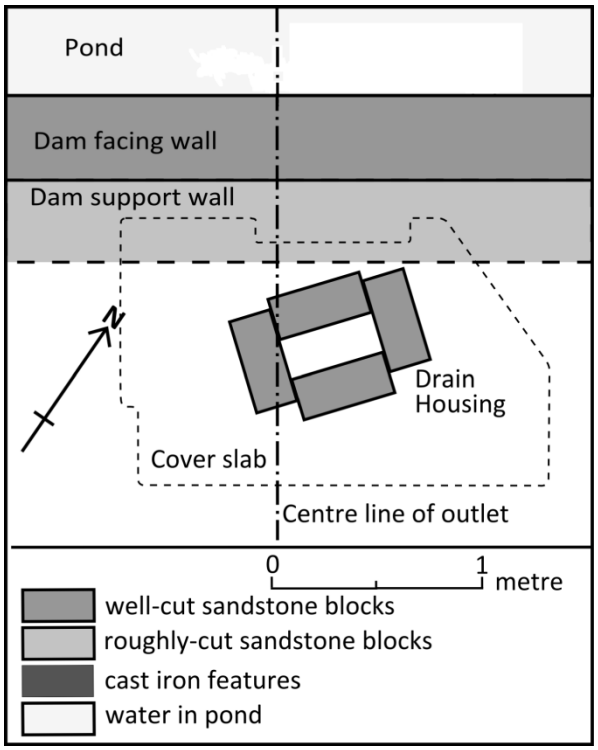
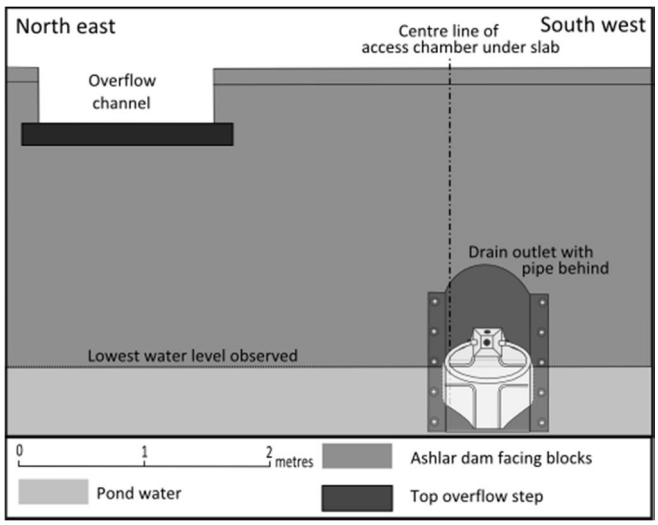



**Figure 49. Location of sluice and pipe.**




There is a culvert on the north bank of the river Black Devon immediately downstream from the point at which the overflow ditch enters the river.

This feature is indicated on the OS Second Edition 25 inch map of the area. **(29)** The culvert starts from a well-constructed sandstone block lined tunnel.

While we can see the start and end of the drainage system, we have not been able to trace the track between the two ends. However, it was recently noted that there was a distinct sound of running water in the area immediately below the overflow sluice. This perhaps relates to a leak in the wall of the dam or another drain. **(30)**

However, there is in the culvert a stone-built drain of remarkable quality.

**Figure 50. Overflow and culvert.**

The culvert enters the river Black Devon just downstream from the point where the overflow channel from the pond dam entered the river.

**Figure 51. Drain enters culvert.**

The end point of the drain is built of very carefully cut sandstone blocks, fashioned into a circular arch some 46 centimetres in width. The blocks are some 46 centimetres deep. The arch sits on a sandstone flag, which forms the base of the drain.

The cut stone blocks have a similar pattern of markings on their front surface to the facing blocks of the dam. The bottom of the culvert contains the remains of a sandstone sett pavement. The culvert enters the river at a shallow angle.

**Figure 52. Cut stone arch.**

**Figure 53. Roofed and floored drain.**

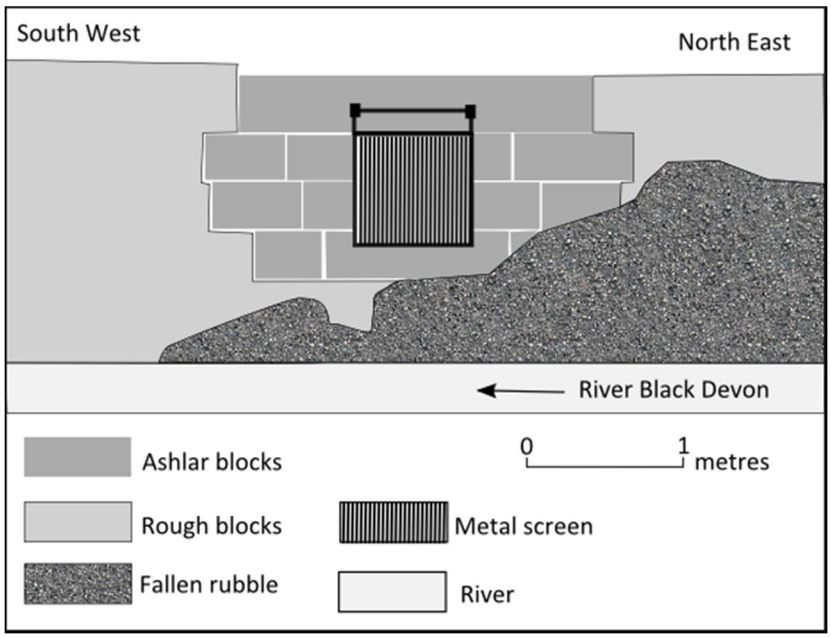
The interior of the drain has a series of sandstone flags forming the base. Above these are two out curving, drystone walls of roughly shaped sandstone blocks of various, but generally small, rectangular shaped pieces. These walls take the sides of the tunnel of the drain up to the halfway mark. Above this, there is a vaulted roof formed from carefully cut sandstone blocks, similar to those which form the exit arch. These blocks also have face markings similar to those seen on blocks forming the facing wall of the dam. The drain is both entirely practical and, at the same time, beautifully finished. This design provides a robust line of drainage from the pond drain. In addition, being a dry stone construction, it also serves as a field drain, keeping the earthen dam and the ground between it and the river drained. It was pointed out that the culvert, being below the level of the Ordinary Spring Tides, is regularly flooded and flushed out by the tidal flow. **(31)**

## 9.4 The Input Sluice and Ditch:

The inlet has been built from well-formed ashlar sandstone blocks set into an older wall composed of roughly shaped blocks of sandstone. Two very substantial blocks have been used to form the top of the sluice, with two smaller blocks forming the bottom. Two large wooden sleepers have been used to carry the riverside path across the inlet ditch.

**Figure 54. River side of inlet sluice.**

**Figure 55. Elevation of inlet sluice.**




A hinged, metal screen has been set into the river side top block. The screen opens outwards towards the river Black Devon. A considerable quantity of fallen rubble lies in the river alongside the walls, suggesting that they were higher in the past. The rubble is a mixture of well-cut ashlar blocks from the inlet sluice and more roughly formed blocks from the older wall.

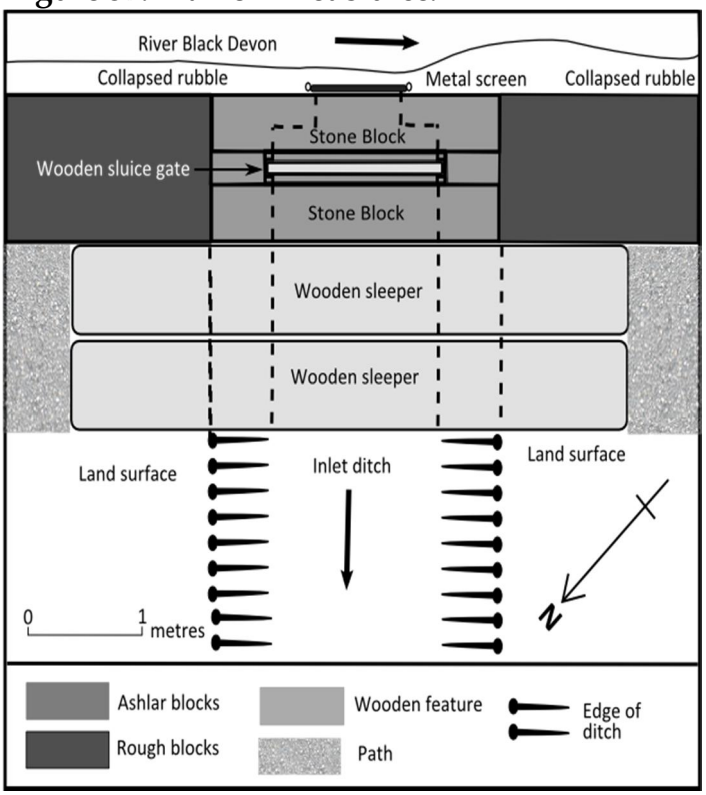
The fact that the metal screen is hinged to open outwards towards the river suggests that it might have been used to prevent debris from the river entering the input ditch.

There is now no trace of the weir shown on the 1871 estate plan. It would have needed to have been about 1.5 metres higher than the present level of water in the river Black Devon. This would have brought the level of water above the weir very close to the level of the path and perhaps explains the higher stonework at the inlet sluice.

**Figure 56. Inlet sluice gate guides.**

The two large blocks on top of the sluice are spaced apart and the ashlar blocks on either side of the channel below leading into the input ditch have been cut to provide guides to hold a gate. This gate, possibly made of wood, could be closed to cut off the supply of water to the pond.

**Figure 57. Plan of inlet sluice.**




Two wooden sleepers have been laid across the landward side of the sluice to enable the river side path to be carried across the inlet ditch. The fact that water ran out of the inlet sluice during the period of high water level which filled the pond showed that the base of the inlet ditch was lower than the top of the overflow in the pond dam.

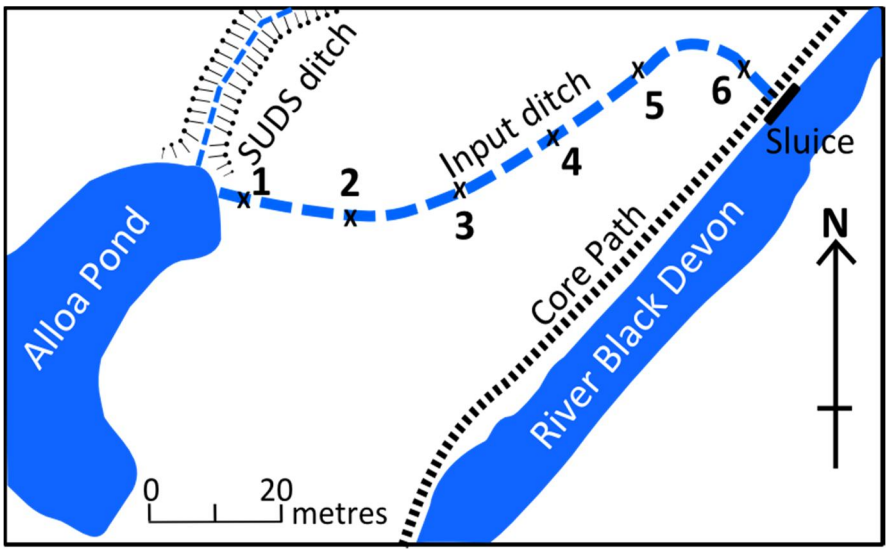
In order for 10 centimetres of water to have gone over the overflow, the water level in the inlet ditch would have needed to be some 50 centimetres deep.

The base of the ditch is still level with the rear lip of the inlet sluice, suggesting that the ditch has not been greatly infilled since it was constructed, or kept clear by drainange water running out of the pond.

**Figure 58. Inlet sluice, landward side.**

The inlet ditch was cut into a light brown, slightly clay soil. The height of the base of the ditch above the river and the relative level of the overflow were measured, along with six cross sections. The base of the input ditch was 89 centimetres above the level of the river (26/04/17) and some 40 centimetres below the level of the top overflow step in the pond dam. Although the width of the ditch varies, all of the cross sections, except the last, were nearly or over two metres in depth.

**Figure 59. Inlet ditch sections.**

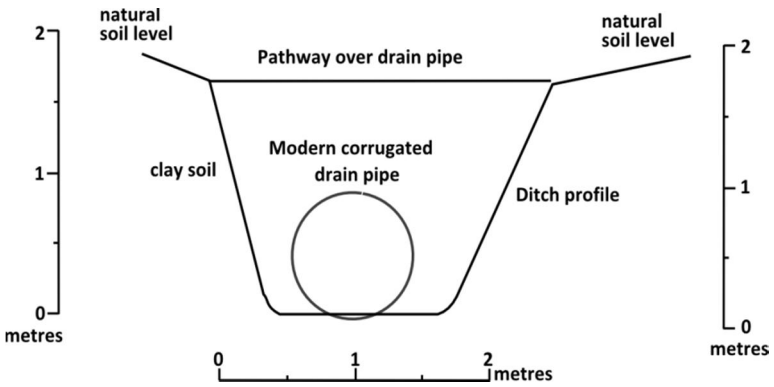



The first section was next to the edge of the pond, where the path has been carried across the ditch on a modern, corrugated metal pipe. The ditch was cut into a clay soil. The sides were steep and the base covered in a layer of leaf litter.

The 1898 OS maps show the path round the pond bridged over the inlet ditch. The introduction of a modern corrugated iron drainage pipe has enabled this path round the pond to be maintained. The length of corrugated pipe has been placed in the ditch and the gap above back-filled with soil. This pipe has allowed the inlet ditch to act as the pond drain.

**Figure 60. Ditch at section 1.**

**Figure 61. Inlet ditch section 1.**



Section 2 was much broader and more than two metres in depth. The sides were cut into a clay soil at an angle of about 45 degrees and the base was covered in a layer of leaf litter.

**Figure 62. Inlet ditch, section 2.**

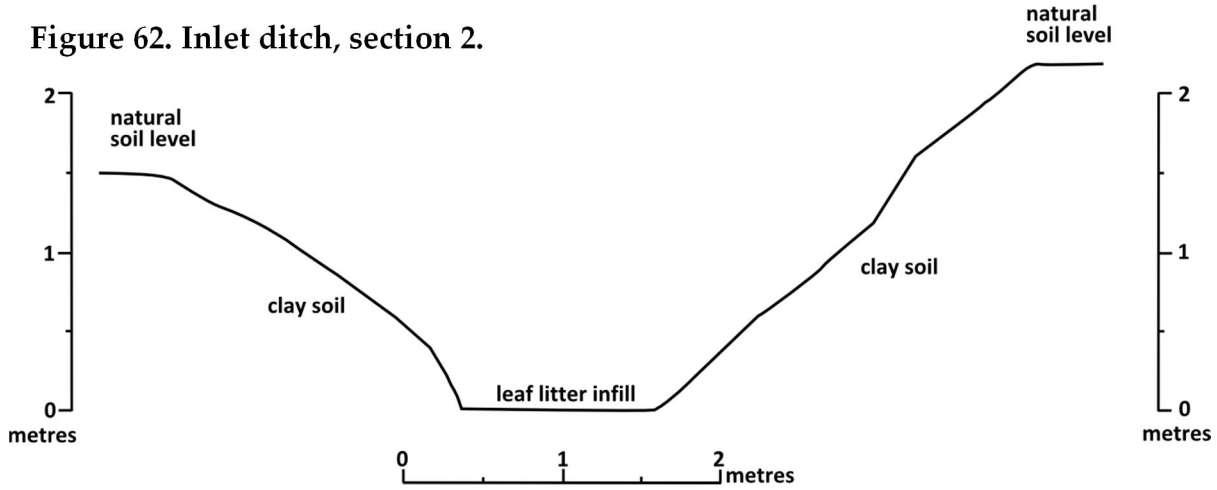



**Figure 63. Inlet ditch, section 3.**

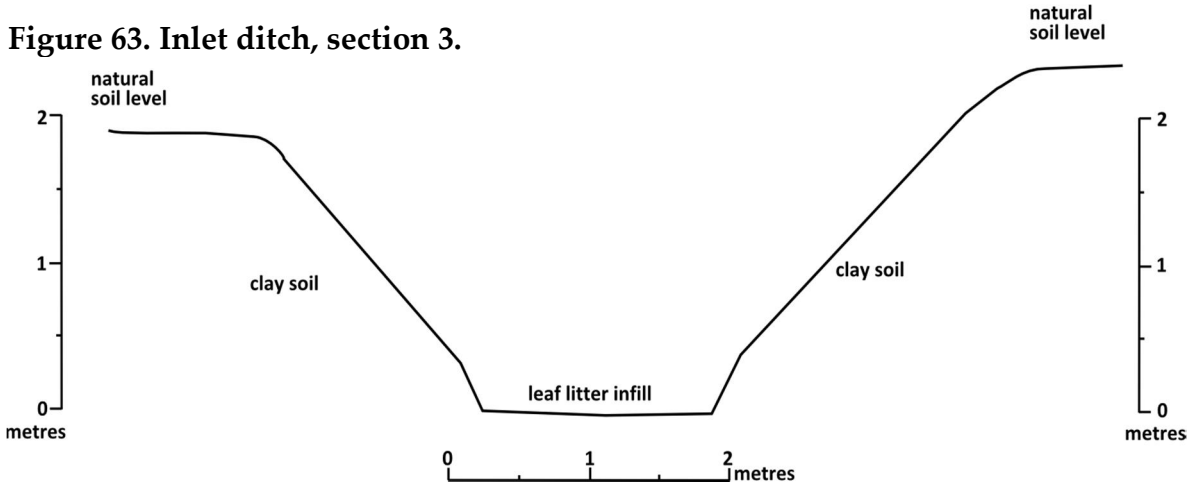



**Figure 64. Inlet ditch, section 4.**

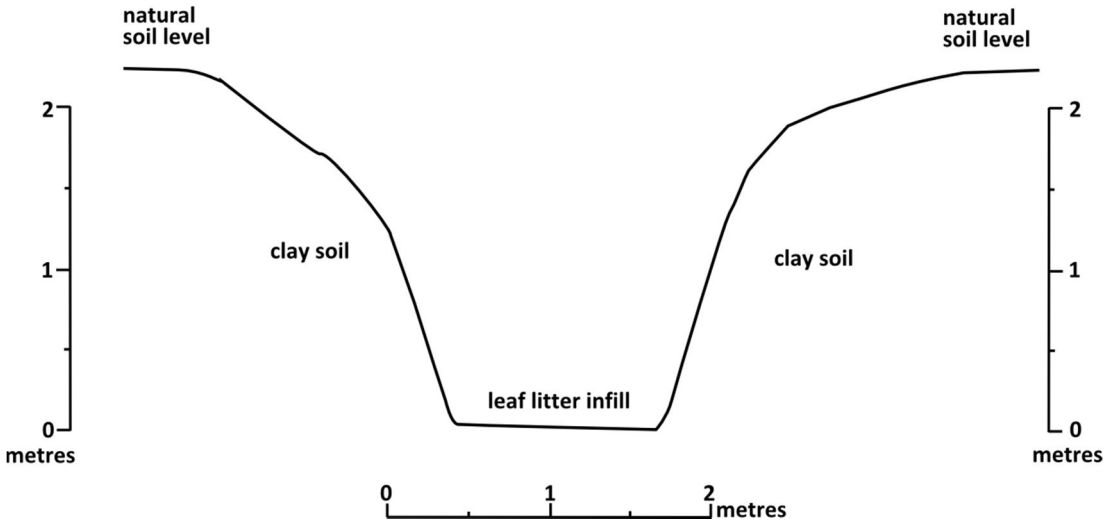
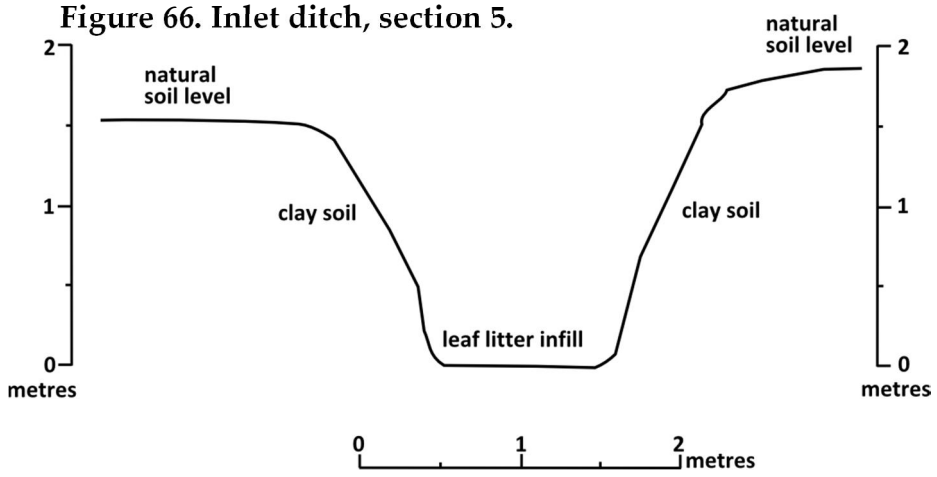


**Figure 65. Inlet ditch at section 5.**

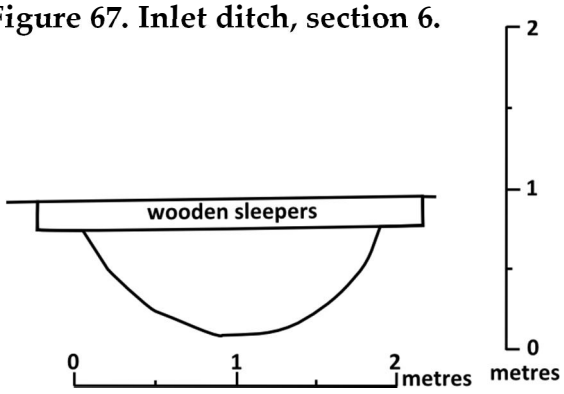
**Figure 66. Inlet ditch, section 5.**




As the input ditch progressed towards the sluice, the sides were still cut into a clay soil and gradually became steeper. At the same time, the depth of the ditch began to reduce.

At the edge of the input sluice the ditch was reduced to less than one metre in depth. The base of the ditch at this point is level with the bottom lip of the input sluice. This, together with the fact that any pond drainage is running through this ditch, suggests that the ditch has been mostly kept clear of leaf fill by regularly running water.

**Figure 67. Inlet ditch, section 6.**




In order to direct a supply of water into the pond, sufficient to generate a 10 centimetres flow of water through the overflow channel in the pond dam, it is likely that the weir across the river Black Devon shown on the 1871 estate plan would have required to have been some 1.5 metres high.

## 9.5 Other ditches:

While surveying the inlet ditch two other features were observed in the area to the south. Both were ditch-like structures, much shallower than the inlet ditch. Both ditches started at the edge of the river, leading towards the same part of the pond as the inlet ditch. This suggests that all three ditches served the same purpose: conveying a supply of water to the pond.

Where ditch A crosses the riverside path, its profile has been greatly eroded.

**Figure 68. Location of three ditches.**

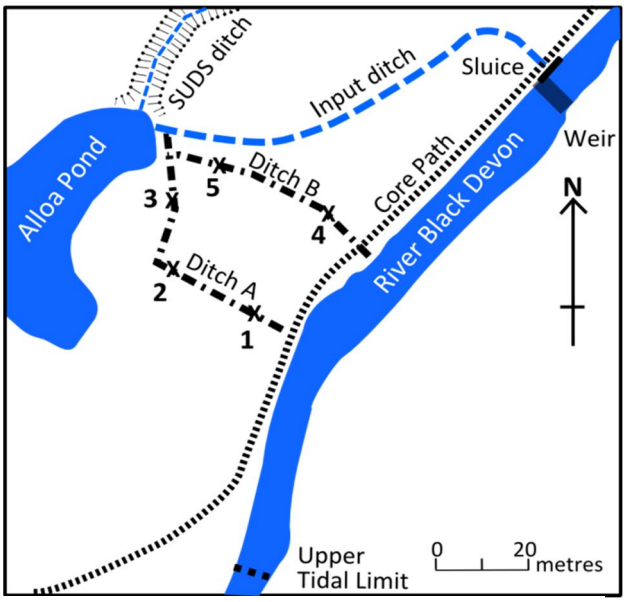



**Figure 69. The core path crossing ditch A at the river's edge.**

At section 1, ditch A is well defined, with steep, sharp edges. Three sections of ditch A were surveyed. All were well defined and between one and one and a half metres in depth. All had a deep layer of leaf litter. The full depth of the ditch was not determined. However, in order to supply water to the pond it would need to have been at least another 50 centimetres deep.

**Figure 70. Ditch A at section 1.**

**Figure 71. Ditch A section 1.**

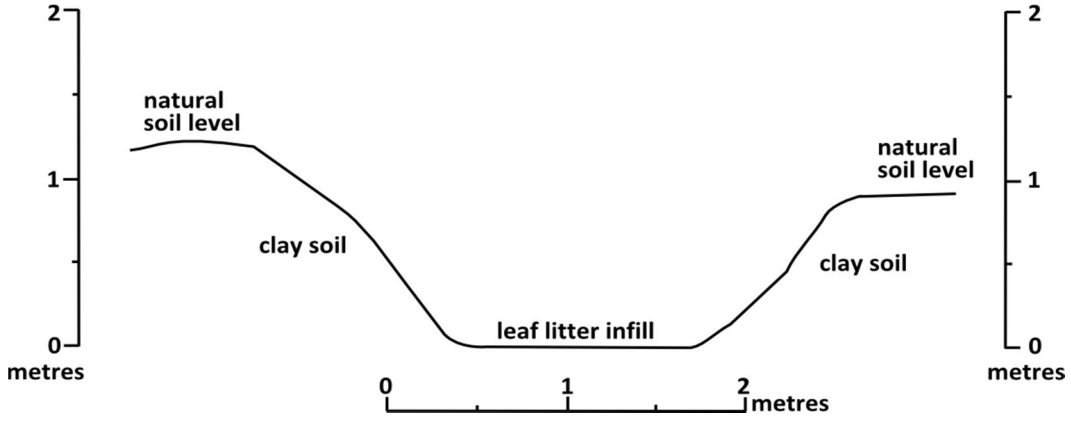



**Figure 72. Ditch A section 2.**

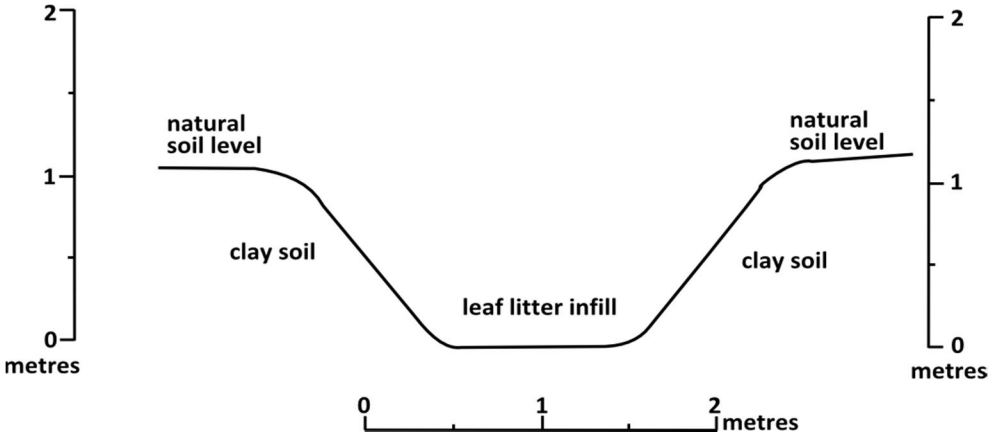
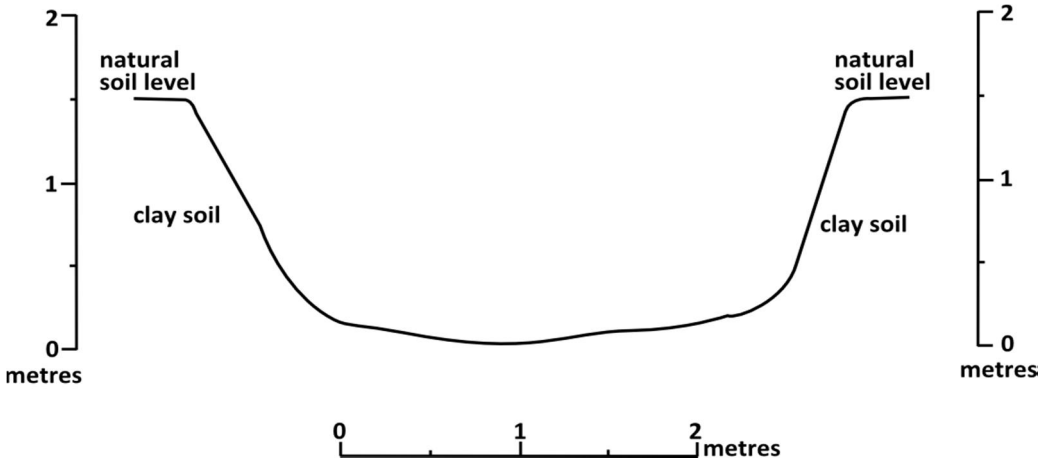



**Figure 73. Ditch A section 3.**



We had previously estimated that the weir shown in the 1871 estate plan would have needed to raise the water level in the river Black Devon by some 1.5 metres to enable the pond to be filled beyond the top of the pond overflow. We examined the bed and banks of the river Black Devon at and below ditch A for any evidence of a similar structure which might have raised the water level to that extent for ditches A and B. There was no structural evidence, but there is a bed of gravel at this point.

**Figure 74. Gravel bed downstream of ditch A.**

There is a distinct drop in the level of the river below the gravel bed. The river above the gravel bed flows at a level to a point next to the inlet sluice. Further investigation may reveal more evidence.

**Figure 75. River above the gravel bed at ditch A**

**Figure 76. Ditch B at the river's edge.**

Ditch B can be seen at the river's edge where it is crossed by two paths. It is possible that constant usage over time has eroded the profile of the ditch. As it moves away from the river, the ditch becomes much more clearly defined, being narrower and about one metre in depth. The line of the ditch can be traced towards the point where the inlet ditch enters the pond.

The section of this ditch is much broader and shallower than the inlet ditch, being over six metres wide and just less than a metre deep. The pitch of the sides of the ditch is extremely shallow.

**Figure 77. Ditch B at section 4.**

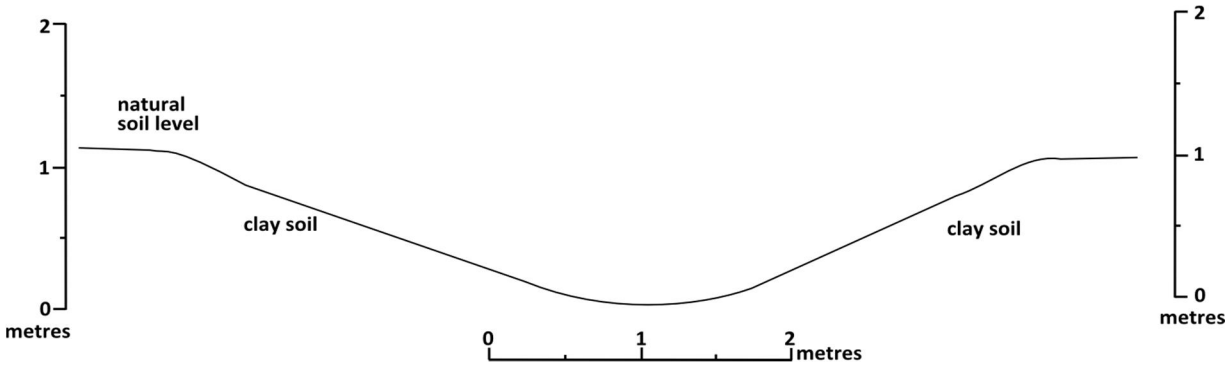
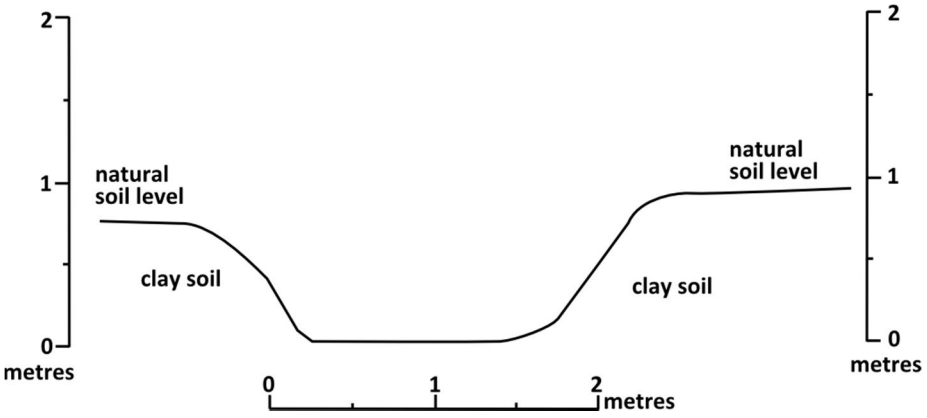



**Figure 78. Ditch B section 5.**




At the second section the ditch is roughly the same depth, but now slightly narrower.

.

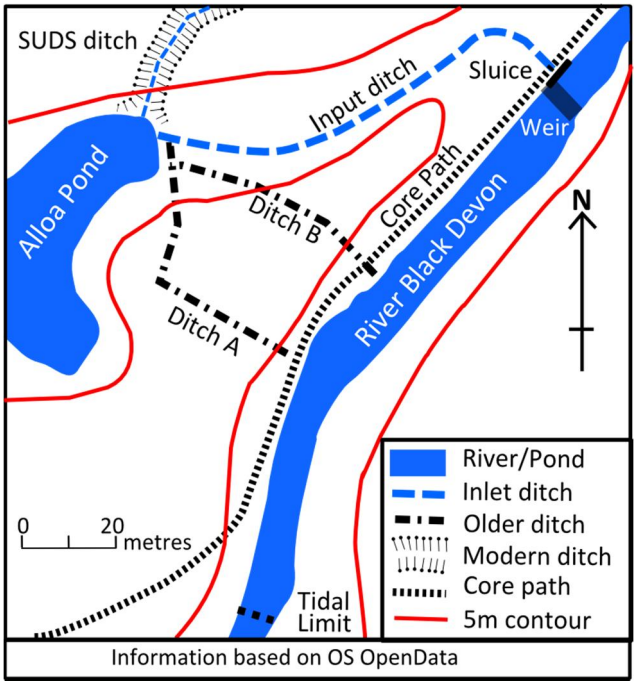
**Figure 79. Ditch B at section 5**

The present inlet ditch is deepest and most well defined. Ditch A is less deep, but still well defined. Ditch B, is least deep and least well defined. Ditches A and B have lost much of their definition close to the riverside path, but there is still enough definition left to indicate that they both started from the river bank. The differences between the ditches in terms of their depth and definition suggest that the three ditches are of different age, with the inlet ditch being the most recent and ditch B being the oldest.

The 1814 Estate plan **(32)** shows a pond with water in it and the 1863 OS map of the area shows that the pond had been abandoned. **(33)** The 1871 Estate plan shows the pond has been redeveloped. This confirms that there had been at least two stages of development of the pond.

We think that the three ditches were successive water inlets to the pond. The pond shown on the 1814 Estate plan is exactly the same size and shape as that shown on later maps. This suggests that it would have needed to have a similar head of water.

**Figure 80. All three ditches and the five metre contour.**




Returning to the physical nature of the site, we can see that the five metre contour shows up the present and previous courses of the river. The pond was constructed in the hollow left by the old course of the river.

There is an area of slightly higher ground between the present course of the river and the hollow occupied by the pond. The least well-defined ditch (B) takes the shortest route from the river to the pond.

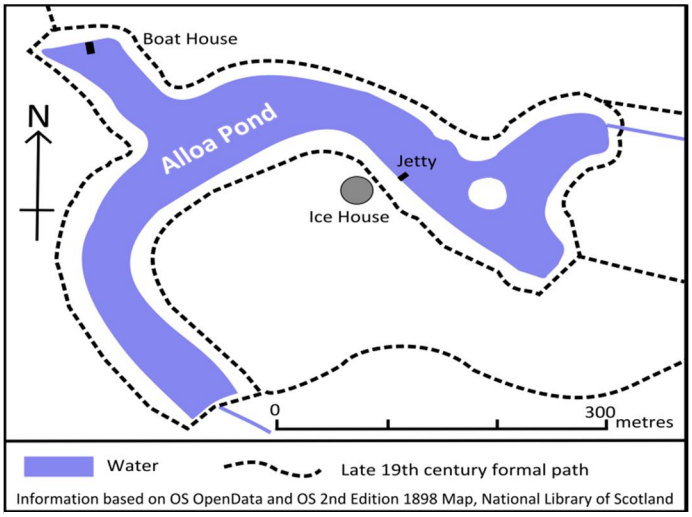
The second old ditch (A) takes a longer course, but has to cut across a larger part of the "island" of raised ground.

The most recent inlet ditch takes a much longer course, being nearly twice the length of ditch A. However, it runs through the hollow created by the former course of the Black Devon, avoiding the "island" of higher ground.

In addition, the site of the most recent inlet has been built into the substantial stonework of what we are reasonably sure was an old bridge. The 1871 estate plan shows a weir just downstream from the sluice. It is likely that the weir was built between the stonework on either bank, offering a narrower point of the river and stable sides for the construction of the weir. The present heights of the two lots of stonework are more than high enough to have accommodated a weir able to lift the water of the river by the 1.5 metres. We calculate that this would be needed to ensure a 10 centimetre flow of water over the overflow of the pond dam.

## 9.6 The Ice House:

**Figure 81. Location of ice house.**




The remains of the ice house are still clearly visible within the area enclosed by the horse-shoe shape of the pond. The area is part of the outwash plain of the river Black Devon and is almost flat. Smaller "islands" of higher ground extend some one to two metres above this flat area along the south eastern edge of the pond. The ice house is built into one of these areas of higher ground.

**Figure 82. Flat area next to pond and small islands of higher ground.**

**Figure 83. Alloa Ice House, c. 1898**

Courtesy of the Erskine family, we have a photograph of the ice house as it was at the close of the nineteenth century. (34) Close examination of the photograph shows a wooden doorway leading through an earthen bank. The roof is thatched. There has been some damage to the thatch and removal of soil from the earthen bank around the doorway. A sheet, possibly of metal, has been inserted below the damaged thatch to the left of the doorway. The pond is well filled and there are two small jetties in front of the ice house. The family continued to live in Alloa House until the 1950s and the pond was occasionally used, although it was known that it was difficult to maintain the water level. (35)

**Figure 84. First visit to the icehouse in 2014.**

Volunteers first visited the ice house in the winter of 2014, when ground vegetation was extremely low and was easy to see the outline of the earthen bank. This photograph was taken from in front of the entrance, looking towards the centre of the internal depression. There were several mature trees growing around and within the earthen bank.

A group of volunteers undertook a survey of the site in the spring of 2017. The remains of the earthen bank were clearly seen, with a well-marked bowl in the centre. The entrance doorway was also clearly visible.

There were several mature sycamore trees growing around and within the earthen bank on the east and south sides. The two largest trees appeared to have displaced part of the earthen bank.

Several smaller trees within the ice house had been cut and their stumps treated.

**Figure 85. First survey of the icehouse in 2017.**

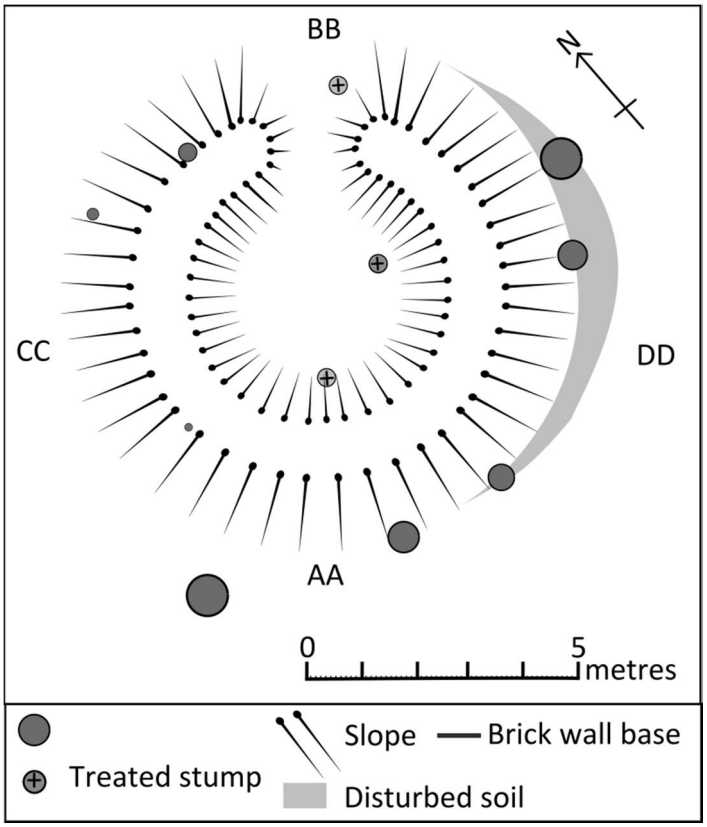
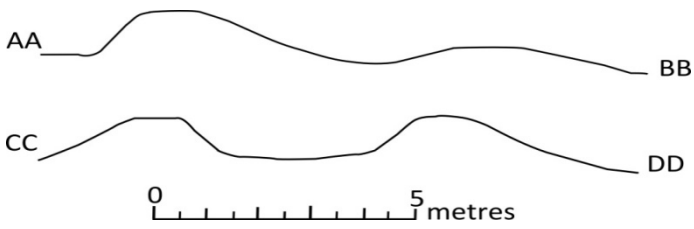



**Figure 86. Cross sections in spring, 2017.**




The cross sections revealed that there was a bowl of some four metres diameter in the centre of the earthen bank and a slight lip at the entrance.

**Figure 87. Start of excavation, summer 2017.**

A small team of volunteers, supervised by Susan Mills, began the excavation of two linked sections within the ice house in July, 2017. One section started at the entrance and a second ran at right angles towards the north east side of the earthen bank.

The trench from the top of the bank revealed a thin layer of top soil over a thick layer of extremely homogenous alluvium. This was a fine, dark brown, clay-rich silty material, almost completely devoid of stones. Only a few, very small, rounded sandstone pebbles were found.

**Figure 88. Side trench opened up.**

**Figure 89. Bricks uncovered in entrance space.**

The first line of brickwork was uncovered in the lower area of the entrance. These appeared to be part of two small walls. There were also a number of random individual bricks. The bricks were of red, fired clay and were roughly nine inches long by four inches wide by three inches high (23 x 10 x 8 cms).

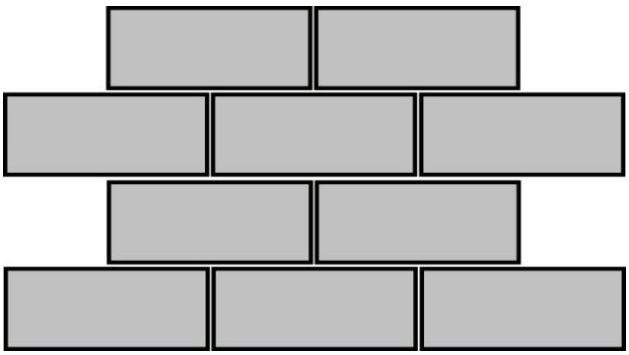
**Figure 90. Bricks uncovered in side trench.**

Further excavation in the side trench revealed the top of a brick wall. Again, the bricks were of red fired clay and were mortared together with a sand and lime mortar of roughly three quarters of an inch in thickness (2 cms). The line of the wall showed a marked curve, suggesting that it was part of a circular structure.

As excavation proceeded, a large number of random bricks were uncovered, suggesting that the wall had been higher at one point and had collapsed or been pushed inwards. As each layer of bricks was exposed it was photographed to pin point the location of individual bricks, before they were removed to allow excavation to continue.

**Figure 91. Ice house wall revealed in side trench.**

**Figure 92. Stretcher bond brick pattern.**



The bricks had been laid in a stretcher bond pattern. Striations on the long sides of the bricks indicated that they had been formed by extrusion through a rectangular four inches by three inches former and then wire cut into nine inch lengths (23 x 10 x 8 cms).

**Figure 93. Ice house wall fully excavated.**

When the wall was fully excavated it was found to be a single brick thick, sitting on a base layer of bricks laid at right angles to the line of the wall. The wall was eight courses high on the entrance end and seven courses high on the other end. The trench exposed a very large number of individual bricks and pieces of lime and sand mortar.

The Curvature of the wall was recorded by photographing the top with a half metre measure. The photograph was then transferred in the graphics package Inkscape and a circle scaled to fit the arc of the brickwork. The 50 cm scale was then added. This indicated that the ice house was 4.44 metres in diameter.

**Figure 94. Ice house wall showing curvature.**

**Figure 95. Ice house wall with foundation exposed.**

No trace of any flooring material was found and a small excavation was continued below the level of the base course of bricks. This confirmed the absence of a floor layer and showed that the base bricks were sitting directly on the sub-soil.

**Figure 96. Ice house wall with stepped foundation.**

This photograph shows the base layer of bricks stepping down from right to left. There was a gap at the junction, filled with a slump of white sandstone. The existence of a layer of mortar on the first wall brick to the left of the gap suggests that there may well have been an additional brick or bricks here.

When the trench was excavated to the level of the base of the wall, sections of brickwork were uncovered. It would appear that the first sections to fall, having landed on the earthen floor, remained partially intact. Later sections had broken up into individual bricks. There was a distinct profile of bricks reducing from the wall inwards, with a large number of bricks next to the wall and much fewer bricks towards the centre.

**Figure 97. Fallen brickwork revealed in side trench.**

**Figure 98. Two trenches being excavated.**

The two trenches were excavated at the same time, which made for a cramped site. Spoil was removed to a protected heap outside of the ice house site and bricks from each trench were counted and kept separate.

**Figure 99. Remains of doorway exposed.**

Excavation at the doorway revealed the remains of two entrance walls, with a large number of bricks in the space between. The bricks were packed very tightly and bound firmly together by the alluvium fill, making their clearance very labour intensive.

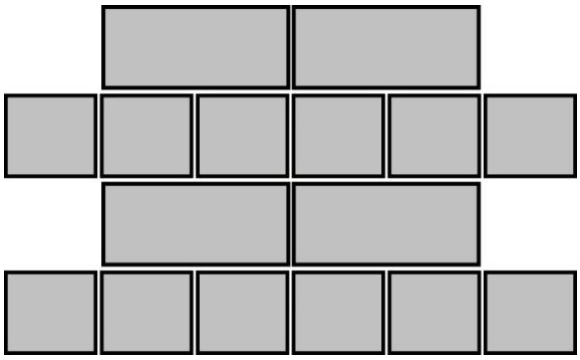
As the excavation progressed, it was clear that there were two entrance walls, infilled with a jumble of fallen bricks. The orientation of the walls indicated that they had been pushed out of alignment by movements of the earthen bank.

**Figure 100. Entrance in ice house wall exposed.**

**Figure 101. Entrance excavated to base.**

The two walls had been pushed inwards and the right hand wall had broken away from the main ice house wall. Unlike the main wall, the entrance walls were of double brick construction, with no different base course. They were essential laid directly on to the subsoil.

**Figure 102. English bond brickwork.**

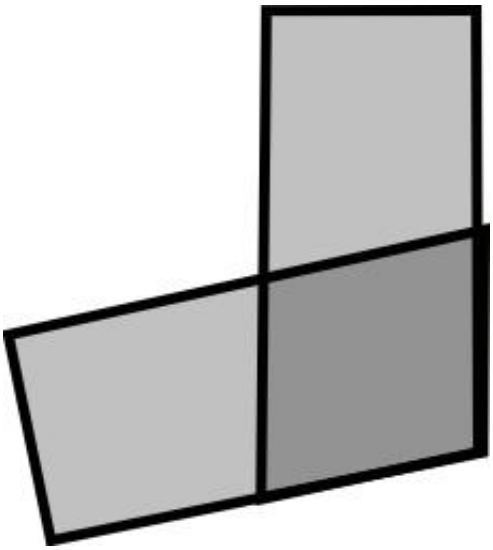


The double brick walls were laid in an English Bond pattern. The bricks were again roughly nine inches by four inches by three inches (23 x 10 x 8 cms).

A number of odd shaped bricks were found during the excavation of the entrance. These had been cut off at the corner at an angle of 10 degrees. These bricks were found to be used to create the corners where the entrance walls joined the main circular ice house wall.

**Figure 103. Cut brick at entrance.**

**Figure 104. Cut brick reversed.**



This ingenious design means that after each corner brick is laid, the next brick can be turned over and rotated so that the cut side can either lie parallel with the entrance wall or the main ice house wall. These bricks were in all other ways identical to the bricks used to construct the main ice house and entrance walls.

As these bricks had been cut prior to being fired, it is likely that the bricks were specially ordered for the construction of this particular ice house.

**Figure 105. Entrance and sections of wall exposed.**

Once the entrance had been fully exposed, it was measured in detail and photographed from all angles. The measurements and photographs were used to create a reconstruction of what the remains of the entrance to the ice house would have looked like, prior to their collapse.

**Figure 106. Top course of entrance bricks.**

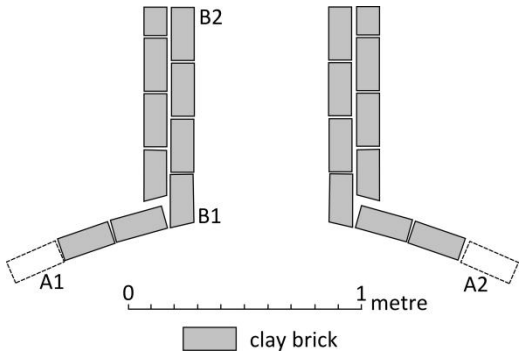



**Figure 107. Entrance from inside.**

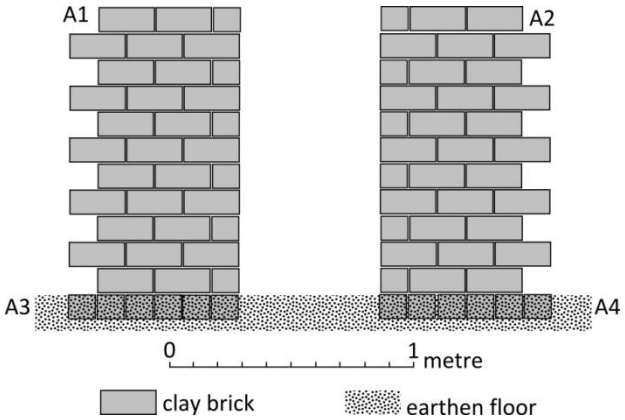



**Figure 108. Entrance from side.**

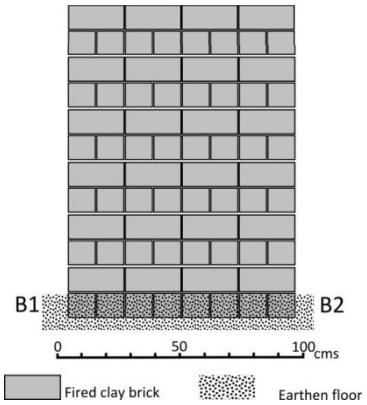


**Figure 109. Large areas of fallen brickwork.**

In the central part of the excavation a number of extensive slabs of brickwork were uncovered. These were carefully photographed before being removed to allow excavation to continue. As in the side trench, there was a clear profile, with the layers of bricks being thickest at the edges and becoming shallower towards the centre of the structure.

Particular attention was made to keep the bricks associated with each trench separate and accurately counted. The large number of bricks being unearthed suggested that the structure may have been domed shape. When the excavation is finally completed it is hoped that the number of bricks will help to answer this question.

**Figure 110. Entrance brick store.**

in

During the excavation a large number of small finds were unearthed. These were principally small nails and metal pins and small pieces of wood. Each find was bagged and labelled.

**Figure 111. Many small finds bagged.**

**Figure 112. Every excavated layer photographed.**

The work was photographed at every stage, giving a picture of the emerging jumble of bricks and brickwork and the details of walls, courses and corners.

In addition, the site was regularly surveyed using a dumpy level to pinpoint the location of the major features and finds.

The photographs and survey results enabled us to add the details of the main ice house brickwork to the original survey. It also enabled the doorway to be added to the circular brickwork, pinpointing the location and size of the entrance.

**Figure 113. Site regularly surveyed.**

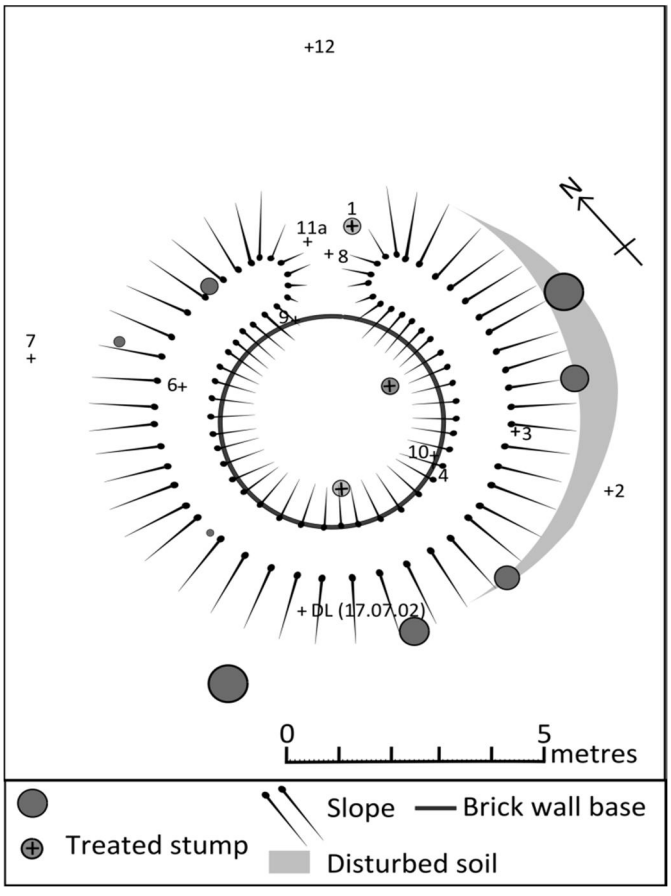



**Figure 114. Top course of entrance.**

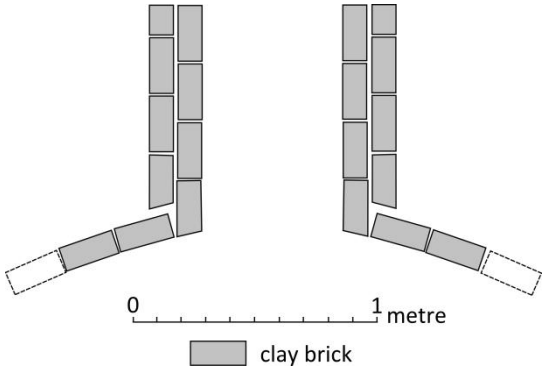


**Figure 115. 19th century photograph of ice house.**

**Figure 116. Reconstructed doorway.**

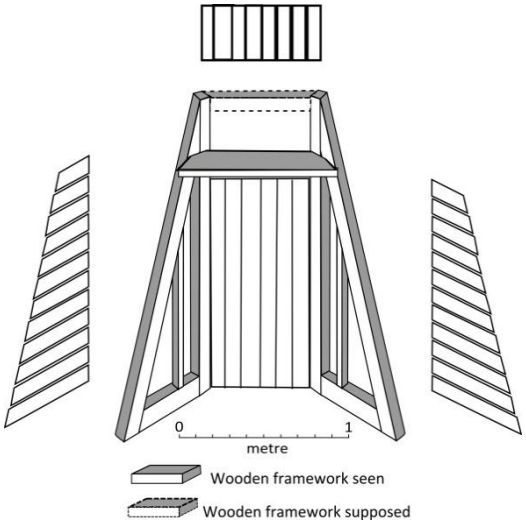
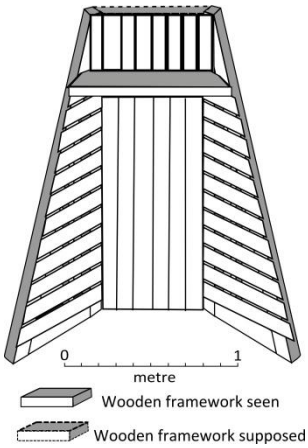
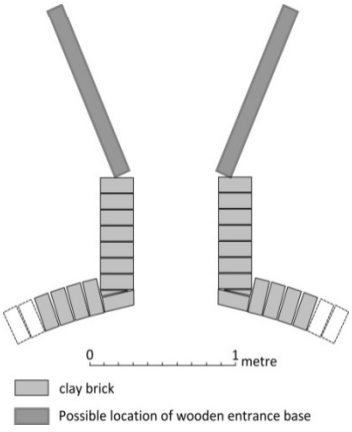



**Figure 117. View of doorway.**




Using details from an enlarged copy the 19th century photograph (bearing in mind the loss of earth around the doorway), together with the site photographs and survey results from the excavation, it was possible to reconstruct what the individual features of the structure of the ice house entrance and walls would have looked like.

**Figure 118. Reconstructed entranceway.**



All of these details were put together to give an elevation and plan of the ice house.

Finally, the plan could be added to the original survey to show the relationship of the original ice house to the present remains.

**Figure 119. Reconstructed elevation and plan.**

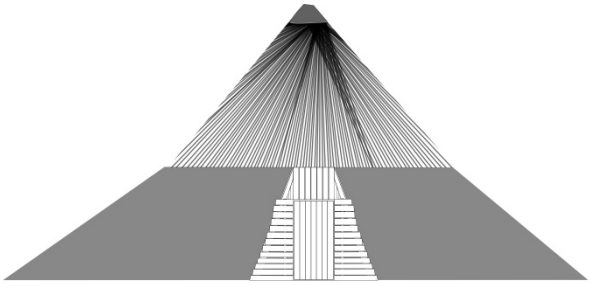
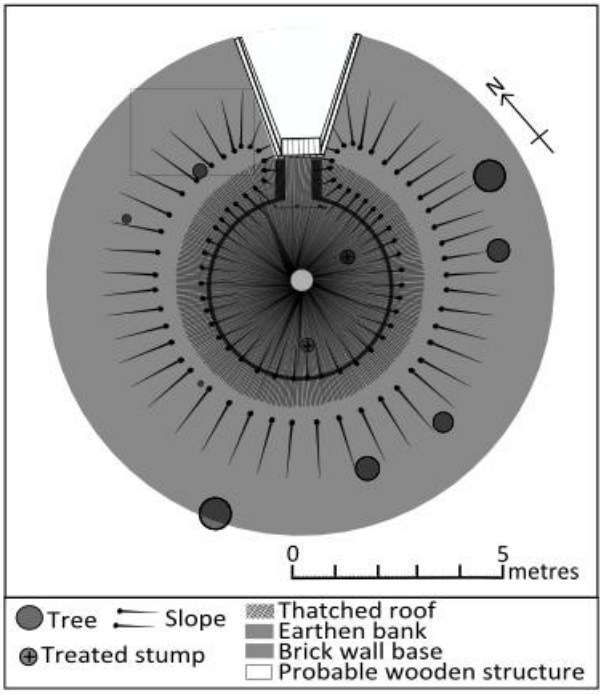
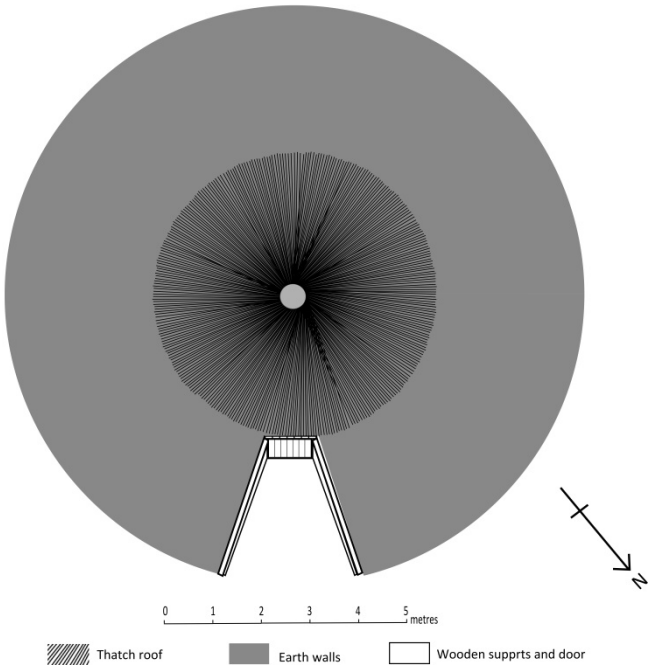


**Figure 120. Reconstructed site plan.**




At the time of publishing this report, the ice house excavation is still continuing. Upon completion of the excavation, a detailed technical report will be published.

## 10 The Pond:

We have been impressed by the almost complete lack of dumped litter in the pond and the surrounding area. The pond has not had a regular source of water for some time. As a result, the North West arm of the pond has silted up and is no longer shown on the OS OpenData map as a body of water.

**Figure 121. North West arm of the pond silting up.**

Now, with rain water being diverted from the new housing area to the North, the level of the water in the pond regularly increases, often flowing forcefully out of the drain at the dam and even out of the inlet ditch into the river Black Devon. At its highest level, the north east arm of the pond floods and the island is again surrounded by water.

**Figure 122. Pond flooded by water from new housing and island surrounded.**

During the three years we have been visiting the site, the level of water in the pond has varied considerably. It has never gone down below the centre of the outlet drain, nor has it managed to run over the top of the overflow, as the lower level of the open inlet ditch ensures that it cannot rise this far.

**Figure 123. Low rain water**

**Figure 124. High rain water**

Heavy rain causes the pond to fill up and flood back into the new ditches and the inlet ditch.

Once the water drops below the base of the inlet ditch, the sluice valve in the dam continues to lower the level until it reaches the level of the centre of the valve.

**Figure 125. New North drainage ditch flooded**

**Figure 126. Inlet Ditch flooded.**

**Figure 127. New East drainage ditch flooded**

## 11 Path Network:

There is a network of old and new pathways in the area.

### 11.6 Modern Paths:

The Pond Wood is crossed by the Clackmannan Core path number 8. This is complemented by two informal paths coming from the new housing area to the north. These paths are well used by joggers, walkers and dog walkers.

**Figure 128. The path network.**

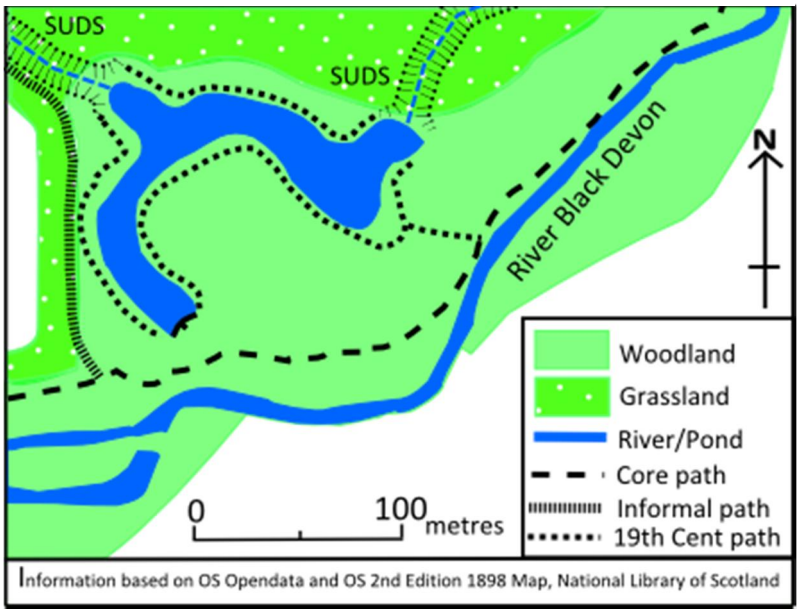



**Figure 129. Jogger.**

**Figure 130. Walker and dog.**

The paths are unsurfaced but the clay-rich soil offers a firm walking surface in all but the wettest conditions. There is evidence that cyclists are using the path networks, causing minor wet spots.

**Figure 131. Repairs.**

It has been great to see that local residents have been undertaking simple maintenance and repair work.

### 11.2 19th Century Paths:

There was an extensive system of paths around the pond in the late 19th century. These went round the pond and connected it to Alloa House and the river Black Devon path. Much of the pathway round the pond is still clearly visible.

**Figure 132. Section of the 19th century path.**

**Figure 133. Path bridged over inlet**

The pathway has been bridged over the inlet ditch at some point in the past. Sadly, two large sections of the path have been removed in the construction of the modern drainage ditches.

**Figure 134. Path lost to north ditch.**

The modern drainage is a mixed blessing. It keeps the pond topped up and, with a little help, will help to prevent plants choking it.

**Figure 135. Path lost to east drainage ditch.**

However, the water is not treated, raising concerns about pollution and the pond silting up. In addition, the new ditches have severed the 19th century formal paths.

Perhaps it would be possible to restore the line of the path using large pipes and backfilling, as was done in the past to retain the pathway over the inlet ditch.

## 12. Riverbank Walling:

Both banks of the river Black Devon have been protected by walling for a considerable period of time. Most of the walling is composed of rough sandstone blocks. Some of the stone walling is in very poor condition and in some places has been lost entirely.

**Figure 136. Walling on the east bank of the Black**

**Figure 137. Extensive walling on the west bank.**

Some of the walling on the west bank (the pond side) has been extensive at one time.

The walling here appears to have been built at two different times. There is a layer of very coarse stones at the base and more shaped stones above. All the material is sandstone.

A small section of the east bank has been protected with a roughly cast concrete wall. This wall repair appears to be associated with the numerous field drains which are used to keep the fields on the east bank which are close to the upper tidal limit free of water.

**Figure 138. Concrete wall, field drain and mink.**

**13. Bridge Site:**

Comparing all of the historical and modern map sources relating to the vista and bridge shown on a plan of the Alloa Estate drawn in 1710, the bridge was located at NS8990192100. This coincides with the location of the inlet ditch for the pond. There is a substantial stonework construction on the east bank at this point. The base layers are of coarse material but the upper, major part of the construction is built of well-cut blocks.

**Figure 139. Possible remains of an early 18th century or earlier bridge.**

**Figure 140. West bank end.**

On the west side of the river there is a matching area of stonework. It is built of roughly squared sandstone blocks and has a clearly formed straight end on the downstream end. The input sluice is built into this structure. It is likely that these two structures relate to the vista and bridge shown in the 1710 plan of the Alloa Estate. **(36)**

**Figure 141. Inlet sluice built into older structure.**

## 14. Pond Wood:

Pond Wood has been shown on maps since the mid-17th century. It was probably part of the original ancient forest associated with Clackmannan Tower and Alloa Tower. The trees have suffered losses over time, but the ground cover is rich in plants associated with areas of ancient forest.

In early spring the wood is carpeted with wood anemones, providing a dazzling display of white flowers on top of delicate green foliage. Within a few weeks the anemones are overtaken by native bluebells, drowned under a sea of blue and green. Pond Wood is a definite must for bluebell lovers.

**Figure 142. Wood Anemones.**

**Figure 143. Carpets of native bluebells.**

**Figure 144. Celandine.**

These are followed by celandines and wild garlic. There are also many other plants which are associated with areas of ancient woodland.

**Figure 145. Wild Garlic.**

The trees in the wood are a mixture of ages, from very mature trees to seedlings. A large percentage is covered in self-seeded young trees.

**Figure 146. Mature and self-seeded trees.**

A considerable number of older stumps are successfully coppicing. There are several areas of new plantings.

**Figure 147. Older stump coppicing.**

**Figure 148. Area of new planting.**

All of these trees; mature, coppicing, self-seeded and new plantings, would benefit from active management.

## 15. Conclusion:

Our observation of the Pond Wood over a period of nearly four years is testimony to the dedication of the project volunteers and the members of the Alloa Park Residents' Association. Our observations enabled us to see considerable changes in water level and helped us to understand the workings of the pond inlet and drainage systems.

We have seen that the area is well used by local people at all times of the year. The existence of the Council's Core path network, together with informal access from new housing, has made entrance to the Pond Wood easy. We have regularly encountered walkers, dog walkers, joggers and cyclists. In fact, I do not think that we ever visited the area without seeing some members of the public there. The flower cover during the late spring is spectacular and changes dramatically over a period of four to six weeks. It certainly should be more widely known as a wood anemone and bluebell wood.

The wood has a long, well documented history as an area of woodland and there are still significant historical remains, dating from at least the late 17th century. The area has the potential to make a significant contribution to the environmental and recreational value of Clackmannanshire. The historic remains provide a connection back to the major improvements to the Alloa Estate in the 18th century and the later improvements in the 19th century. Both the ecological and historical environments have been neglected in the recent past and would benefit from active management and interpretation.

We are extremely supportive of the efforts of the Alloa Park Resident's Association in taking forward active management of the area. We would wish to see the remains of the former inlet ditches, the 19th century formal paths, the outlet sluices of the dam and the remains of the 17th century bridge added to their list of significant historic sites. We would also see value in examining the possibility of restoring the "round-the-pond" route of the formal paths which has been severed by the modern drainage ditches. Having observed the action of the modern drainage ditches, we feel that there would be merit in monitoring the impact of pollution and rapidly changing water levels on the pond. We would also recommend that attention is paid to the impact of regular flooding of the former inlet ditch and stone input sluice. We have noted an increase in cracking in the stonework of the sluice over the past two years. There are a number of trees growing in the stonework of historical remains and within the pond and we would recommend their removal.

We would see considerable benefit in gaining a better understanding of the public's use of the area and developing and making available interpretive material relating to the wealth of botanical and historical material so clearly observable within the wood. Lastly, we consider that Alloa Pond and its ice house are of sufficient architectural and historic merit to justify being listed.

**R**eferences:


1 Lens, B,, Plan of Alloa, Engraved by L. Sturt after an original drawing by Bernard Lens c. 1710, RHP13258/1, Edinburgh, National Records of Scotland.
2 Stobie, J, A Map of Perth and Clackmannan, 1783, London, National Library of Scotland.
3. Bald, R. and Horn, J., Plan of the Park and Pleasure Ground of Alloa, 1814, Canmore, cl 2/1.
4 OS Opendata Viewer, https://www.ordnancesurvey.co.uk/opendata/viewer/. 2017.
5 Carvel, J., 1944, 100 Years in Coal, T and A Constable, Edinburgh, page 11.
6 Adair, J., Frith of Forth, circa 1680, Edinburgh, National Library of Scotland.
7 Canmore Record, Canmore ID 74672, https://canmore.org.uk/site/74672/alloa-house.
8 Brodie, W., New Statistical Account, Volume 8, Alloa, Church of Scotland, Edinburgh, 1834-45, page 17.
9 Hutton, W., 1706, Letter to the 6th Earl of Mar, GD124/15/440.Edinburgh, ational Records of Scotland,
10 Adair, J., Post 1701, Map of the Frith of Forth, London, National Library..
11 Lens, B,, 1710, Plan of Alloa, Engraved by L. Sturt after an original drawing by Bernard Lens, RHP13258/1, Edinburgh, National Records of Scotland.
12 Erskine, John, 6th Ear of Mar, 1711, Draft terms of an agreement whereby John, Earl of Mar, ratifies to Col William Dalrymple of Glenmuir and Alexander Inglis of Murdistone, etc.binds himself to pay them a rent for the east end of a bridge over the water of Dovan [Devon]. GD124/17/259, Edinburgh, National Records of Scotland.
13 Erskine, John, 6th Earl of Mar, 1712, Letter to his brother Lord Grange re possible purchase of the Clackmannan estate, GD124/15/1024/11, Edinburgh, National Records of Scotland.
14 Hutton, W., 1724, Letter to James Erskine of Grange, GD124/17/534, Edinburgh, National Records of Scotland.
15 The Peerage, 2017, London, http://www.thepeerage.com/p2590.htm.
16 Roy, W., 1747-1755, London, Military Survey of Scotland, Highlands Sheet, http://maps.nls.uk/geo/explore/#zoom=14&lat=56.1177&lon=-3.7910&layers=3&b=1, National Library, 2017.
17 Stobie, J, A Map of Perth and Clackmannan, 1783, Edinburgh, National Library of Scotland.
18 Unknown, 1830, Sketch of water courses adjoining the distillery erecting by Mr Haig, RHP13276, Edinburgh, National Records of Scotland.
19 Allan, D c 1780 -1790, John Francis, 7th Earl of Mar, and Family, Alloa Tower, The National Trust for Scotland.
20 Canmore Record, Canmore ID 74672, Edinburgh
21 Bald, R. and Horn, J., Plan of the Park and Pleasure Ground of Alloa, 1814, Canmore, cl 2/1.

22 OS First Edition, 1863, 25 Inch Map, Perth and Clackmannan Clackmannanshire Sheet CXXXIX.8 (Combined), Edinburgh, Nation al Library of Scotland.
23 Canmore Record, Canmore ID 74672,, Edinburgh.
24 Sutter, A., 1871, Coloured, and Annotated, Plan of Alloa Park, the property of the RT Hon Earl of Kellie, courtesy of Erskine, J, Earl of Mar and Kellie, 2017.
25 OS Second Edition, 1898, 25 Inch Map, Clackmannanshire, Sheet 139.08, Edinburgh, National Library of Scotland.
26 OS Second Edition, 1898, 25 Inch Map, Clackmannanshire, Sheet 139.08, Edinburgh, National Library of Scotland.
27 OS Second Edition, 1922, Revision, 25 Inch Map, Clackmannanshire Sheet 139.08, Edinburgh, National Library of Scotland.
28 Sutter, A., 1871, Coloured, and Annotated, Plan of Alloa Park, the property of the RT Hon Earl of Kellie, courtesy of Erskine, J, Earl of Mar and Kellie, 2017.
29 OS Second Edition, 1898, 25 Inch Map, Clackmannanshire, Sheet 139.08, Edinburgh, National Library of Scotland.
30 Robert Dingwall, 2017.
31 Erskine, J, Earl of Mar and Kellie, 2017.
32 Bald, R. and Horn, J., Plan of the Park and Pleasure Ground of Alloa, 1814, Canmore, cl 2/1.
33 OS First Edition, 1863, 25 Inch Map, Perth and Clackmannan Clackmannanshire Sheet CXXXIX.8 (Combined), Edinburgh, Nation al Library of Scotland.
34 Erskine, W. Earl of Mar and Kellie, Alloa courtesy of Erskine, J, Earl of Mar and Kellie, 2017.
35 Erskine, J, Earl of Mar and Kellie, 2015.
36 Lens, B,, Plan of Alloa, Engraved by L. Sturt after an original drawing by Bernard Lens c. 1710, RHP13258/1, Edinburgh, National Records of Scotland.