

Brisbane Observatory
Brisbane Estate, Largs, North Ayrshire

Analytical Assessment and Historic Building Record: Data Structure Report

for Brisbane Observatory Trust

February 2016



Addyman Archaeology

Archaeology Heritage Consultancy Architecture

Addyman Archaeology

St. Ninian's Manse, Quayside Street, Edinburgh , EH6 6EJ
admin@addyman-archaeology.co.uk
0131 555 4678

Brisbane Observatory

Brisbane Estate, Largs, North Ayrshire

Analytical Assessment and Historic Building Record : Data Structure Report

for Brisbane Observatory Trust

February 2016

Tom Addyman, Kenneth Macfadyen and Jenni Morrison



Sir Thomas Brisbane by John Watson Gordon, 1848 (© The Royal Society of Edinburgh)

Contents

| | | |
|-------------------|---|-----------|
| 1. | Introduction | 1 |
| i. | General | 1 |
| ii. | Historical summary and significance | 1 |
| | a. General | 1 |
| | b. Sir Thomas Brisbane | 1 |
| | c. Significance | 1 |
| iii. | The site | 2 |
| iv. | Brisbane Observatory Trust | 5 |
| v. | Scope of works in 2015 | 7 |
| | a. General | 7 |
| | b. Drawn survey | 7 |
| | c. Photographic survey | 8 |
| | d. Context record | 8 |
| | e. Written report | 8 |
| | f. Fieldwork | 8 |
| 2. | Description and assessment | 9 |
| i. | General | 9 |
| ii. | Exterior | 11 |
| | a. Covered channel | 11 |
| | b. South elevation | 12 |
| | c. East elevation | 14 |
| | d. North elevation | 16 |
| | e. West elevation | 17 |
| iii. | Interior | 17 |
| | a. General | 17 |
| | b. Ante-room | 19 |
| | c. Main chamber | 21 |
| iv. | Roof structure | 24 |
| v. | Equatorially mounted telescope chamber | 25 |
| vi. | Ex situ elements | 26 |
| | a. General materials | 26 |
| | b. Dedicatory plaques | 27 |
| 3. | Conclusion | 28 |
| i. | General | 28 |
| ii. | Recommendations | 28 |
| Appendix A | Project Documentation | 30 |
| i. | 'The Planned restoration of Brisbane Astronomical Observatory, near Largs, Scotland: a briefing note for Brisbane Trustees (Allen Simpson, February 2011) | 30 |
| Appendix B | Relevant extracts from Addyman Archaeology's February 2013 Assessment and Historic Building Record: Written Scheme of Investigation of Brisbane Observatory, Brisbane Estate, Largs, North Ayrshire, undertaken for the Brisbane Observatory Trust | 33 |
| Appendix C | Contexts register | 36 |
| Appendix D | Field drawings register | 38 |
| Appendix E | Photographic register | 39 |
| Appendix F | Photographic contact sheets | 44 |
| Appendix G | Discovery and Excavation Scotland | 50 |
| Appendix H | Survey drawing set | 52 |

List of Figures

- Figure 1 Site location
- Figure 2 Ordnance Survey 1:25,000, surveyed 1855 / publication 1857 (Ayr Sheet III.8 (Largs)) showing the principal built features within the Brisbane House policies
- Figure 3 Ordnance Survey 1:25,000, surveyed c.1895 / publication 1897 (Ayrshire 003.08)
- Figure 4 The observatory following clearance of enveloping ponticum; south side
- Figure 5 General dimensions of the observatory
- Figure 6 Plan and section of structural ironwork

List of Plates

- Plate 1 Aerial view of the observatory ruin in March 2014 following clearance
- Plate 2 View of the observatory interior looking north in August 2008, before clearance
- Plate 3 The same view in June 2012, following clearance
- Plate 4 Survey work in progress in 2015
- Plate 5 North wall, remains of lime harl (036) and limewash over
- Plate 6 Character of the general rubble construction – west exterior
- Plate 7 South frontage, detail of the character of the ashlar facings at the SE corner
- Plate 8 Left - perimeter covered channel as running southwards from the north-east corner (007)
- Plate 9 Right – channel interior, looking north
- Plate 10 South exterior, following clearance
- Plate 11 Left – side view of the apsidal bay projection, 046
- Plate 12 Left – side view Right - detail of the surviving jamb of window 021
- Plate 13 Sill of the 022 window, with setting for an instrument, possibly a dipeidoscope, 045
- Plate 14 The east elevation, general view
- Plate 15 Detail of blind window 28 showing traces of tromped glazing bars and framing, 030 chimney above
- Plate 16 North exterior, general view
- Plate 17 North wall, eastern window 014, showing masonry detailing
- Plate 18 North wall – central entrance 012
- Plate 19 Paired seatings cut upon the sill of the 010 window, 051
- Plate 20 Interior of the east wall
- Plate 21 Interior of the west wall
- Plate 22 Left - the northern sleeper wall 003 that had supported the 005 principal partition
- Plate 23 Right – details of individual stud sockets – the lower two had relate to an entrance, 006
- Plate 24 Details of the 011 recess, including 043 fixings and the 044 socket at base
- Plate 25 Left – the 013 recess, possibly contained shelving (or a fold-down bed?)
- Plate 26 Right – void of robbed fireplace, 016, with flue rising to 030 chimney above
- Plate 27 The interior of the observatory looking south
- Plate 28 Left – The 026 recess, looking west
- Plate 29 Right – the 018 curved recess, whose south side has been cut back to form an instrument housing, 019
- Plate 30 Base of the 019 recess showing lead-fast fixing point to rear
- Plate 31 The basal slab, tooling and instrument socket, etc.
- Plate 32 Raggle on chimney showing roof pitch
- Plate 33 Matching ragal on other side of chimney
- Plate 34 Fragments of slate at base of wall
- Plate 35 Detail of slate fragments
- Plate 36 Structural ironwork visible loose within the observatory ruin
- Plate 37 Structural ironwork detail
- Plate 38 Recycled flooring slabs from within the observatory
- Plate 39 Dedicatory plaque formerly above the entrance of Brisbane observatory now reset at the Three Sisters, Largs

Acknowledgements

The Brisbane Observatory Trust and Addyman Archaeology wish to gratefully acknowledge the generous support for this project by the Kelburn Wind Farm Community Fund Initiative.

This report contains historic maps, reproduced by permission of the Trustees of the National Library of Scotland (NLS) and the British Library. To view these maps online, see <http://www.nls.uk/>. Unless otherwise stated, all content is the copyright of Simpson & Brown *Architects* with Addyman Archaeology.

Addyman Archaeology would like to thank the Trustees of the Brisbane Observatory Trust for their support and enthusiasm for the project. We are particularly indebted to 'Dr Allen Simpson for his advice on historic scientific instruments and to Mrs Valerie Campbell, Brisbane West Mains Farm, for her valuable local insight.



View of the newly cleared observatory ruin in December 2012 looking north-west (Valerie Campbell)

Brisbane Observatory

Brisbane Estate, Largs, North Ayrshire

Analytical Assessment and Historic Building Record : Data Structure Report

1. *Introduction*

i. *General*

This report describes the detailed historic building record and analytical assessment of the early 19th century observatory built on the former Brisbane Estate, located some 3km north of the coastal town of Largs in North Ayrshire. The project was carried out by Addyman Archaeology for Brisbane Observatory Trust.

The now ruined observatory structure is located adjacent (200m to the NW of) to the site of the 17th century Brisbane House (demolished during military exercises in 1941) at the heart of the original estate.

ii. *Historical summary and significance*

a. *General*

This small but historically important and influential private observatory was established in 1808 by Thomas Brisbane (1774-1860), later General Sir Thomas Makdougall Brisbane, Bart., in the policies of his principal seat, Brisbane House by Largs; the observatory was completed in 1811

b. *Sir Thomas Brisbane*

Sir Thomas Brisbane was a highly successful career soldier in the Peninsula and Napoleonic wars and a central figure in Scottish scientific circles, serving for 25 years as President of the Royal Society of Edinburgh. He was an important patron of the town of Largs, building the pier and providing the first public school for poor children. He was appointed as Governor-General of New South Wales in 1821. There he built a second observatory in the grounds of Government House at Parramatta, Sydney, moving some of his astronomical instruments there from Scotland, and where he produced the first published star catalogue of the southern stars. It is for him the city of Brisbane was named. Very little remains of the Sydney observatory, which has already been the subject of careful archaeological investigation. On his return to Scotland he constructed one of the earliest purpose-built magnetic observatories at Makerston, near Kelso.

c. *Significance*

Brisbane is the oldest surviving astronomical observatory in Scotland and is of outstanding significance in relation to the history of science. It is also of some considerable architectural significance and has been attributed to the notable Scottish architect James Gillespie Graham.

The Observatory was designed and equipped to the exacting and highly individual requirements of the pioneering astronomer Major-General Sir Thomas Makdougall Brisbane, and it is of great importance because it was the first purpose-built observatory to measure star positions with unprecedented accuracy for use in navigation. It was at this observatory that Thomas Brisbane pioneered what became the classic layout and precision instruments for modern positional astronomy. The instruments, made to his designs by the pre-eminent instrument maker of his day, Edward Troughton, included the prototype of the mural circle. At Brisbane these instruments were a 4½-foot transit and 18"

altazimuth both of 1808, and a 2-foot mural circle of 1811. His new instruments and the layout of the building formed the basis for the next generation of positional observatories around the world. The fame of the mural cycle in particular led to the commissioning of larger circles which were central to the work of National Observatories such as Greenwich, The Cape of Good Hope, Edinburgh and Washington (Simpson, 2011, Appendix B).

iii. The site

Brisbane's original observatory at Brisbane House was thought to have been demolished and is recorded as such in Historic Scotland's records.

Remains of 1808 observatory built by Sir Thomas Brisbane close to Brisbane House (now demolished). The observatory was one of the first in Scotland and was the prototype for Australia's first permanent observatory also built by Sir Thomas Brisbane. Little remains of the observatory but 2 sets of Meridian Pillars linked to the observatory survive. One set lies to the S of the remains of the observatory (NS26SW 3.01) and the other is in Waterside Street, Largs (NS25NW 167). Information from Historic Scotland, October 2007

Although Brisbane House is long-demolished and the estate and many of its structures are now derelict, the observatory structure itself was found to be remarkably intact, though roofless and completely overgrown by rhododendron and trees. Brisbane Observatory is now listed on HES' database as site number NS26SW 3, and CANMORE ID 291070.



Plate 1 Aerial view of the observatory ruin in March 2014 following clearance (HES – CANMORE DP186220)

As sited the observatory had an open and unrestricted view of the skies above Noddsdale Water, and facing south along Brisbane Glen towards Largs, *figure 1*. This forms one of the finest coastal panoramas in Ayrshire, and Brisbane Glen itself is recognized as an area of outstanding designed landscape, and forms part of the Clyde Muirshiel Regional Park.

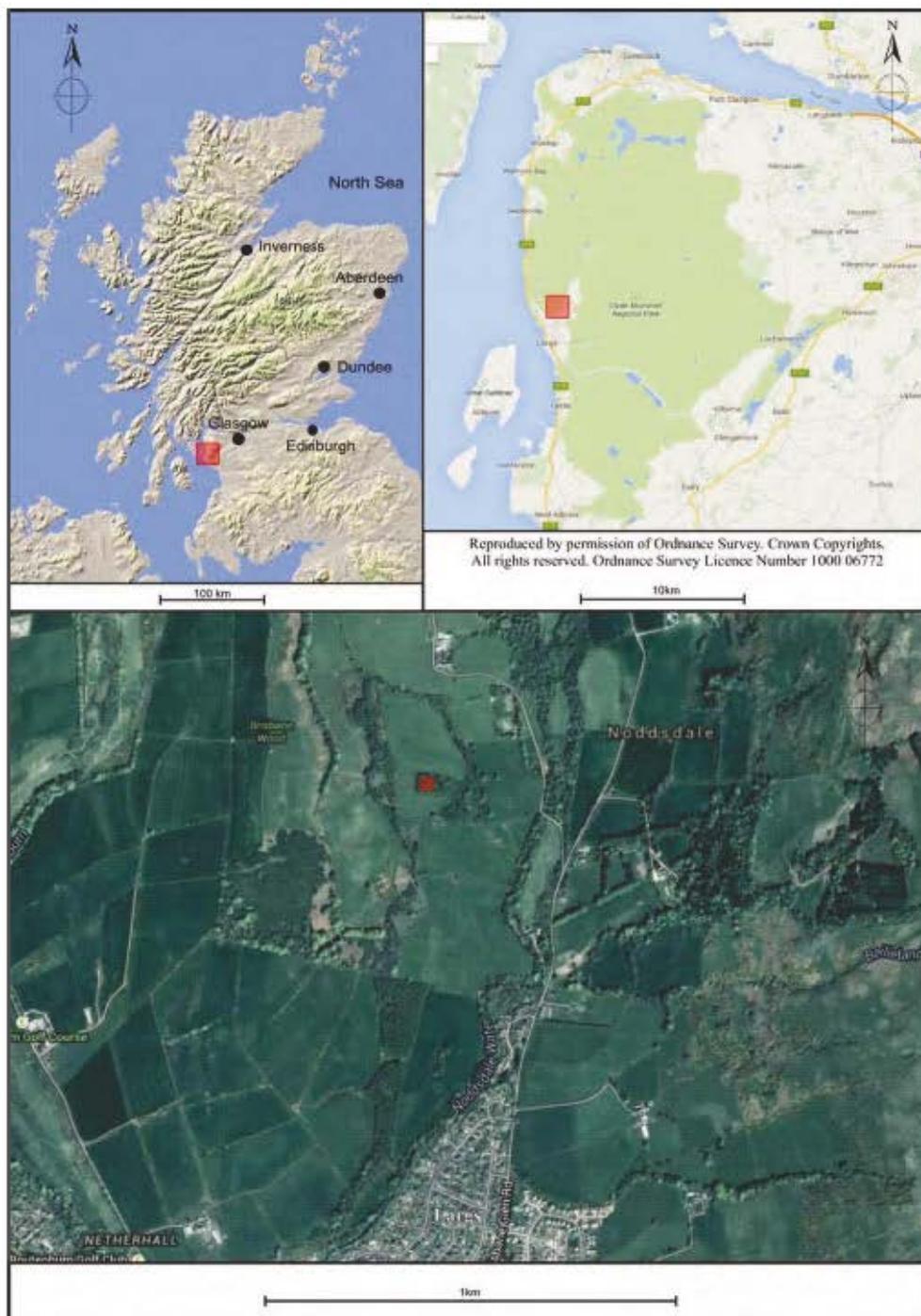


Figure 1 Site location

The observatory itself forms the centre of a group of stone structures, which were designed to form reference points due south and north of the individual instruments in the observatory to check their alignment. The main group of three meridian markers is about 3km due south of the observatory in Largs and is known as the 'Three Sisters' (originally the 'Three Graces'); these are extremely unusual survivors (Gavine, 2004, 168-170). An additional meridian pillar shown in front of Brisbane House on the large scale OS 1855 survey relates to the 'Little Observatory' which was possibly moved subsequently to another circular structure alongside the main observatory.

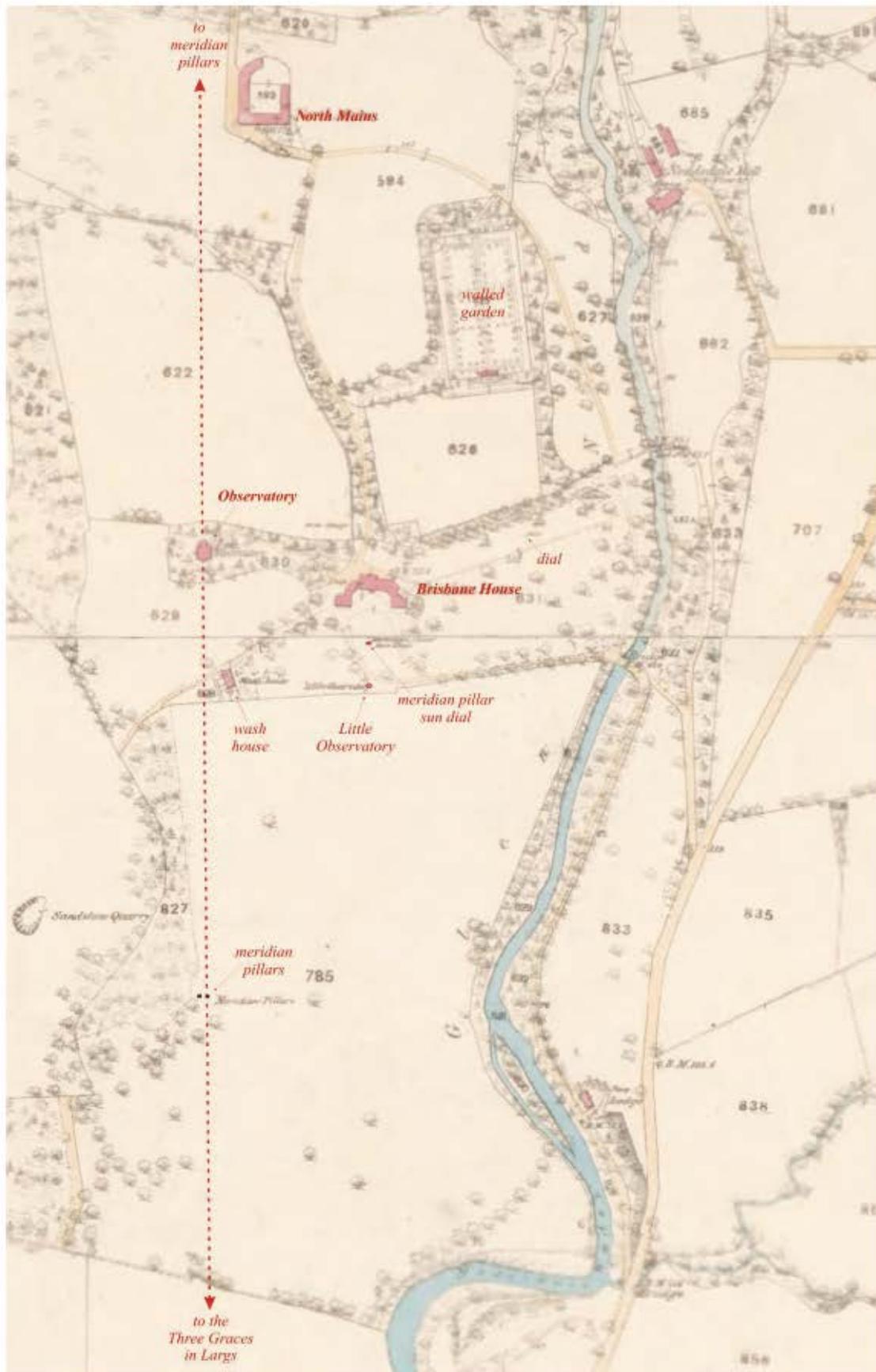


Figure 2 Ordnance Survey 1:25,000, surveyed 1855 / publication 1857 (Ayr Sheet III.8 (Largs)) showing the principal built features within the Brisbane House policies (NLS)



Figure 3 Ordnance Survey 1:25,000, surveyed c.1895 / publication 1897 (Ayrshire 003.08)

iv. Brisbane Observatory Trust

The Brisbane Observatory Trust was set up in 2011 as a charitable building conservation company, to rescue the 1810 observatory, at the site of Brisbane House, which was then considered to be in danger of rapid deterioration and collapse. The Astronomer Royal for Scotland, Professor John Brown, was an original trustee (now the Trust's Patron) with Dr Allen Simpson (formerly of the National Museum of Scotland) the Trust's founding chairman. The Brisbane Observatory Trust proposes to investigate, research and conserve this historically important building to ensure its safe survival. The Trust's architectural advisors are Simpson and Brown Architects, and James Simpson, consultant architect, is a trustee. The Trust's company secretary is Lindsays, Solicitors, Caledonian Exchange, 19A Canning Street, Edinburgh EH3 8HE. The Trust is a Scottish Charity, No. SC 042253, and is registered as a Company in Scotland, No. SC 392502.

The proposed project was planned in a series of stages to be undertaken as funding permitted. The initial Phase 1 was to complete ground clearance and site preparation. Start-up funds were provided by the Royal Scottish Society of Arts, of which Brisbane was once a prominent member. The Society is represented on the trustee board. Initial cutting down of *rhododendron ponticum* which had overwhelmed the ruin and also the removal of a number of large adjacent trees was undertaken by volunteers. A sizeable tree growing inside the building was carefully removed by Cylde Muirshiel Regional Park officials. The remaining growth around the observatory was cut down by community service offenders, under the Community Pay-Back scheme operated by the local authority in conjunction with the Scottish Criminal Justice Department in 2012-13. Final clearance on the north and west sides of the observatory was completed in June 2015. The Trust has an agreement with the landowner, Ian Campbell, formerly a trustee, for the lease of the site, and for the fencing of the perimeter.

An interim measured survey of the structure was completed in April 2012 by John Simpson, now of Morgan McDonnell Architects. Three-dimensional images from this were used to identify key questions about the structure (including the form of the missing roof) and inform subsequent discussions. The Trust agreed that a fully detailed recording of the building in its existing state would be commissioned from Addyman Archaeology. This survey was carried out in April to July 2015, and the present Report summarises the results. The proposal for this work was contained in Addyman Archaeology's 2013 *Written Scheme of Investigation*, of which relevant parts are attached as *Appendix B* to this Report. Funding for this survey was provided in a grant made in August 2014 by the Kelburn Windfarm Trust Community Fund. Although some financial aspects of this have yet to be completed, the survey draws Phase 1 to an end. The Trust is now seeking funds to undertake Phase 2, which will involve consolidation, archaeological investigation and conservation of the structure, together with further archival research into Thomas Brisbane's milieu, and in particular his role in contemporary precision measurement and astronomy.



Plate 2 View of the observatory interior looking north in August 2008, before clearance



Plate 3 The same view in June 2012, following clearance



Figure 4 The observatory following clearance of enveloping ponticum; south side

After this it was firstly proposed that the structure be properly recorded in its as-existing state - the present exercise. This stage was then to be followed by archaeological investigation; general clearance; assessment and recovery of historic building materials for re-use; consolidation of the structure; development of an architectural scheme for its rebuilding; its creative reuse; and its interpretation.

v. *Scope of works in 2015*

a. *General*

In January 2013 Addyman Archaeology produced a project design for archaeology at Brisbane Observatory - *Assessment and Historic Building Record: Written Scheme of Investigation*, produced for the Brisbane Observatory Trust – see *Appendix B*. This outlines the background of the project and reasoning behind the proposed recording and investigation works. Since then funding has been sought in order to progress the recording, research, archaeology and initial stages of consolidation of the structure.

The Trust successfully approached the Largs-based Kelburn Wind Farm Community Fund Initiative for a grant to undertake the analytic survey of the upstanding ruin of the observatory in its present state, which would effectively draw the first main phase of the project to a conclusion. As proposed in a project brief in April 2015 the record would consist of the following:

b. *Drawn survey*

The upstanding walls were hand-surveyed on site by experienced buildings archaeologists (Kenneth Macfadyen and Jenni Morrison), and completed to a high level of detail. The detail was stone-by-stone for dressings as far as presently visible, with all analytical and phasing-related details recorded. A degree of light vegetation and debris removal was necessary to permit access and to be able to view the built fabric. The field drawing set was digitised and annotated, *Appendix G*

c. Photographic survey

A comprehensive, fully catalogued digital photographic survey of the structure was carried out, *Appendix E and F*. Digitally rectified imagery was generated of the structure and included in the record drawing set.

d. Context record

A full context record of the building (a description on an element-by-element basis, fully catalogued, cross-referenced to the survey drawings) was carried out, *Appendix C*.

e. Written report

A narrative report was to include an account of the survey works and a detailed description of the structure - the present report. It was also to incorporate metrical data and drawings from the survey in appendices.

f. Fieldwork

Survey works were carried out on site between 20 and 22 April 2015 by Kenneth Macfadyen and Jenni Morrison. The ruin was generally free of new growth, with the exception of some new nettles, mostly internally, which was trampled down for access. Generally there was little necessity to cut back growth on wall surfaces. The weather varied from overcast to bright sunshine and was generally dry.



Plate 4 Survey work in progress in 2015

2. Description and assessment

i. General

Brisbane observatory occupies a slight prominence within the gently rising ground on the lower western side of Brisbane Glen. It has an open prospect to the south that extends down the floor of the glen to Largs, some 2km distant, and beyond. Its slightly elevated position also commands a broad prospect that extends to the east and north-east. The structure is a compact, neatly-constructed classical building whose siting ensured it was a prominent visual incident in the designed landscape of the Brisbane House policies.

The observatory is almost precisely square in plan at 28'0" by 28'2" (8.51m by 8.57m). The most striking feature of the plan is the near semi-circular bow that projects from the centre of its south elevation, this had supported the observatory's dome. Its walls rise from base of plinth course (the original ground surface) to wall head for 9'6" (2.90m).

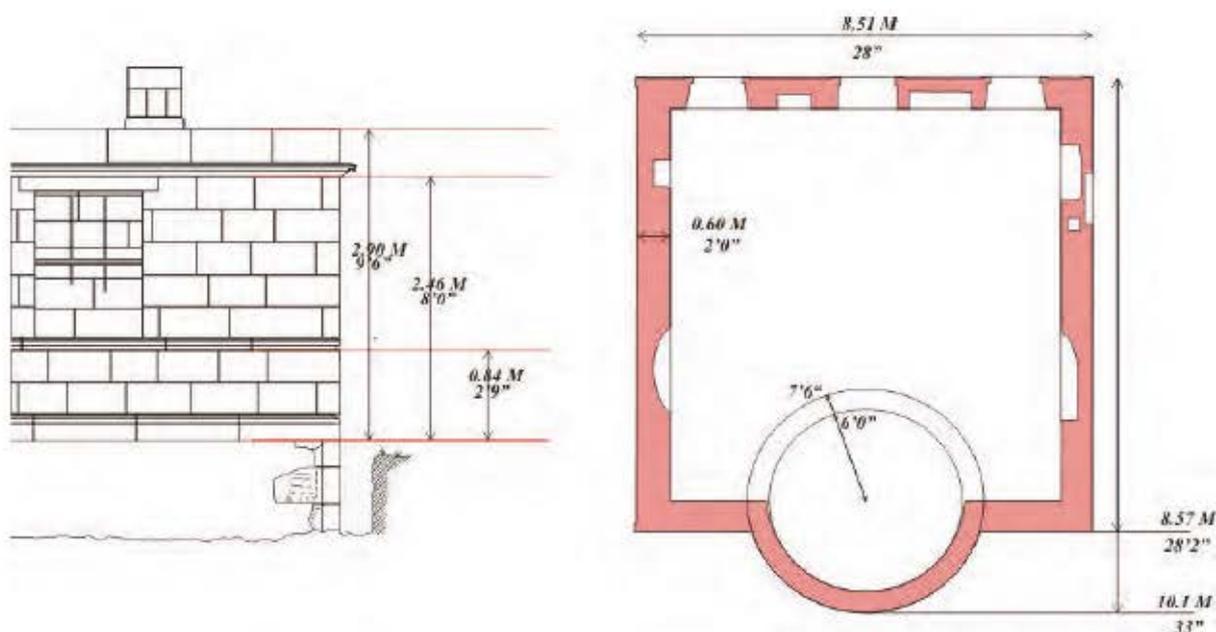


Figure 5 General dimensions of the observatory

The structure is rubble-built with the exception of the exterior east and south facing elevations which are ashlar-fronted. These were the elevations that were visible from the main house and the approach to the house from the south and south-east. The rubble masonry is of lime-bonded mixed field stone that includes cobbles of whin and other igneous rock, schist and some sandstone, 001. Externally the rubble was harled, of which some trace still remains, 036. The ashlarwork employed for dressings for openings, quoining and architectural enrichment, is finely cut, finely droved and tight-jointed, employing a hard, fine-grained pale grey sandstone, 034. It has been suggested that lime was supplied from a quarry source on the Isle of Cumbrae (Campbell, 2012, 7). The ashlar was laid to regular courses of 28cm-30cm in height and joints bedded in a fine high-lime mortar. Where the tails of quoins, etc. extend on to the harled, rubble-built elevations to north and west, these are horizontally broached beyond the raised margins.



Plate 5 North wall, remains of lime harl (036) and limewash over

The structure's walling rises from a plinth that is defined by a moulded plinth course, 033. Above two ashlar courses there is a moulded course at window sill level (south and east exterior), 032, and above a further five courses, a cornice, 031. Above the cornice is a plain wall head course, 052.



Plate 6 Character of the general rubble construction – west exterior

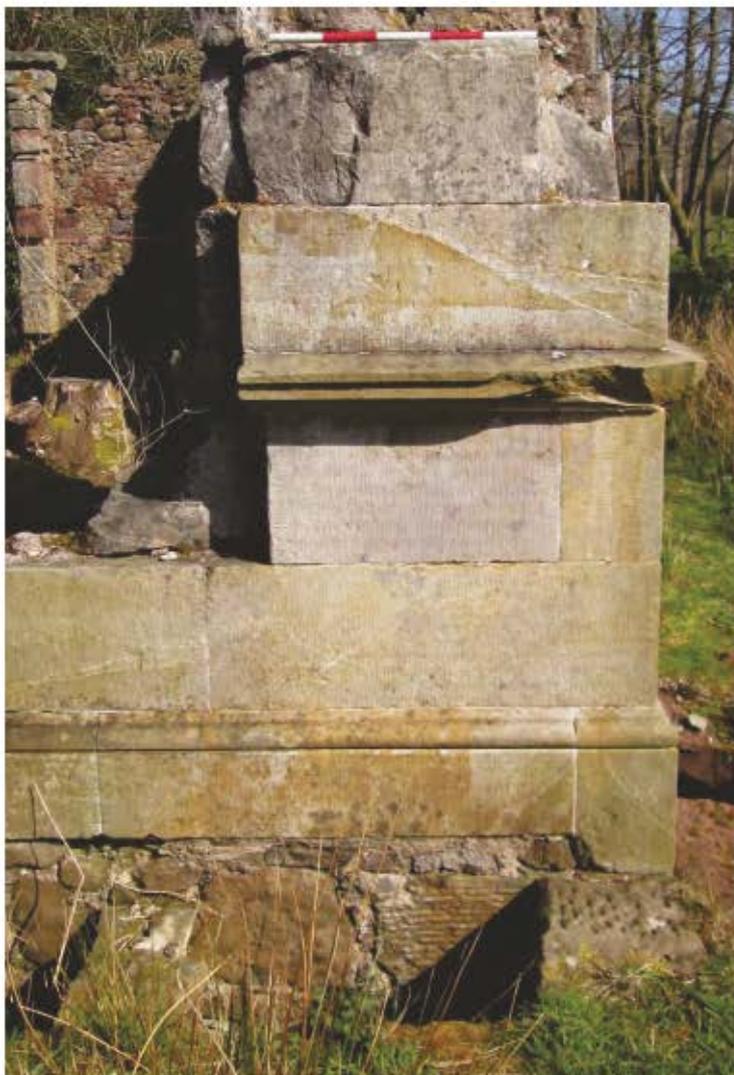


Plate 7 South frontage, detail of the character of the ashlar facings at the SE corner

ii. Exterior

a. Covered channel

At the perimeter wall foot there exists a substantially constructed rubble-walled drain-like feature, perhaps more properly termed a covered channel that seems likely to have run around all sides of the building, 007. It is now visible along the east side and where it returns along the eastern parts of the south and north walls, this accessible where capstones have fallen or have been removed. Though the base of the channel was not visible, being obscured by debris and vegetation build-up, the feature measured at least 0.8m in depth by approximately 0.40m in width where visible. The channel had been carefully coped-over with interlocking coarse-hewn slabs set at a slight inclination, sloping away from the wall-feet.



Plate 8 Left - perimeter covered channel as running southwards from the north-east corner (007)
Plate 9 Right – channel interior, looking north

The covered channel may have reached a bedrock foundation (though this is yet to be determined) and was intended to ensure the building closely retained its orientation and isolated it from surface vibration.

b. South elevation

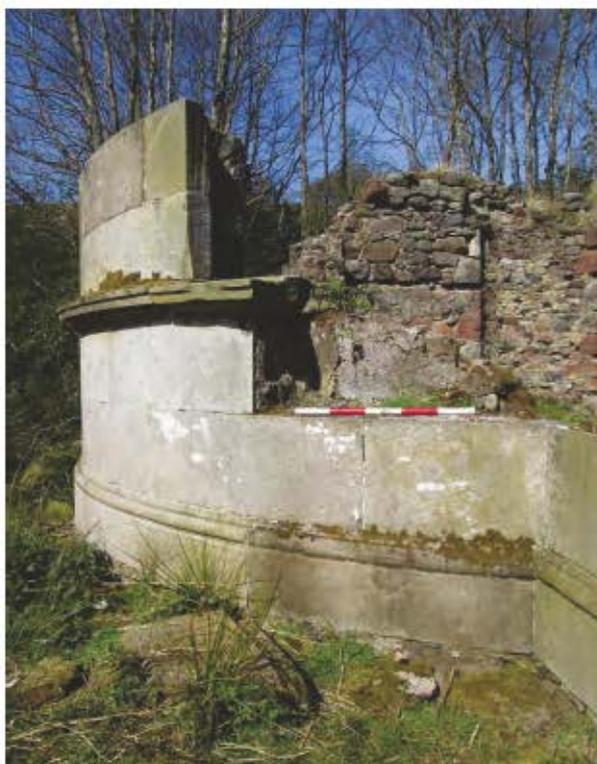
The south exterior wall of the observatory has seen extensive robbing in recent decades and is comparatively poorly preserved. Its reduced masonry now only stands above window sill level at isolated points – at the outer angles and part of the central bay. The ashlarwork, dressings, etc. are of fine quality. Some individual *ex situ* stones lie where they fell during the dismantling process, some externally and some within, including a keystone, sill fragments and lintel stones.

The principal feature of the elevation is the central apsidal projection of near semi-circular plan that had contained one of the three principal instruments within and that supported the observatory's dome above, 046. At plinth level the diameter of the circle projected from it measures 4.65m (15'3"); historic sources describe the dome itself as being of 12 feet in diameter (Brisbane, 1860, 66).



Plate 10 South exterior, following clearance

The apse had been detailed with three apertures, a central window that seems certainly to have functioned, 022, and two further window openings on either side that may or may not have been blind, 021 and 023 respectively. Of these only a part of the pier between windows 021 and 022 and their respective sill stones still remain; window 023 is now wholly robbed.



*Plate 11 Left – side view of the apsidal bay projection, 046
Plate 12 Left – side view Right - detail of the surviving jamb of window 021*

The sill stone of the apse's central window retains a circular seating, some 25.5cm (10") in diameter, with a central socket or fixing point, 045. This was possibly for the mounting of a *dipleidoscope*, an instrument used to determine local noon (*Pers. comm*, Allen Simpson).



Plate 13 Sill of the 022 window, with setting for an instrument, possibly a *dipleidoscope*, 045

The south frontage's outer two windows, 020 and 024, to east and west on either side of the apse, are similarly poorly preserved, only parts of their respective east and west jambs still remaining. Historical sources suggest these may have been formed with vertical slots rising through their heads, this to allow an unimpeded outlook for the instrumentation located within.

c. *East elevation*

The ashlar-fronted east elevation of the observatory has also been damaged by stone robbing, particularly in its southern parts. The mid-section survives up to the cornice, only missing the plain facings of its wall head course; these latter still remain at the north end. The principal features of this frontage are two blind windows, in-filled with vertically-set flags and originally *tromped* to suggest sash and case windows. The northern of the two windows remains intact and preserves such evidence of paintwork 028; the southern window only preserves its south jamb 029.

The other feature of this frontage is a simple square chimney located towards its north end, 030. Set upon a plinth slab the chimney seems perhaps to have lost its upper parts. The existing upper stone is somewhat curiously detailed with a channel, possibly a rustication detail, at its lower angles.



Plate 14 The east elevation, general view



Plate 15 Detail of blind window 28 showing traces of tromped glazing bars and framing, 030 chimney above

d. North elevation

The north wall of the observatory is symmetrically arranged, with paired window openings on either side of a central entrance. The windows are detailed with ashlar dressings brought to a raised polished margin that is only interrupted by a slightly projecting key-stone above. The window head runs up to the cornice that returns along the elevation; there are corresponding projections of the cornice above the key-stones. The tails of the dressings are horizontally broached. There are some surviving areas of lime harl upon the rubble body of the wall, particularly towards the wall foot.



Plate 16 North exterior, general view

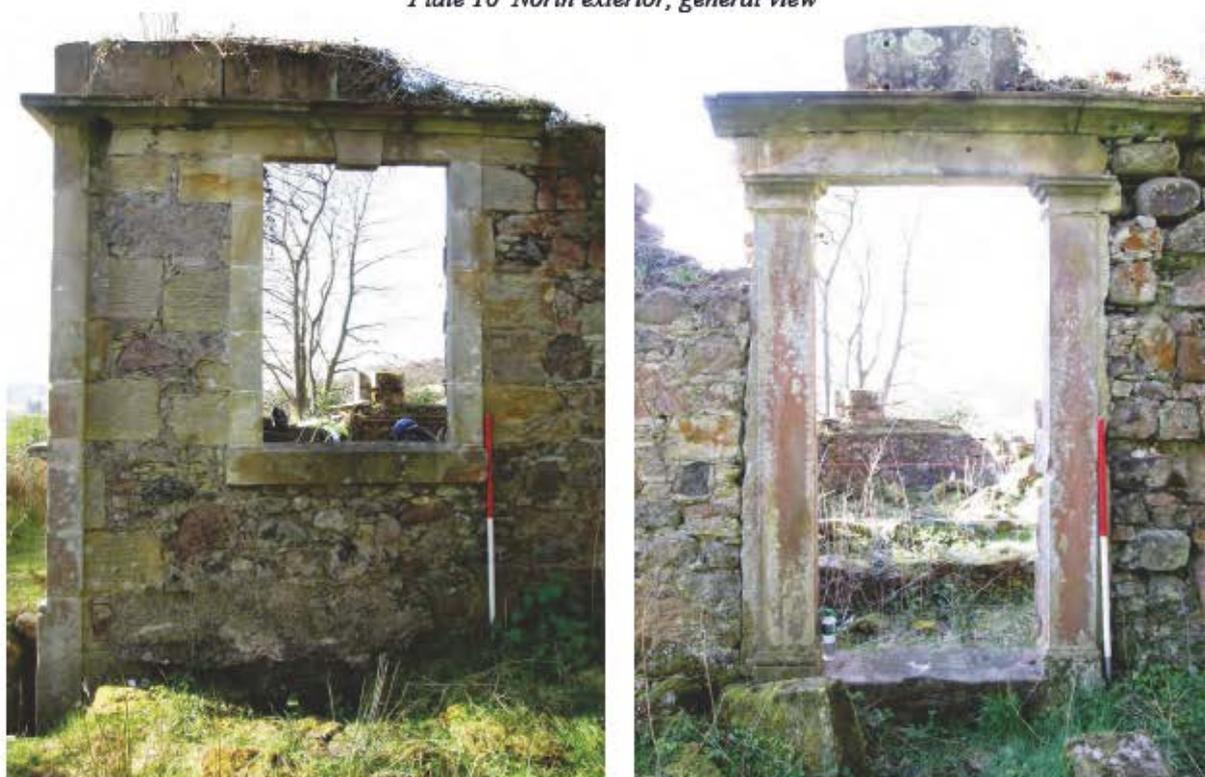


Plate 17 North wall, eastern window 014, showing masonry detailing

Plate 18 North wall – central entrance 012

The jambs of the entrance are formed of monoliths that rise up from moulded bases to capitals that in turn support a single plain lintel stone. The fine carved work of the columnar jambs and architrave project slightly from the general plane of the wall face; this again further expressed by a slight corresponding projection of the cornice course. Centrally set above the entrance is an ashlar block, 035, part of the plain wall head course that is now mostly missing. The block preserves a projecting panel upon which are seatings, fixing points for a dedicatory panel since removed. However the panel itself still survives, though now re-set into a modern cairn monument at the Three Sisters in Largs.

The sill stone of the western window 010 has upon it two neatly cut square seatings spaced some 21cm apart close to its outer edge, 051. Their position and lack of any corresponding holes elsewhere on the window's surround indicate that these were not for window bars, and none of the other windows featured bars. It is possible that these are the seatings for an instrument setting – a rear-sight to the northern meridian pillar in Brisbane Glen?



Plate 19 Paired seatings cut upon the sill of the 010 window, 051

e. West elevation

The west wall of the observatory, which faced away from Brisbane House, is comparatively featureless; it has no apertures and was provided with minimal detail or embellishment. The walling is almost wholly rubble-built and had evidently been harled, traces of which still remain in places. The SW and NW angles are defined by raised margins, the quoining tails are broached. The cornice returns along the elevation. Above this the upper masonry – presumably the returning plain wall head course of dressed stone – has been robbed of its facings, just a stump of rubble masonry rising behind.

Debris and growth obscures the wall foot; no details of any perimeter drain were accessible though presumably it will be similar to the one evident on the other side of the structure.

iii. Interior

a. General

Internally the observatory was rubble-walled and, evidently on the basis of multiple dook holes (small seatings, 009) visible upon most wall faces and sockets for embedded batons 008, it was lined-out, most likely with lath and plaster.



Plate 20 Interior of the east wall



Plate 21 Interior of the west wall

The interior of the observatory was sub-divided into two chambers, this by means of an east-west aligned framed cross-partition supported upon a masonry sleeper wall. Sockets for four vertical studs are still visible cut into stone blocks embedded within the upper part of the sleeper wall, 005. A pair of these sockets to the east correspond to the site of an entrance 006, whose position appears on the plan of c.1860 (figure 6). Similar evidence for a second entrance at the western end of the partition wall, 042, also shown on the historic plan, was not observable at the time of survey.



Plate 22 Left - the northern sleeper wall 003 that had supported the 005 principal partition, looking east
Plate 23 Right - details of individual stud sockets - the lower two had relate to an entrance, 006

b. *Ante-room*

Accessed by means of the 012 entrance to the north was an outer chamber. This is described in 1860,

There is besides an ante-room, 27 feet long by 8 feet wide, with a fireplace, and containing a bed fitted up for [Thomas Brisbane's] convenience while observing during the night (Brisbane, 1860, 66-7).

The chamber was lit by means of the two windows in the north wall, 010 and 014. The only feature of the west wall of the chamber is a narrow mural recess, 027. In the north wall between the western window and the entrance there exists a further narrow mural recess, 011. The latter is notable for the presence of a series of lead-fast iron fixings set into larger sandstone blocks at the rear of the recess,

043, and the sandstone slab at its base with displays a neatly cut rectangular socket to its centre rear, 044. This is likely to be for the William Hardy Sidereal - time regulator clock, as the fixing shown on the rear of this instrument appear to correlate with those identified in the wall.



Plate 24 Details of the 011 recess, including 043 fixings and the 044 socket at base

Also in the north wall, between the entrance and the eastern window, is a further somewhat broader 1.16m wide mural recess, 013. In the rear of this are multiple dooks. It is possible that this had functioned as a shelved book press (or had even contained a fold-down bed?).

The principal feature of the east wall of the ante-room is a centrally-located fireplace, 016. The dressings have been robbed though their mortar impressions suggest two vertically set jamb stones supported a lintel. The above-lintel masonry has also been broken away to reveal the flue rising above to the 030 chimney. The 016 flue track is joined by another running diagonally in on its south side, 017. This second flue, which rises up from the under-floor area, may have formed part of a sub-floor ventilation system.



*Plate 25 Left – the 013 recess, possibly contained shelving (or a fold-down bed?)
Plate 26 Right – void of robbed fireplace, 016, with flue rising to 030 chimney above*

c. Main chamber

The inner room was the observatory's main chamber, occupying over two thirds of its floor space and measuring 7.29m by 4.72m between masonry wall faces and excluding the apse (23'11" by 15'5"), and defined to the north by the 005 partition wall, for which evidence has been described.

The south interior was the principal elevation in terms of out-look, requiring a clear line of sight down Brisbane Glen, where there was a meridian pillar, to Largs, where there exists Green Hill, surmounted by the sighting pillars known as the Three Sisters.

This chamber had housed the installation's principal instruments, each mounted on stone pillars – a transit instrument on paired pillars to the east 047, 048, the mural circle, to the west 049, and the altitude and azimuth instruments centrally located beneath the dome, off-set to the centre-south 050. The pillars no longer survive though just possibly parts of them may lie buried on site.

A second east-west aligned masonry sleeper wall bisects the larger chamber, 003. Set at the same level as the one existing further to the north that supported the internal partition wall, 003, this had clearly supported the floor structure within the main chamber. However its position, aligned with the 018 and 026 mural recesses, indicates that it must also have supported the eastern and western pillars for the transit instrument and mural circle respectively. Unfortunately the sleeper wall is now mostly obscured by debris.

Presently there is no observable indication in the rubble-choked interior as to whether parts of a pillar base for the central instrument still survives. However it is presumed that there had been an independent foundation and that it may be identified on excavation of the interior of the building.



Plate 27 The interior of the observatory looking south

On the south wall the ingoes of the two outer windows, 020 and 024, extended down to former floor level. Paired rectangular sockets immediately below each indicate positions of floor joisting – these corresponding to the level and alignments of the similar sockets seen in the exterior north wall, 015.

By contrast within the interior of the projecting apsidal bay, 046, the inner wall face seems to have been thickened with an additional 0.2m thick rubble masonry skin, rising up to just below window sill level, 025. It is likely that this supported a raised dias, the platform from which the telescope and dome above was more conveniently accessed.

The west wall displays a broad curved recess, located at the room's centre-point. Measuring 1.60m by 0.31m maximum depth the feature was to permit movement around the mural circle, the curvature corresponding to its position. Multiple *looks* within the curvature of the recess suggest it had been lined and plastered.



Plate 28 Left – The 026 recess, looking west

Plate 29 Right – the 018 curved recess, whose south side has been cut back to form an instrument housing, 019

A further shallow curved recess exists in the east wall of the main chamber, also centrally positioned, 018. In a similar manner this recess permitted access around the former position of the twin-pier supports for the transit instrument. The upper parts of the walling in this area have been broken down and the recess itself is now much damaged; however it evidently measured about 1.64m by 0.30m in depth. There are dook holes within the curvature of the recess that again evidently relate to wall lining.

The southern side of the 018 recess seems to have been modified at a secondary stage - 019. Its interior appears to have been cut back in order to fashion a narrow and deep rectangular recess of very similar character to 011 on the north wall of the ante-room. The remaining lower part of its rear side displays lead-fast iron fixings that still considerably project, 047. A sill stone was inserted as part of the recess's construction, a sandstone slab that slightly projects at the wall face. In common with the 011 recess this slab was detailed with a neatly cut rectangular socket to the centre-rear – this evidently for the installation of a clock for timing star transits, such as the Journeyman Sidereal Clock or the Principal Sidereal Clock 048.



Plate 30 Base of the 019 recess showing lead-fast fixing point to rear

Plate 31 the basal slab, tooling and instrument socket, etc.

iv. *Roof structure*

Having been derelict since the 1950s and subject to recovery of building materials, the observatory has long been roofless. There was little physical evidence recorded during the survey that related to the lost roof structure. The wall tops were mostly robbed and what remained preserved little direct evidence for roofing structure, and given the loose nature of some of the wall head masonry no attempt was made at vegetation removal. However it was notable for the better preserved areas of wall head that the interior face of the wall top rose to the same level as the external facings (i.e. the plain wall head course), 052. There was no obvious evidence for an off-set that might relate to the setting of a roof structure; likewise there was no apparent pattern of sockets on the surviving areas of wall heads (to the east and west only) to suggest positions of principal roof members, trusses or the like. It is possible that roof framing had been in north-south alignment and that there had been sockets on at the heads of the north and south walls, however the south wall head is now wholly missing and the north wall head much degraded and too vegetation-obscured to reveal evidence.

Other features that may be roof-related include a substantial vertical socket, 0.75m deep, within the centre-point of the 002 sleeper wall, 004. This seems to be the void for an upright square-section timber, possibly a roof-supporting post. The masonry of the sleeper wall was evidently built around it. There exist two drainage outlets at either end of the upper walling of the north wall, these emerging through the base of the 031 cornice – 049 and 050. Such features would be consistent with a parapeted roof detail. Local memory was of a slated roof and, indeed, some slate fragments were noted on site. The fragments recovered are of very dark grey slate, possibly West Highland, this could be confirmed by further analysis. A slated roof self-evidently implied a pitched structure.

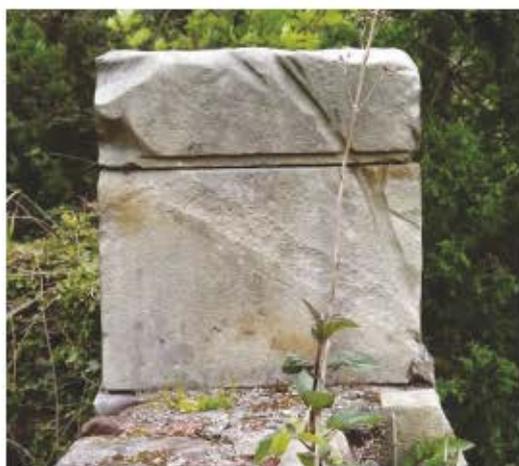


Plate 32 Raggle on chimney showing roof pitch



Plate 33 Matching raggle on other side of chimney



Plate 34 Fragments of slate at base of wall



Plate 35 Detail of slate fragments

Further features that seem likely to be roof-related may be a number of wrought iron sections. Four of these have been recorded on site, 037 - 040. All are of similar detail – long strips that display fixing spikes or bolts and a central shallow recess. They are all 1.85m in length, 0.10m across and 0.4m thick, the bolts protrude by around 0.10m. It is possible that these are strapping elements for roof trusses.



Plate 36 Structural ironwork visible loose within the observatory ruin



Plate 37 Structural ironwork detail

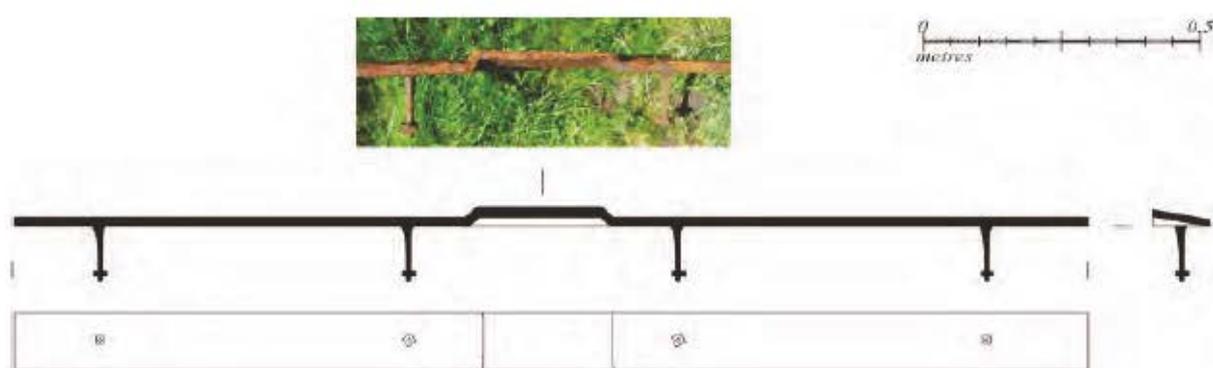


Figure 6 Plan and section of structural ironwork

v. *Equatorially mounted telescope chamber*

There is little visible evidence for the addition to the north elevation that is shown on the plan of c.1860, whose annotation, *equatorial*, indicates this was the chamber housing an equatorial telescope. Though it is known this had been a secondary addition and its structure had presumably abutted, there is little indication that its structure had been tied in to the north wall. There are a number of

individual seatings or fixing points upon the masonry on either side of the 012 entrance may be associated, possibly fixings for the interior linings of the extension. There are also two neatly cut square seatings upon the entrance's lintel stone, very similar to those for the plaque immediately above – perhaps this was for affixing a similar feature rather than architecturally-related.

From the historic plan it would be supposed that the extension had been of masonry construction. If so a solid footing structure would be expected to survive. It is possible that, in spite of the wall thickness shown on the plan (which may be inaccurate in detail), this had been a timber-framed structure. If framed its removal would likely have left little trace; if of masonry then the structure had clearly been very cleanly dismantled. Whatever its construction some evidence of the sub-structure should still be in evidence as buried archaeological features.

vi. *Ex situ elements*

a. *General materials*

The observatory had self-evidently been partly dismantled, and some of its materials removed. This likely included its roofing materials, other fixtures and fittings, and certainly much stonework. Stonework removal concentrated upon the high quality dressings of the south frontage and parts of the east side wall. Elsewhere floor slabs were removed *in toto*. The destination of much of this material can be identified locally, at one house in the vicinity, substantial slabs employed for a patio (pictured) are likely part of the observatory's flagged flooring, and elsewhere further stones for a fire-surround are thought to have been taken from the top course of the observatory walls. However, further survey work is required to fully confirm this.



Plate 38 *Recycled flooring slabs from within the observatory*

b. *Dedicatory plaques*

The dedicatory plaque from above the main entrance of the observatory was removed and re-set into a modern cairn monument at the Three Sisters in Largs.

*Ad Scientiam Astronomicam: Extruxit T. Brisbane
Anno Domini MDCCCVIII*



Plate 39 Dedicatory plaque formerly above the entrance of Brisbane observatory now reset at the Three Sisters, Largs

Of engraved brass, the panel reads,

*ad scientiam astronomicam colendam
extruxit T Brisbane*

'To astronomical science reverently built
by T Brisbane'

According to *Reminiscences* (1860) there had been a second inscription at Brisbane within the larger of the two rooms that read,

*Observatory – Brisbane –
Latitude, 55 degrees 49' 6 seconds north;
Longitude, 19m27.8' of time, or 4''52' of space, west of Greenwich.
Height of basin barometer above mean level of sea, 156.5
A.D. 1843.*

3. *Conclusion*

i. General

The initial phase of systematic archaeological recording, documented within this report has provided further information on the structural detail of the building. It has provided an accurate drawn and photographic record of the structure as it stands and will form the basis for any further works.

It has importantly demonstrated that despite its current ruinous condition, the observatory retains architectural details and fittings which can be used to assist in the reconstruction of the building as designed and used by Sir Thomas Brisbane. This detailed information can only be obtained by carefully and detailed archaeological investigation and recording, and it is anticipated that excavation and further recording of the interior of the building would produce similarly valuable results.

ii. Recommendations

In light of the success of this initial phase of archaeological investigation and in order to progress the objectives of the Brisbane Observatory Trust it is recommended that the following works be undertaken as funding allows;

- Prior to any further archaeological excavation, it is imperative that consolidation of the exterior walls is carried out to secure the structure and prevent further collapse
- Complete archaeological excavation of the interior of the Observatory building; building stones to be examined, recorded and retained for re-use. Detailed recording of newly exposed areas, with results integrated into a revision of this historic building survey report.
- Post-excavation requirements should be planned for – conservation, curation and assessment of finds made and samples taken during the excavation and clearance process.
- Detailed recording of features that formed the wider astronomical landscape around the Observatory; to include the circular structure immediately to the south-west, the meridian pillars to the north and south of the observatory and the Three Sisters, etc.
- Where possible locate and record elements of the Observatory fabric which are now re-used in the surrounding area.
- Thorough historical research of all documentary material related to the Observatory and Sir Thomas Brisbane's pioneering work there. This work would be best carried out collaboratively, to include experts in the field of astronomical history, and the results considered in relation to the physical evidence of the observatory building itself, reported appropriately.

- Detailed comparative study with Brisbane's other astronomical installations in Scotland and Australia – their history, architecture and instrumentation
- It would be desirable to disseminate further research on this structure, and its context within the history of astronomy and navigation in peer-reviewed journals.

References

Brisbane, T. M. (1860)

Reminiscences of Sir Thomas Makdougall Brisbane, Bart. Of Brisbane and Makerstoun, Bart., Thomas Constable, Edinburgh

Campbell, Valerie (2013)

We will not forget : a fascinating personal view of the Brisbane family

Gavine, David, (1984)

'Meridian Pillars – A Few Examples', *Journal of the British Astronomical Association*, 94, 168-70

Simpson, A. (January 2011)

'Historical Observatory building to be restored' in *The Inter-Union Commission for History of Astronomy Newsletter*, No.11, 5.

Appendix A Project Documentation

- i. *The Planned restoration of Brisbane Astronomical Observatory, near Largs, Scotland: a briefing note for Brisbane Trustees* (Allen Simpson, February 2011)

Background

This small but historically important and influential private observatory was established in 1808 by Thomas Brisbane (1774-1860), later General Sir Thomas Makdougall Brisbane, Bart., at his principal seat, Brisbane House. (Brisbane House was demolished about 70 years ago.) The observatory is located on a low ridge about 200m to the west of the site of the old house, with an open and unrestricted view of the skies above Noddsdale Water, and facing south along Brisbane Glen towards Largs. This forms one of the finest coastal panoramas in Ayrshire, and Brisbane Glen itself is recognised as an area of outstanding designed landscape, and forms part of the Clyde Muirshiel Regional Park. The observatory itself forms the centre of a group of stone structures, which were designed to form reference points due south and north of the individual instruments in the observatory to check their alignment. The main group of three meridian markers is about 3 kms due south of the observatory in Largs and is known as the 'Three Sisters' (originally the 'Three Graces'). These are extremely unusual survivors and are included in our conservation interest.

The attached illustration [reproduced here in the final sheet of Appendix G] shows north and south elevations and a plan of the observatory, published at the time of Brisbane's death. The three specialised astronomical instruments shown on the plan - mural circle, transit and alt-azimuth (the equatorial is a late addition) - were for measuring the precise positions of stars in celestial co-ordinates, and all were by the pre-eminent London instrument maker Edward Troughton. The telescopes of two of these instruments were mounted to rotate precisely in the north-south meridian plane so that stars could be observed as they crossed the meridian, and narrow north-south slots cut in the roof could be opened to give virtually horizon-to-horizon coverage of the sky. A high precision sidereal regulator clock by William Hardy of London and two specialised 'journeyman' clocks were used for timing observations, and the sidereal coordinates of stars could be reduced by calculation from many such observations. The type and relationship of these instruments, pioneered by Brisbane at this observatory, was subsequently adopted at positional astronomy observatories all over the world.

The observatory was begun by Brisbane in 1805 when he retired temporarily on health grounds from military service in the Caribbean. The 'Three Sisters' meridian markers were built that year, and the main observatory structure was finished in 1808, with the last major instrument installed by Troughton in 1811. The bicentenary of the completion of the observatory therefore falls in 2011. The detailed design of the observatory building is being provisionally attributed to the prominent Scottish architect James Gillespie Graham (1776-1855), who re-modelled the North Brisbane Mains farm block for Thomas Brisbane in 1807.

Brisbane served with Lord Wellington – a personal friend of long standing – in the Peninsular War and in the later occupation of France (1812-1819), and was subsequently appointed Governor of New South Wales (1821-25) on Wellington's recommendation. (He is remembered in the name of the city of Brisbane, founded in Queensland in his period as Governor.) The principal instruments at Brisbane Observatory were packed by his astronomical assistant and installed in a new southern hemisphere observatory, build on the same lines as at Brisbane House, which he erected at Parramatta near Sydney. There Brisbane published the first catalogue of Southern Hemisphere stars. After his return to Scotland his principal residence was at his second wife's estate at Makerston, near Kelso, where he built yet another astronomical observatory and an important observatory for measuring the earth's magnetic field. However, he retained Brisbane House and in later life he returned for several months each year where the old observatory had been re-equipped.

The Observatory Building

Although the building has been recognised locally for some time, it has long been lost to view, having become completely obscured in a dense rhododendron thicket in the garden grounds of Brisbane House. It had been looked for, but not found, by Historic Scotland's inspectors who visited the site in 1985 in order to record and protect the meridian markers, and the observatory was subsequently described as 'now demolished'. When we visited the site in 2003, the growth immediately round three sides of the building had been cut back to some extent so that the structure was partly accessible. The roof is missing, but the walls are to full height except at the south-facing window front and a part of the east wall. Some of the missing masonry is likely to be lying in the undergrowth to the south of the building. We hope that a careful archaeological examination of the site will resolve a number of questions about the construction, and we believe the building to be eminently restorable.

The quality of the construction is excellent. The south and east facades, as they were visible from Brisbane House, were executed in the high quality finish of finely dressed ashlar. The north and west facades by contrast were originally harled random rubble, with dressed stone openings and quoins. The entrance, flanked by two windows incorporating keystones, is to a narrow outer room, which is understood to have housed a bed, a warming stove and possibly the master clock. The inner room, with a large bay window capped with a dome, housed the principal instruments, each mounted on stone pillars. The external walls extend well below ground level, and a narrow covered channel running round the building probably reaches a bedrock foundation and ensured the building closely retained its orientation and isolated it from surface vibration. The instrument pillars will have had independent foundations, and the bases of these pillars may be found on excavation of the interior of the building.

Its Significance

The protection and survival of this building are important for two particular reasons. Firstly, Makdougall Brisbane was a considerable figure in Scottish science and a notable patron of scientific enterprises. He was a Fellow of the Royal Society, Fellow (and President from 1834) of the Royal Society of Edinburgh, and founding Fellow and medalist of the Royal Astronomical Society. He was intimately involved with the Astronomical Institution of Edinburgh and the Royal Observatory of Edinburgh, as well as being active in the Royal Scottish Society of Arts. He devoted his resources towards astronomy, and he built and equipped three observatories for positional astronomy and one for magnetic observation – all representing the leading edge of the scientific technology of the day. These were innovative and influential establishments. At Parramatta and Makerstoun little survives, but at Brisbane there is almost the entire lower structure of what became the classic layout of an observatory for the newly devised instruments of positional astronomy. The design was followed, for example, in W H Playfair's observatory for the Astronomical Institution of Edinburgh on Calton Hill.

Secondly, Brisbane himself devised one of these key instruments, the 'mural circle' - a telescope set to move in the meridian, with a very large divided scale read by several micrometers allowing the altitudes of stars crossing the meridian to be computed with unprecedented accuracy and designed to allow instrumental errors to be reduced. The first of its type, constructed to his specifications and engineered by Edward Troughton, was installed at the Brisbane House observatory. The fame of this instrument led to larger copies being made later for national observatories at Greenwich, the Cape of Good Hope, Washington and other major observatories; and mural circles proved of enormous value in the accurate charting of the skies, as an essential part of the great nineteenth-century drive for the production of marine charts and improved mathematical navigation.

Although the observatory at Brisbane operated for only a comparatively short period in its original form, it nonetheless served as the prototype and test-bed for a new generation of positional astronomy observatories, and its influence is only now becoming adequately appreciated. It is particularly associated with the great novelty of the introduction of the first mural circle, especially developed by Troughton to Brisbane's exacting requirements; but Troughton's sophisticated alt-azimuth telescope

also created great interest as a result of its illustration in David Brewster's Edinburgh Encyclopaedia. For example, the instrument subsequently acquired for the Edinburgh observatory was very closely based on this design.

The contribution of this site to the rising science of precision astronomy indicates that this small observatory is of international significance and its survival and restoration is an important objective for the Nation.

The Brisbane Observatory Trust

A special building preservation trust is being established to undertake the restoration and rehabilitation of this fine historical building and to generate interest in astronomy and in Brisbane's work in Scotland and Australia. The Trustees who will take this project forward are: Professor John Brown, Astronomer Royal for Scotland, who has taken in interest in the site for a number of years; Professor Ian Robson, Director of the UK Astronomy Technology Centre of the Royal Observatories, based at the Royal Observatory, Edinburgh; James Simpson, consultant and founding partner of Simpson & Brown Architects, who specialise in architectural conservation; Ian Campbell, owner of the farm on which the observatory stands; Jean Donaldson, Chair of the board of directors of Largs Museum and Chair of the Largs and District Historical Society; Dr Alison Morrison-Low, Head of the History of Science Section of the National Museums of Scotland, who has done the principal work on Brisbane's scientific work in Scotland, and who is an RSSA Makdougall Brisbane medallist; and Dr Allen Simpson, a former museum scientific instrument specialist, now of Edinburgh University's School of History and a member of the International Astronomical Union's Commission on the History of Astronomy.

Allen Simpson
February 2011

Appendix B Relevant extracts from Addyman Archaeology's February 2013 Assessment and Historic Building Record: Written Scheme of Investigation of Brisbane Observatory, Brisbane Estate, Largs, North Ayrshire, undertaken for the Brisbane Observatory Trust

Brisbane Observatory

Brisbane Estate, Largs, North Ayrshire

Assessment and Historic Building Record: Written Scheme of Investigation

for Brisbane Observatory Trust : Addyman Archaeology, February 2013 (amended February 2016)

1. *Introduction to the Observatory*

This proposal outlines the requirements for a detailed historic building record and analytical assessment of Brisbane Observatory, on the former Brisbane Estate, 3kms north of the North Ayrshire coastal town of Largs. It is adjacent to the site of the 17th century Brisbane House, demolished as a military exercise in 1941, and is the oldest surviving astronomical observatory in Scotland.

The Observatory is of outstanding significance in relation to the history of science. It is also of some considerable architectural significance and has been attributed to the notable Scottish architect James Gillespie Graham. The Observatory was designed and equipped to the exacting and highly individual requirements of the pioneering astronomer Major-General Sir Thomas Makdougall Brisbane, and it is of great importance because it was the first purpose-built observatory to measure star positions with unprecedented accuracy for use in navigation. His new instruments and the layout of the building formed the basis for the next generation of positional observatories around the world – at the Cape of Good Hope, Washington, Greenwich and Edinburgh.

Brisbane was a highly successful career soldier in the Peninsula and Napoleonic wars and a central figure in Scottish scientific circles, serving for 25 years as President of the Royal Society of Edinburgh. He was an important patron of the town of Largs, building the pier and providing the first public school for poor children. He was appointed as Governor-General of New South Wales in the 1820s, where he built a second observatory and there produced the first published star catalogue of the southern stars. Very little remains of the Sydney observatory, which has already been the subject of careful archaeological investigation.

Brisbane's original observatory at Brisbane House was thought to have been demolished and is recorded as such in Historic Scotland's records. However, the structure was found to be remarkably intact, roofless and completely overgrown by rhododendron and trees. This growth is in the process of being removed by community service offenders, under the Community Pay-back scheme operated by the local authority in conjunction with the Scottish Government Criminal Justice Department.

2. *The proposed recording and archaeology exercise*

The purpose of the proposed recording exercise is twofold. Firstly to undertake a record of an important structure that is clearly highly vulnerable (i.e. at risk). It also has the more academic aim of a comprehensive analysis of the physical evidence for the function and details of its primary purpose as an observatory.

There is an urgency in undertaking these works as some parts of the structure are in a parlous state and may suffer further disintegration and fabric loss in the near future. It is essential that all available information is recorded before this happens.

3. Scope of works

3.i Historic building survey

This would consist of a comprehensive formal record and analysis of the building. A preliminary measured survey has already revealed the fixing points for the two standard clocks, and the evidence for a raised floor level under the dome. It has pinpointed some particular concerns – for the method of supporting the dome at the interior side; for establishing the nature and positions for the interior foundation of the instruments; and for establishing the purpose of a number of forged iron bars found inside the building which may be connected with roof trusses. The loss of much of the top course of stones (which have been stripped for re-use elsewhere) poses problems for determining the structure of the original roof and also the architect's suspected use of small triangular pediments on the long sides. Evidence for the operation of meridian slits in the roof can perhaps be gathered in a near contemporary (1812) transit telescope building at the Calton Hill observatory in Edinburgh, with which Brisbane was closely involved. It can also be deduced that the meridian slits did not continue down the vertical walls because the solid central keystone from one of the south windows has been recovered. The roof surface had probably been replaced at some stage, and was subsequently been hung with slates, and a local informant who played in the building as a child is giving valuable information on the roof structure that he remembers (*Figures 4 & 5*).

There is still growing vegetation – ivy, grass and small saplings – on the wall heads. This will have to be treated at an early stage to kill growth. Initial consideration will be given to protecting and proofing the wall heads to prevent further water ingress. A few trees are within or closely abutting the buildings and these will have to be carefully taken down.

The full Survey would include a drawing set to include:

- A pre-excavation plan at ground floor level (1:20)
- A wall head plan – recording evidence for roof junctions, chimneys, copings, etc. (1:20)
- 4 external elevations (1:10 or 1:20)
- 4 internal elevations (1:10 or 1:20)

For the drawn record a high level of analytical detail is required, particularly internally, as much of the analytical evidence for the former use of the building is subtle in nature. A comprehensive referenced formal photographic record taken before, during and after clearance.

3.ii Clearance

Clearance of the ruin will be an archaeologically controlled exercise. For a structure where much of the evidence for its former appearance and function, particularly internally, may be highly idiosyncratic, it is essential that this is undertaken with the greatest care. Clearance of rubble and overburden will be undertaken by hand. The individual positions of all significant finds will be recorded – eg. fixtures and fittings, structural elements, evidence for the installation of scientific equipment, evidence for fallen roofing, etc. Clearance will include careful removal of overburden in order to fully reveal the structural fabric of the lower parts of the observatory. The remains of secondary additions will be revealed and left *in situ*. These latter include the porch-like addition to the north elevation. An important aspect will be revealing the instrument pier foundations, and looking for portions of the piers themselves.

It is already apparent that the substantial portions of external finished masonry are present in the rubble at the south end of the building. Careful recovery of these stones will be a priority.

Once cleaned – the lower walls will be carefully cleaned of the existing moss – the entire structure will be recorded in close detail in plan. Newly revealed sections of lower walling, footings, etc., will be added to the elevation drawings. Footing structures will be investigated where possible and in a non-invasive manner as far as practical.

3.iii *Recovery of worked stones and materials*

There are numerous carved stones deriving from the observatory superstructure fallen within and in the immediate vicinity of the observatory building. As part of the clearance exercise it will be necessary to identify and retain these.

These stones will be recorded as to their locations – most will lie below or close to their point of origin - numbered and catalogued and recorded photographically. Significant stones will be set aside at the site at an agreed location, and retained for future reinstatement.

Other construction materials, such as roofing materials, will be sorted, recorded and, as necessary, retained. A provision will be made to take suitable mortar samples both for the sake of record and to permit later mortar-matching for repair.

3.iv *Reporting*

A comprehensive report will be produced; in archaeological terms this would be called a *Data Structure Report*. In terms of the work at Brisbane the report ought to draw together: historical evidence for the structure (some of which has already been gathered in the Brisbane papers at the Mitchell Library in Glasgow and elsewhere); a detailed building description focussing on what evidence the physical remains of the structure preserve of materials, construction techniques employed, architectural details (decorative and functional), the structure's planning and evidence for the function of different areas. There should be an overview section to discuss in detail the interpretation of astronomy-related aspects of the building, referenced and related to comparative structures elsewhere. This report would also contain the digitised worked-up and fully annotated drawing set.

Appendix C Contexts register

| Context | Recorded by | summary | Description |
|---------|-------------|--------------------------|---|
| 001 | K MacFadyen | general masonry | General masonry of the observatory; internally a mixture of rubble stone, whin boulders and sandstone, lime-bonded. Externally to east and south ashlar-faced; north and west exterior elevations were harled (some remnants - 036) |
| 002 | K MacFadyen | sleeper wall | Interior - southern sleeper wall; 0.40m wide running E-W across interior; random rubble same as 001 much reduced and damaged by trees, lower parts rubble-obscured |
| 003 | K MacFadyen | sleeper wall | Interior - northern sleeper wall; 0.40m wide; better preserved than 002, on the top four sandstone blocks have neat rectangular sockets for timber uprights, clearly the room was partitioned on this line. |
| 004 | K MacFadyen | post socket | Rectangular socket built into 003 (10x15cm by 25cm deep) likely for a timber upright, possibly a principal support for the roof? |
| 005 | K MacFadyen | partition evidence | Evidence for partition wall - shallow neatly cut rectangular sockets (7x17 by 1.5cm depth); set 1.5m apart; includes 006, site of entrance |
| 006 | K MacFadyen | entrance | Pair of shallow neatly cut sockets to E of 004 (7x24 by 1.5cm deep) probably for framing of an entrance set within the 005 partition wall |
| 007 | K MacFadyen | covered channel | Covered channel / drain around wall foot (0.30-0.40m wide) capped with stone slabs, bottom not seen – debris-clogged. |
| 008 | K MacFadyen | wall lining batons | Series of horizontally set timber batons built into masonry 001, of varying sizes |
| 009 | K MacFadyen | dooks | Series of small <i>dook</i> holes cut into masonry 001 |
| 010 | K MacFadyen | window | Window in north elevation (west end); 2 small square sockets cut into sill |
| 011 | K MacFadyen | mural recess, north wall | Narrow vertical wall recess, north wall, on west side of main entrance (0.30m deep, 0.62cm wide); base formed by sandstone slab – for associated features see 043 and 044. |
| 012 | K MacFadyen | entrance | Entrance, centre of north wall |
| 013 | K MacFadyen | mural recess, north wall | broad wall recess, north wall, on east side of main entrance (0.36m deep, 1.16m wide); possibly for shelves (books?) or containing a fold-down bed; <i>dooks</i> to back for lining |
| 014 | K MacFadyen | window | Eastern window in north elevation |
| 015 | K MacFadyen | floor structure | Evidence for floor structure - 6 joist evenly-spaced sockets surviving within north wall, evidence for 4 onto the south (paired on either side of the apse); for vertically set rectangular north-south aligned joisting (of about 0.08m by 0.22-24m section) |
| 016 | K MacFadyen | fireplace | East elevation Fireplace, heating the north room; dressings robbed, but the imprint of the stone sides can be seen; fire back trimmed ? ; the rear of the external facing stones visible, 034 |
| 017 | K MacFadyen | flue | Flue to south of 016 vents the below floor space runs up into the same pot as 016; plaster-lined internally |
| 018 | K MacFadyen | mural recess, east wall | Broad curved recess in east wall, off-set to south (1.64m by 0.30m) to permit access around the azimuth instrument); similar feature in west wall – see 026 |
| 019 | K MacFadyen | mural recess, east wall | Mural recess, cutting in to the south side of the 018 recess and possibly secondary to it. Within are lead-set seatings and cut socket in base. |
| 020 | K MacFadyen | window | South wall, east window, little survives, some of east |

| Context | Recorded by | summary | Description |
|---------|-------------|-------------------------|---|
| | | | jamb. |
| 021 | K MacFadyen | window (blind?) | South wall, window in east side of apse, part of west jamb and sill survives; ?possibly blind |
| 022 | K MacFadyen | window | South elevation central window, sill and part of east jamb survive; on the sill a circle and hole in the centre is at the middle of the window presumably to mount an instrument, possibly a <i>dipleidoscope</i> . |
| 023 | K MacFadyen | window (blind?) | South wall, window in west side of apse, part of west jamb and sill survives; ?possibly blind |
| 024 | K MacFadyen | window | South wall, west window, little survives, some of east jamb. |
| 025 | K MacFadyen | wall thickening | Thickening of interior walling of the 046 bay window, possibly to support a raised platform upon which were located the altitude and azimuth instruments |
| 026 | K MacFadyen | mural recess, west wall | Broad curved recess in west wall, off-set to south (1.60m by 0.31m); to allow movement around an azimuth instrument; similar to 018 in the east wall |
| 027 | K MacFadyen | mural recess, west wall | West interior, narrow wall recess, close to north-west corner, for an instrument or clock |
| 028 | K MacFadyen | blind window | East exterior; blind window, off-set to north (retains traces of tromped sash and case) |
| 029 | K MacFadyen | blind window | East exterior; blind window, off-set to south; mostly destroyed – only part of south jamb remains |
| 030 | K MacFadyen | chimney | East elevation, chimney off-set to north |
| 031 | K MacFadyen | moulding | Moulded cornice – extends around full exterior of the superstructure |
| 032 | K MacFadyen | moulding | Moulded sill course; extends around south and east sides of the superstructure |
| 033 | K MacFadyen | plinth | Moulded plinth course |
| 034 | K MacFadyen | ashlar facings | Ashlar facings to the 001 masonry – exterior to east and south; laid to regular courses of 0.28m – 0.30m in height |
| 035 | K MacFadyen | fixings | Stone centrally set above the 012 entrance; raised panel upon the 052 wall head course displays four seatings for affixing dedicatory plaque – see 041 |
| 036 | K MacFadyen | lime harl | Traces of lime harl evident on the exterior north and west walls |
| 037 | K MacFadyen | architectural ironwork | Loose architectural ironwork (recorded) |
| 038 | K MacFadyen | architectural ironwork | Loose architectural ironwork (buried in the doorway area) |
| 039 | K MacFadyen | architectural ironwork | Loose architectural ironwork (lost) pair to 037? |
| 040 | K MacFadyen | architectural ironwork | Short Loose architectural iron work (lost) formerly seen to the north exterior, possibly a broken pair to 037 |
| 041 | TOA | brass plaque | Brass plaque formerly located above the observatory entrance, affixed to stone 035; engraved inscription : <i>Ad Scientiam Astronomicam: Extruxit T. Brisbane Anno Domini MDCCCVIII</i> now re-set into a modern cairn monument at the Three Sisters in Largs |
| 042 | TOA | internal entrance | Site of entrance at the western end of the 005 partition wall – known from historic plan |
| 043 | TOA | instrument setting | series of off-set lead-fast iron fixings within the rear of the 011 wall recess; indicating former position of a clock or instrument |
| 044 | TOA | instrument setting | Shallow-cut rectangular socket in the sandstone base stone of the 011 wall recess; indicating former position of a |

| <i>Context</i> | <i>Recorded by</i> | <i>summary</i> | <i>Description</i> |
|----------------|--------------------|--------------------|---|
| | | | clock or instrument |
| 045 | TOA | instrument setting | On the sill stone of the 022 window was cut a shallow circular setting and seating hole in the centre; presumably to mount an instrument, possibly a <i>dipleidoscope</i> . |
| 046 | TOA | apsidal bay | South wall, apsidal projection at centre-line, supported 12' diameter observatory dome |
| 047 | TOA | instrument setting | lead-fast iron fixings within the lower rear of the 019 wall recess; indicating former position of a clock or instrument (upper parts of recess missing) |
| 048 | TOA | instrument setting | Shallow-cut rectangular socket in the sandstone base stone of the 019 wall recess; indicating former position of a clock or instrument |
| 049 | TOA | drainage | Roof parapet drainage hole at the east end of the north wall head – aperture cutting through base of cornice moulding – ?leading to a lead spout (no obvious evidence for down-pipe fixings) |
| 050 | TOA | drainage | Roof parapet drainage hole at the west end of the north wall head – aperture cutting through base of cornice moulding – ?leading to a lead spout (no obvious evidence for down-pipe fixings) |
| 051 | TOA | seatings | Pair of small square-cut seatings upon the sill of the 010 window; there are no corresponding seatings above to suggest these had been vertical bars; possibly they related to an instrument setting – a rear-sight to the northern meridian pillar in Brisbane Glen? |
| 052 | TOA | Wall head course | Plain wall head course rising above the 031 cornice |
| | | | |
| | | | |
| | | | |

Appendix D Field drawings register

| <i>Drawing number</i> | <i>Scale</i> | <i>Type</i> | <i>Description</i> | <i>Drawn By</i> | <i>Date</i> |
|-----------------------|--------------|-------------|--|-----------------|-------------|
| 001 | 1:20 | Plan | Plan of Brisbane Observatory (2 parts) | KMacF | 20.4.2015 |
| 002 | 1:20 | Elevation | North exterior elevation | JMM | 20.4.2015 |
| 003 | 1:20 | Elevation | East exterior elevation | JMM | 21.4.2015 |
| 004 | 1:20 | Elevation | South exterior elevation | KMacF | 21.4.2015 |
| 005 | 1:20 | Elevation | West exterior elevation | JMM | 21.4.2015 |
| 006 | 1:20 | Elevation | South interior elevation | KMacF | 21.4.2015 |
| 007 | 1:20 | Elevation | South extension to bay under window | JMM | 21.4.2015 |
| 008 | 1:2 | Profile | Wall head cornice profile | JMM | 21.4.2015 |
| 009 | 1:2 | Profile | Sill cornice profile | JMM | 21.4.2015 |
| 010 | 1:2 | Profile | Plinth profile | JMM | 21.4.2015 |
| 011 | 1:20 | Elevation | North interior elevation | KMacF | 22.4.2015 |
| 012 | 1:20 | Elevation | East interior elevation | KMacF | 22.4.2015 |
| 013 | 1:20 | Detail | Detail of metal bracket | KMacF | 22.4.2015 |
| 014 | 1:20 | Elevation | West interior elevation | JMM | 22.4.2015 |

Appendix E Photographic register

| Frame | Elevation | Direction Facing | Description | Taken By | Date |
|-------|----------------|------------------|--|----------|-----------|
| 001 | North exterior | | | JMM | 22.4.2015 |
| 002 | North exterior | SW | General view of north elevation | JMM | 22.4.2015 |
| 003 | North exterior | S | Square on detail of east side of north elevation | JMM | 22.4.2015 |
| 004 | North exterior | S | As above moving west | JMM | 22.4.2015 |
| 005 | North exterior | S | Square on detail of door | JMM | 22.4.2015 |
| 006 | North exterior | S | Masonry between door and west window | JMM | 22.4.2015 |
| 007 | North exterior | S | East jamb of window 010 | JMM | 22.4.2015 |
| 008 | North exterior | S | West window (bad light) 010 | JMM | 22.4.2015 |
| 009 | North exterior | S | West corner lower section | JMM | 22.4.2015 |
| 010 | North exterior | S | West corner upper section | JMM | 22.4.2015 |
| 011 | North exterior | S/down | Detail of sockets, sill of west window | JMM | 22.4.2015 |
| 012 | North exterior | S/down | Detail of sockets, sill of west window | JMM | 22.4.2015 |
| 013 | North exterior | S/down | Detail of sockets, sill of west window | JMM | 22.4.2015 |
| 014 | North exterior | S/down | Detail of west end of west window | JMM | 22.4.2015 |
| 015 | North exterior | S | Detail of cornice on east door pillar | JMM | 22.4.2015 |
| 016 | North exterior | S | Detail top of door 012 | JMM | 22.4.2015 |
| 017 | North exterior | S | Detail of stone which held plaque above the door | JMM | 22.4.2015 |
| 018 | North exterior | S | Detail of keystone east window 014 | JMM | 22.4.2015 |
| 019 | North exterior | S | Detail of keystone west window 010 | JMM | 22.4.2015 |
| 020 | North exterior | S | Detail into trench NE corner | JMM | 22.4.2015 |
| 021 | North exterior | S | Cap stone over trench east end | JMM | 22.4.2015 |
| 022 | North exterior | S | Detail of moulding plinth | JMM | 22.4.2015 |
| 023 | North exterior | S | Detail of moulding sill cornice | JMM | 22.4.2015 |
| 024 | East exterior | W | General view of east elevation | JMM | 22.4.2015 |
| 025 | East exterior | W | As above | JMM | 22.4.2015 |
| 026 | East exterior | W | Square on detail corner N end | JMM | 22.4.2015 |
| 027 | East exterior | W | Upper section of above | JMM | 22.4.2015 |
| 028 | East exterior | W | Blank window north end | JMM | 22.4.2015 |
| 029 | East exterior | W | Upper section of window and chimney | JMM | 22.4.2015 |
| 030 | East exterior | W | Square on central section | JMM | 22.4.2015 |
| 031 | East exterior | W | Upper section of above | JMM | 22.4.2015 |
| 032 | East exterior | W | Section of collapsed wall head | JMM | 22.4.2015 |
| 033 | East exterior | W | Area of collapsed window | JMM | 22.4.2015 |
| 034 | East exterior | W | South end whole height | JMM | 22.4.2015 |
| 035 | East exterior | W | South end with bay projecting behind | JMM | 22.4.2015 |
| 036 | East exterior | W | East elevation of bay window | JMM | 22.4.2015 |
| 037 | East exterior | W | Detail of cap stones south end | JMM | 22.4.2015 |
| 038 | East exterior | W | Detail of plinth at south end | JMM | 22.4.2015 |
| 039 | East exterior | W | Close up of above | JMM | 22.4.2015 |
| 040 | East exterior | N | Detail of wall section north of missing window | JMM | 22.4.2015 |
| 041 | East exterior | N up | Detail of cornice | JMM | 22.4.2015 |
| 042 | East exterior | W | Detail blank window | JMM | 22.4.2015 |
| 043 | East exterior | W | Detail of chimney | JMM | 22.4.2015 |
| 044 | | | Detail of plinth in N corner | | |
| 045 | East exterior | W | Looking down into trench | JMM | 22.4.2015 |
| 046 | East exterior | S | Trench along east elevation 007 | JMM | 22.4.2015 |
| 047 | East exterior | N | Trench along east elevation | JMM | 22.4.2015 |
| 048 | East exterior | N | Trench along east elevation | JMM | 22.4.2015 |
| 049 | East exterior | N | Corner of trench East & south side | JMM | 22.4.2015 |
| 050 | East exterior | S | Trench along south elevation | JMM | 22.4.2015 |

| Frame | Elevation | Direction Facing | Description | Taken By | Date |
|-------|----------------|------------------|---|----------|-----------|
| 051 | East exterior | W | Looking up out of south trench | JMM | 22.4.2015 |
| 052 | East exterior | S | Detail cap stones and white wash | JMM | 22.4.2015 |
| 053 | East exterior | S | N end south trench looking s | JMM | 22.4.2015 |
| 054 | East exterior | S | As above | JMM | 22.4.2015 |
| 055 | South exterior | N | General shot south elevation | JMM | 22.4.2015 |
| 056 | South exterior | N | As above | JMM | 22.4.2015 |
| 057 | South exterior | N | As above | JMM | 22.4.2015 |
| 058 | South exterior | N | Close up of bay window | JMM | 22.4.2015 |
| 059 | South exterior | N | West end south elevation | JMM | 22.4.2015 |
| 060 | South exterior | N | Close up of west corner south elevation | JMM | 22.4.2015 |
| 061 | South exterior | N | As above | JMM | 22.4.2015 |
| 062 | South exterior | N | Close up east corner/ section through wall | JMM | 22.4.2015 |
| 063 | South exterior | N | As above | JMM | 22.4.2015 |
| 064 | South exterior | N | East end south elevation | JMM | 22.4.2015 |
| 065 | South exterior | W | Bay-east elevation 020 | JMM | 22.4.2015 |
| 066 | South exterior | SE down | Detail of window | JMM | 22.4.2015 |
| 067 | South exterior | SE down | As above | JMM | 22.4.2015 |
| 068 | South exterior | SW | Section through wall west jamb window | JMM | 22.4.2015 |
| 069 | South exterior | down | Detail of window sill ex-situ | JMM | 22.4.2015 |
| 070 | South exterior | SE down | As above | JMM | 22.4.2015 |
| 071 | South exterior | Down N | Detail of central window sill with seating for instrument 022 | JMM | 22.4.2015 |
| 072 | South exterior | Down N | As above | JMM | 22.4.2015 |
| 073 | South exterior | NE | General view broken down wall south elevation 023 | JMM | 22.4.2015 |
| 074 | South exterior | W | Section through south wall west end | JMM | 22.4.2015 |
| 075 | West exterior | S | South end west elevation | JMM | 22.4.2015 |
| 076 | West exterior | S | Central section masonry W elevation 001 | JMM | 22.4.2015 |
| 077 | West exterior | S | North end west elevation close-up | JMM | 22.4.2015 |
| 078 | West exterior | S | North end west elevation general shot | JMM | 22.4.2015 |
| 079 | West exterior | S | As above | JMM | 22.4.2015 |
| 080 | West exterior | S | Section of masonry west elevation | JMM | 22.4.2015 |
| 081 | West exterior | S | Close up of quoins N corner W elevation | JMM | 22.4.2015 |
| 082 | West exterior | S | As above middle section | JMM | 22.4.2015 |
| 083 | West exterior | S | As above top section | JMM | 22.4.2015 |
| 084 | West exterior | NE | General view angled W elevation | JMM | 22.4.2015 |
| 085 | West exterior | S | Close up of top sec. masonry with harl | JMM | 22.4.2015 |
| 086 | West exterior | S | Close up of lower sec. masonry with harl | JMM | 22.4.2015 |
| 087 | West exterior | S | As above bottom courses | JMM | 22.4.2015 |
| 088 | West interior | W | General shot W interior wall 001 | JMM | 22.4.2015 |
| 089 | West interior | W | S end W interior wall | JMM | 22.4.2015 |
| 090 | West interior | W | Curved recess W interior wall 026 | JMM | 22.4.2015 |
| 091 | West interior | W | Central area of walling | JMM | 22.4.2015 |
| 092 | West interior | W | As above further north | JMM | 22.4.2015 |
| 093 | West interior | W | Narrow recess in west wall 027 | JMM | 22.4.2015 |
| 094 | West interior | W | North corner W interior wall | JMM | 22.4.2015 |
| 095 | West interior | W | Detail of narrow recess 027 | JMM | 22.4.2015 |
| 096 | West interior | W | Detail of curved recess 026 | JMM | 22.4.2015 |
| 097 | West interior | W | Detail of stone with circular dook s end 009 | JMM | 22.4.2015 |
| 098 | West interior | W | Detail of groove for horizontal timber | JMM | 22.4.2015 |

| Frame | Elevation | Direction Facing | Description | Taken By | Date |
|-------|------------------|------------------|--------------------------------------|----------|-----------|
| | | | 008 | | |
| 099 | General interior | S | Underside of metal fitting | JMM | 22.4.2015 |
| 100 | General interior | W | Profile central section of above | JMM | 22.4.2015 |
| 101 | General interior | W | As above without scale | JMM | 22.4.2015 |
| 102 | General interior | / | Detail of FE pins on above | JMM | 22.4.2015 |
| 103 | General interior | / | General shot upper face of above | JMM | 22.4.2015 |
| 104 | General interior | / | Detail of nut and bolt | JMM | 22.4.2015 |
| 105 | General interior | E | Detail of socket on sleeper wall 005 | JMM | 22.4.2015 |
| 106 | General interior | E | Second of pair 005 | JMM | 22.4.2015 |
| 107 | General interior | E | Detail of socket on sleeper wall 006 | JMM | 22.4.2015 |
| 108 | General interior | E | Second of pair 006 | JMM | 22.4.2015 |
| 109 | General interior | S | Deep socket 004 in sleeper wall 003 | JMM | 22.4.2015 |
| 110 | General interior | S | As above without tape | JMM | 22.4.2015 |
| 111 | East interior | / | View down 004 | JMM | 22.4.2015 |
| 112 | East interior | / | View down small flu in east wall 017 | JMM | 22.4.2015 |
| 113 | East interior | / | View u p main flu 016 | JMM | 22.4.2015 |
| 114 | North interior | N | West window recess 010 | JMM | 22.4.2015 |
| 115 | North interior | N | Recess for clock 011 | JMM | 22.4.2015 |
| 116 | North interior | N | As above | JMM | 22.4.2015 |
| 117 | North interior | N | Door 012 and adjacent masonry | JMM | 22.4.2015 |
| 118 | North interior | N | Recess to east of door 013 | JMM | 22.4.2015 |
| 119 | North interior | N | Recess 013 and east window 014 | JMM | 22.4.2015 |
| 120 | North interior | N | Close up west window 010 | JMM | 22.4.2015 |
| 121 | North interior | N | Keystone west window | JMM | 22.4.2015 |
| 122 | North interior | N | Lower section W jambs W window | JMM | 22.4.2015 |
| 123 | North interior | N | Middle section of above | JMM | 22.4.2015 |
| 124 | North interior | N | Upper section of above | JMM | 22.4.2015 |
| 125 | North interior | N | Upper fixings in clock recess 011 | JMM | 22.4.2015 |
| 126 | North interior | N | Lower fixings of above | JMM | 22.4.2015 |
| 127 | North interior | N | Seating at base of 011 | JMM | 22.4.2015 |
| 128 | North interior | N | As above | JMM | 22.4.2015 |
| 129 | North interior | N | Close up of above | JMM | 22.4.2015 |
| 130 | North interior | N | Seating and 3 dooks within 011 | JMM | 22.4.2015 |
| 131 | General interior | E | North sleeper wall 003 | JMM | 22.4.2015 |
| 132 | General interior | W | As above | JMM | 22.4.2015 |
| 133 | General interior | E | South sleeper wall 002 | JMM | 22.4.2015 |
| 134 | General interior | W | As above | JMM | 22.4.2015 |
| 135 | North interior | N | Masonry between door and east window | JMM | 22.4.2015 |
| 136 | North interior | N | Interior of door 010 and recess 011 | JMM | 22.4.2015 |

| <i>Frame</i> | <i>Elevation</i> | <i>Direction Facing</i> | <i>Description</i> | <i>Taken By</i> | <i>Date</i> |
|--------------|------------------|-------------------------|--|-----------------|-------------|
| 137 | North interior | N | Interior of east window 014 | JMM | 22.4.2015 |
| 138 | North interior | N | Joist sockets 015 at base of wall | JMM | 22.4.2015 |
| 139 | North interior | N | Close up of joist socket 015 | JMM | 22.4.2015 |
| 140 | North interior | N | General shot of interior N elevation | JMM | 22.4.2015 |
| 141 | East interior | E | General shot interior E elevation | JMM | 22.4.2015 |
| 142 | East interior | E | North end of wall with flu | JMM | 22.4.2015 |
| 143 | East interior | E | Central section of masonry | JMM | 22.4.2015 |
| 144 | East interior | E | Masonry with splay for blank window | JMM | 22.4.2015 |
| 145 | East interior | E | Area of damaged wall south end | JMM | 22.4.2015 |
| 146 | East interior | E | South end of east wall | JMM | 22.4.2015 |
| 147 | East interior | E | Close up of above | JMM | 22.4.2015 |
| 148 | East interior | E | Base of fireplace 016 | JMM | 22.4.2015 |
| 149 | East interior | E | Upper section of fire place, flu | JMM | 22.4.2015 |
| 150 | East interior | S | Looking into side flu 017 | JMM | 22.4.2015 |
| 151 | East interior | E | South jamb of fire place | JMM | 22.4.2015 |
| 152 | East interior | E | Looking into flu | JMM | 22.4.2015 |
| 153 | East interior | E | Groove in masonry 001 for timber battons 008 | JMM | 22.4.2015 |
| 154 | East interior | E | Slab seating and fixing for clock 019 pair with 011 in north elevation | JMM | 22.4.2015 |
| 155 | East interior | E | As above | JMM | 22.4.2015 |
| 156 | East interior | E | Close up of seating slot | JMM | 22.4.2015 |
| 157 | East interior | E | Jamb of blank window south of east elevation | JMM | 22.4.2015 |
| 158 | East interior | E | Close up of shallow check south jamb of south blank window | JMM | 22.4.2015 |
| 159 | South interior | E | Detail of dowel and mortar impression from reused timber in socket | JMM | 22.4.2015 |
| 160 | South interior | E | As above | JMM | 22.4.2015 |
| 161 | South interior | S | General shot south elevation | JMM | 22.4.2015 |
| 162 | South interior | S | As above | JMM | 22.4.2015 |
| 163 | South interior | S | East end south elevation | JMM | 22.4.2015 |
| 164 | South interior | S | Thicker masonry beneath window 025 | JMM | 22.4.2015 |
| 165 | South interior | S | End of wall at curved bay window | JMM | 22.4.2015 |
| 166 | South interior | S | Broken section of wall at curve of bay | JMM | 22.4.2015 |
| 167 | South interior | SE | East part of bay window interior | JMM | 22.4.2015 |
| 168 | South interior | E | Looking east at section of south wall | JMM | 22.4.2015 |
| 169 | South interior | SSE | Rubble and ashlar between windows 020 and 022 | JMM | 22.4.2015 |
| 170 | South interior | SSE | Close up of ashlar work between windows | JMM | 22.4.2015 |
| 171 | South interior | SE | Close up of east jamb of central window 022 | JMM | 22.4.2015 |
| 172 | South interior | SE | As above | JMM | 22.4.2015 |
| 173 | South interior | SW | Rubble forming base of bay window | JMM | 22.4.2015 |
| 174 | South interior | WSW | As above to west | JMM | 22.4.2015 |
| 175 | South interior | SW | Close up of west end of bay window 024 | JMM | 22.4.2015 |
| 176 | South interior | S | Section through wall at west end of bay window | JMM | 22.4.2015 |
| 177 | South interior | S | Foundations at west end of south wall | JMM | 22.4.2015 |
| 178 | South interior | W | West jambs of west window 023 | JMM | 22.4.2015 |
| 179 | South interior | W | Close up of above | JMM | 22.4.2015 |
| 180 | South interior | S | General shot west end of south wall 023 and 024 beneath | JMM | 22.4.2015 |
| 181 | South interior | S | General view central bay 022 and 025 | JMM | 22.4.2015 |

| <i>Frame</i> | <i>Elevation</i> | <i>Direction Facing</i> | <i>Description</i> | <i>Taken By</i> | <i>Date</i> |
|--------------|------------------|-------------------------|---|-----------------|-------------|
| 182 | South interior | SE | General view east end of south wall 020 and 021 beneath | JMM | 22.4.2015 |
| 183 | South interior | S | West end of south wall | JMM | 22.4.2015 |
| 184 | General | S | View from central point on south elevation | JMM | 22.4.2015 |
| 185 | General | SW | View of additional circular building to SW | JMM | 22.4.2015 |
| 186 | General | N | Working shot of Kenny at north elevation | | |

Appendix F Photographic contact sheets



1800 (001).JPG



1800 (002).JPG



1800 (003).JPG



1800 (004).JPG



1800 (005).JPG



1800 (006).JPG



1800 (007).JPG



1800 (008).JPG



1800 (009).JPG



1800 (010).JPG



1800 (011).JPG



1800 (012).JPG



1800 (013).JPG



1800 (014).JPG



1800 (015).JPG



1800 (016).JPG



1800 (017).JPG



1800 (018).JPG



1800 (019).JPG



1800 (020).JPG



1800 (021).JPG



1800 (022).JPG



1800 (023).JPG



1800 (024).JPG



1800 (025).JPG



1800 (026).JPG



1800 (027).JPG



1800 (028).JPG



1800 (029).JPG



1800 (030).JPG



1800 (031).JPG



1800 (032).JPG



1800 (033).JPG



1800 (034).JPG



1800 (035).JPG



1800 (036).JPG



1800 (037).JPG



1800 (038).JPG



1800 (039).JPG



1800 (040).JPG



1800 (041).JPG



1800 (042).JPG



1800 (043).JPG



1800 (044).JPG



1800 (045).JPG



1800 (046).JPG



1800 (047).JPG



1800 (048).JPG



1800 (049).JPG



1800 (050).JPG



1800 (051).JPG



1800 (052).JPG



1800 (053).JPG



1800 (054).JPG



1800 (055).JPG



1800 (056).JPG



1800 (057).JPG



1800 (058).JPG

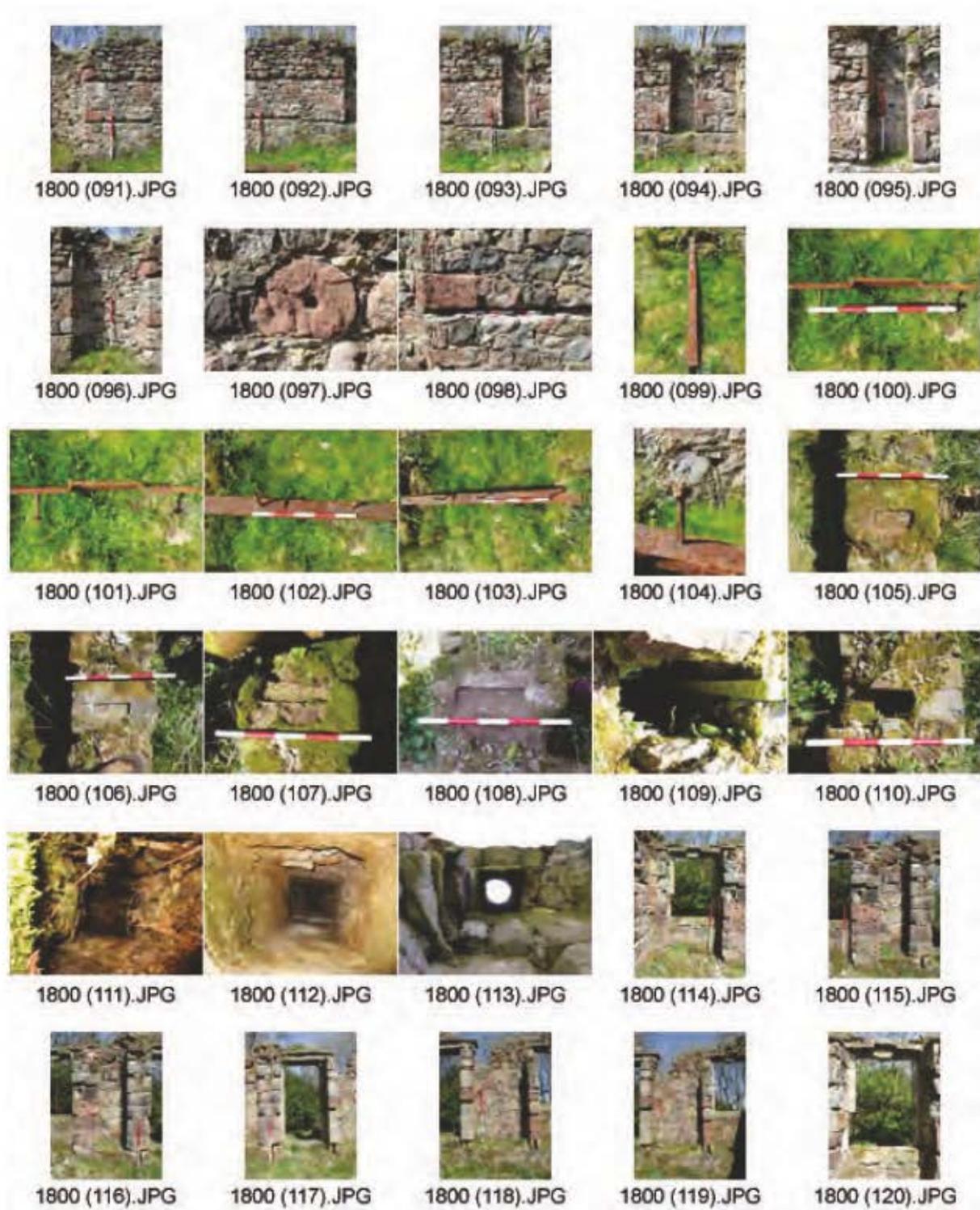


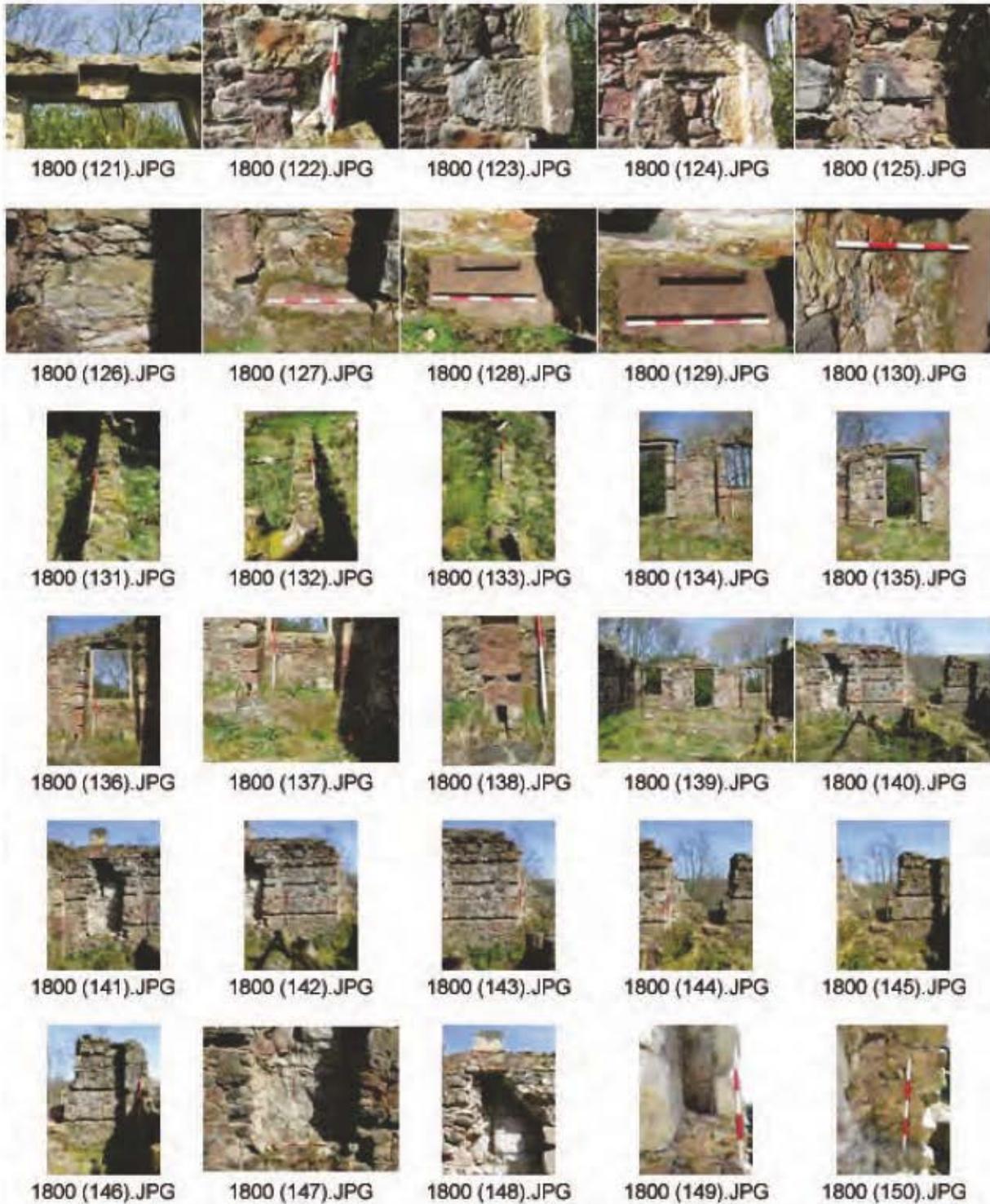
1800 (059).JPG



1800 (060).JPG







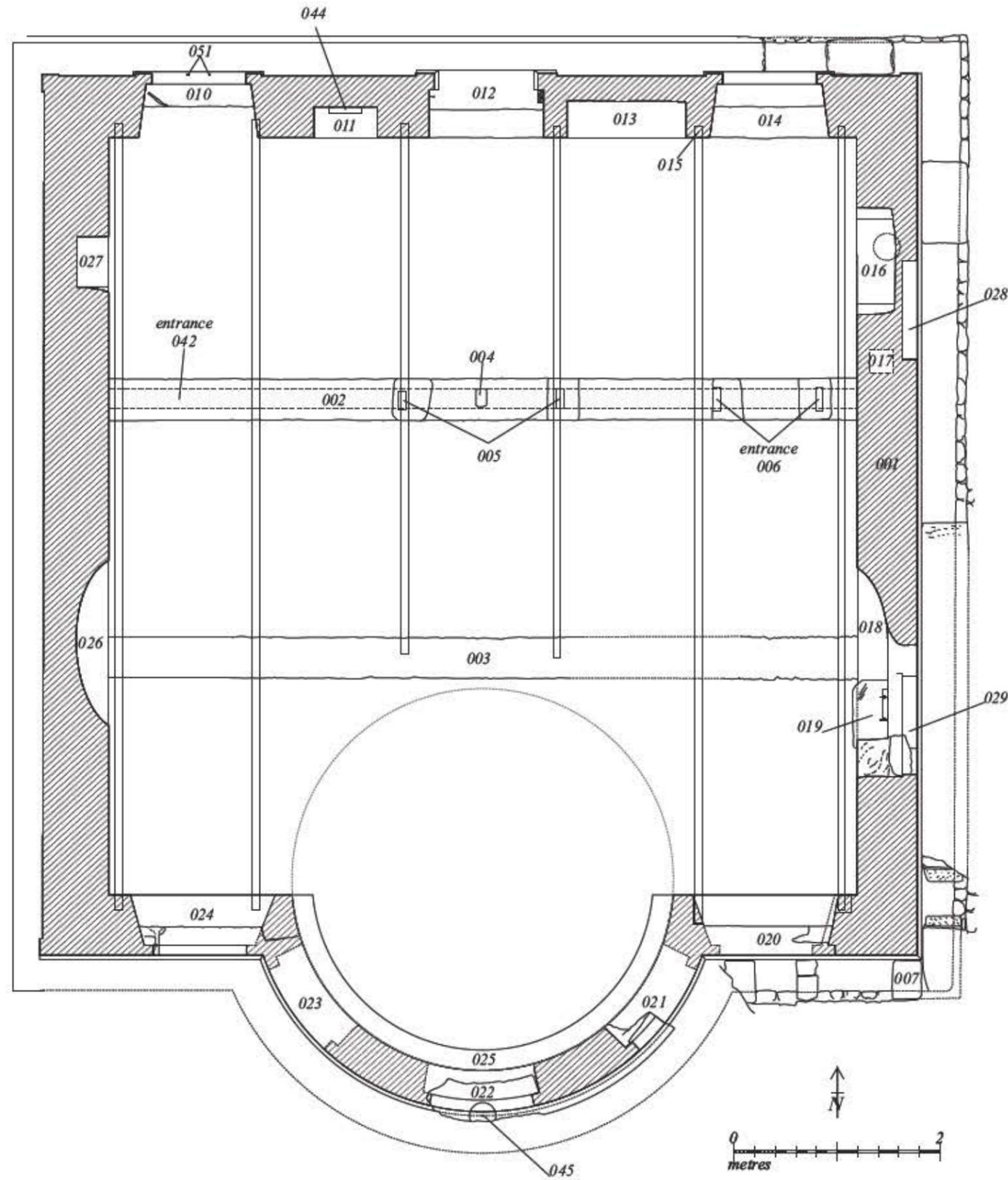


Appendix G Discovery and Excavation Scotland

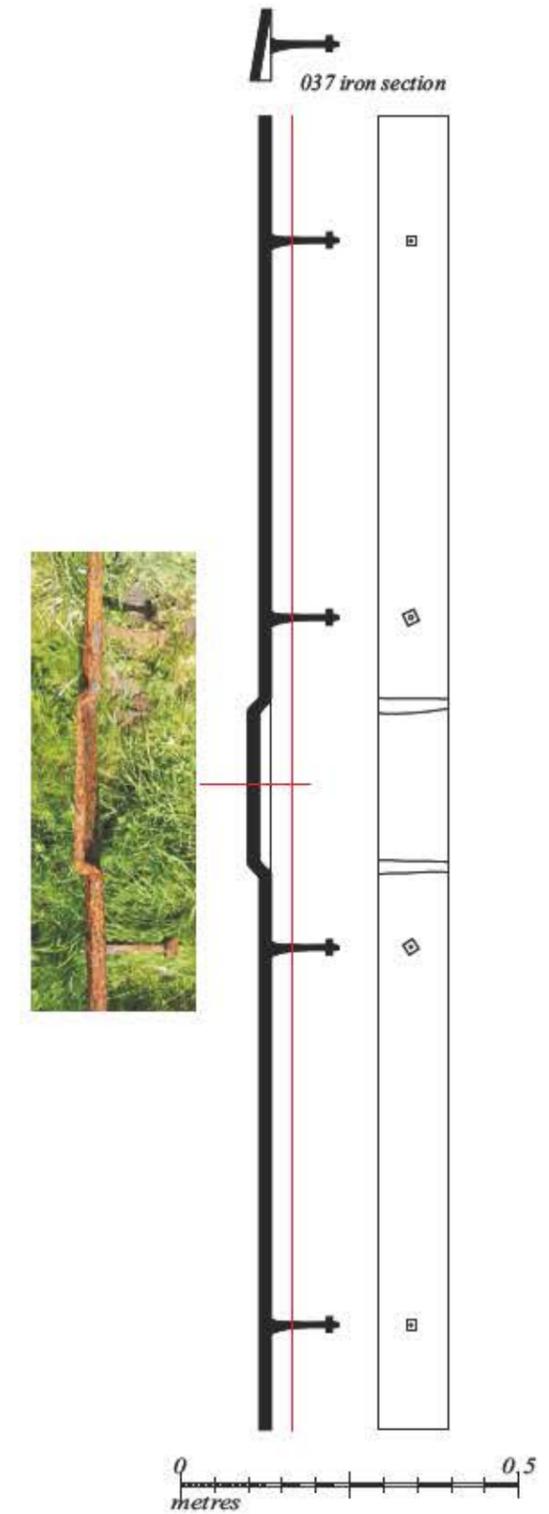
| | |
|---|---|
| LOCAL AUTHORITY: | North Ayrshire |
| PROJECT TITLE/SITE NAME: | Brisbane Observatory |
| PROJECT CODE: | 1800 |
| PARISH: | Largs |
| NAME OF CONTRIBUTOR: | Jenni Morrison |
| NAME OF ORGANISATION: | Addyman Archaeology |
| TYPE(S) OF PROJECT: | Building Recording |
| NMRS NO(S): | NS26SW3.2 |
| SITE/MONUMENT TYPE(S): | C19th ruined building |
| SIGNIFICANT FINDS: | None |
| NGR (2 letters, 8 or 10 figures) | NS 20846 61925 |
| START DATE (this season) | 20.04.2015 |
| END DATE (this season) | 22.04.2015 |
| PREVIOUS WORK (incl. DES ref.) | Site clearance |
| MAIN (NARRATIVE) DESCRIPTION: (May include information from other fields) | <p>On the 20th to 22nd of April 2015 Addyman Archaeology undertook the detailed historic building recording and analytical assessment of the early 19th century observatory built on the former Brisbane Estate, located some 3km north of the coastal town of Largs in North Ayrshire.</p> <p>The now ruined observatory structure is located adjacent (200m to the NW of) to the site of the 17th century Brisbane House (demolished during military exercises in 1941) at the heart of the historic estate.</p> <p>This small but historically important and influential private observatory was established in 1808 by Thomas Brisbane (1774-1860), later General Sir Thomas Makdougall Brisbane, Bart., in the policies of his principal seat, Brisbane House by Largs; the observatory was completed in 1811.</p> <p>In January 2013 Addyman Archaeology produced a project design for archaeology at Brisbane Observatory. This outlined the background of the project and reasoning behind the proposed recording and investigation works. Following which, funding was sought in order to progress the recording, research, archaeology and initial stages of consolidation of the structure.</p> <p>So far funding has been identified from the Kelburn Windfarm Trust, who generously offered their support. It was decided by the Brisbane Observatory Trust to progress the first stages of the programme of works with this funding, namely the survey of the upstanding remains of the building as they presently exist. It is anticipated that the further works as outlined in the January 2013 project design can be taken forward in due course.</p> <p>The upstanding walls were hand-surveyed on site by experienced buildings archaeologists (Kenneth Macfadyen and Jenni Morrison), and completed to a high level of detail. The detail was stone-by-stone for dressings as far as presently visible, with all analytical and phasing-related details recorded. A degree of light vegetation and debris removal was necessary to permit access and to be able to view the built fabric. The field drawing set was digitised and annotated. A comprehensive, fully catalogued digital photographic survey of the structure was carried out. Digitally rectified imagery was</p> |

| | |
|--|---|
| | <p>generated of the structure and included in the record drawing set.</p> <p>A full context record of the building (a description on an element-by-element basis, fully catalogued, cross-referenced to the survey drawings) was carried out.</p> <p>It is hoped that this survey will form the base line for further works on the Observatory including excavation and recording of the interior and detailed historical research.</p> |
| PROPOSED FUTURE WORK: | Further excavation and recording, historical research |
| CAPTION(S) FOR ILLUSTRS: | |
| SPONSOR OR FUNDING BODY: | Brisbane Observatory Trust |
| ADDRESS OF MAIN CONTRIBUTOR: | St Ninian's Manse, Quayside Street, Edinburgh, EH6 6EJ |
| EMAIL ADDRESS: | JMorrison@addyman-archaeology.co.uk |
| ARCHIVE LOCATION (intended/deposited) | HES |

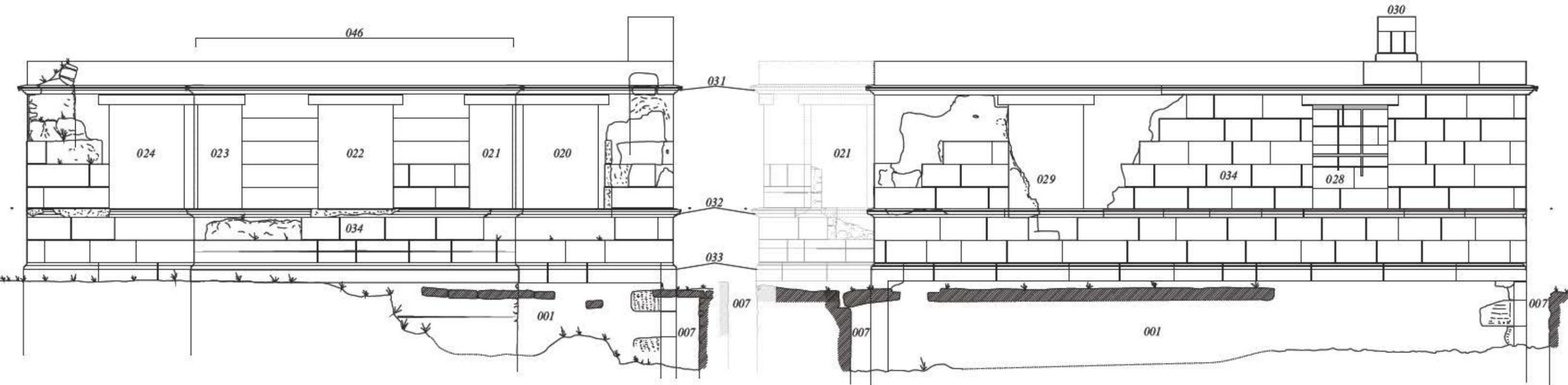
Appendix H Survey drawing set



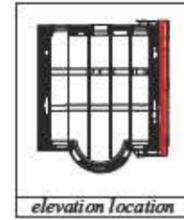
Plan



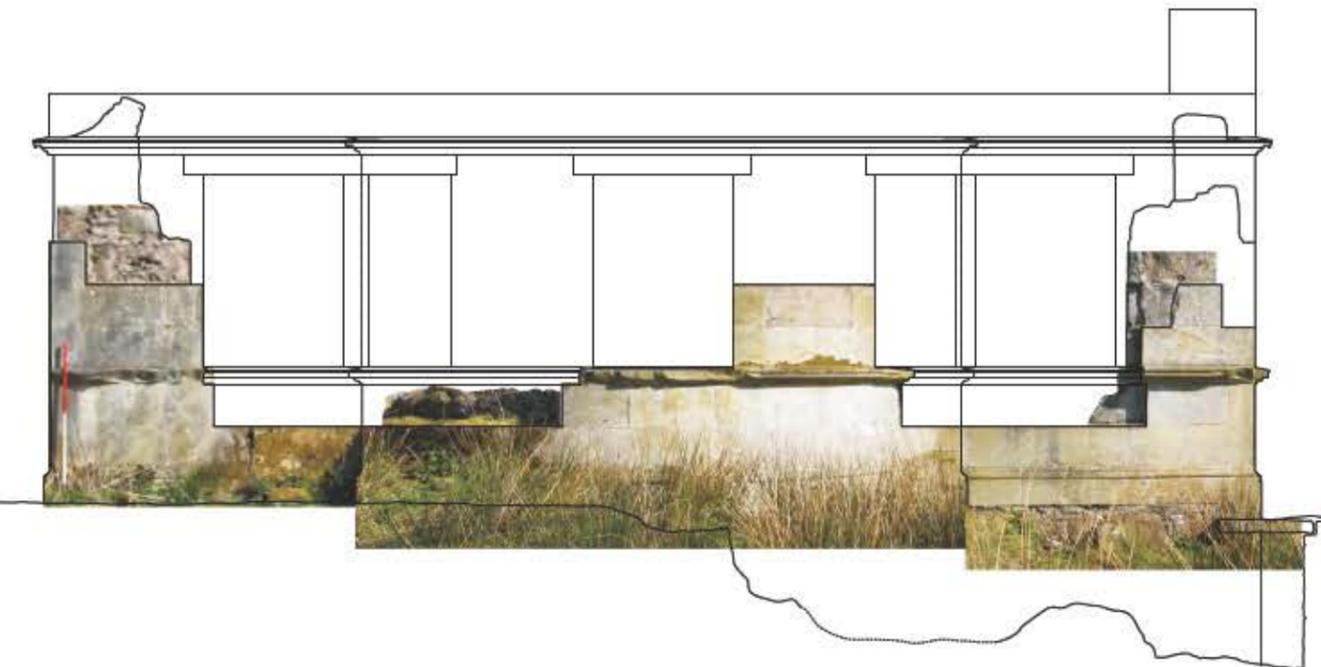
Detail of structural ironwork



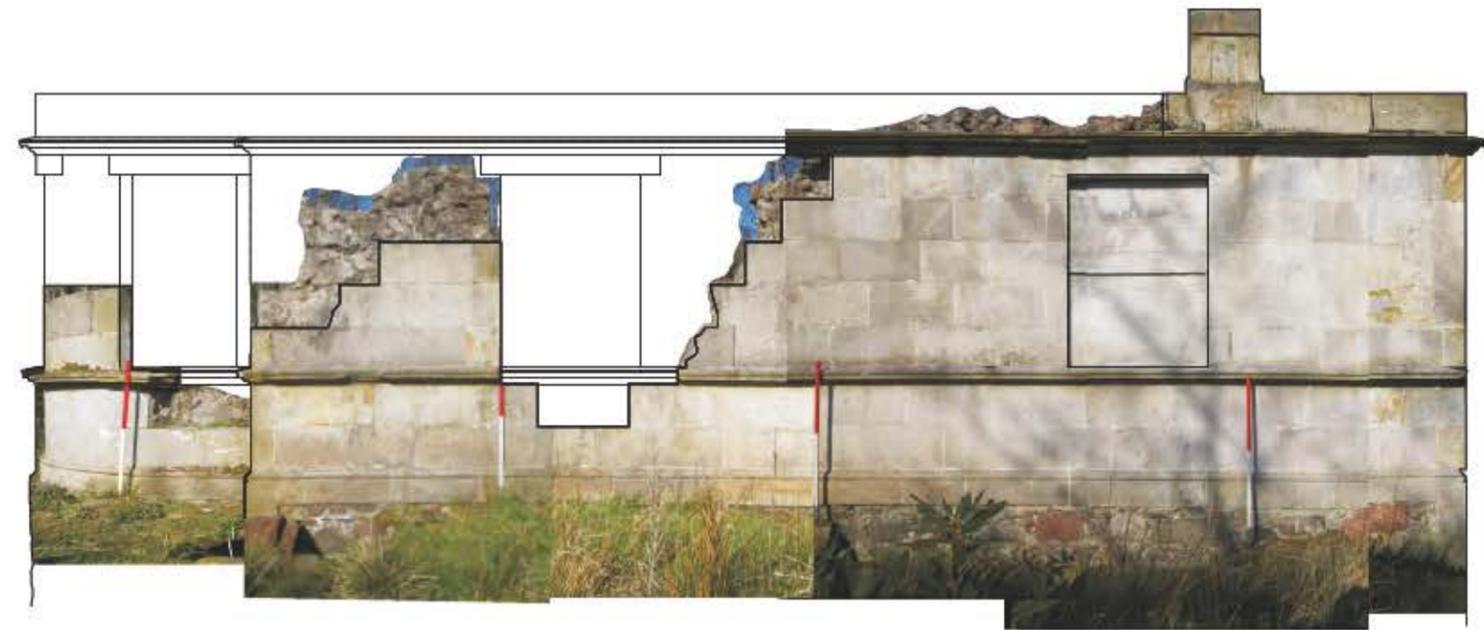
elevation location



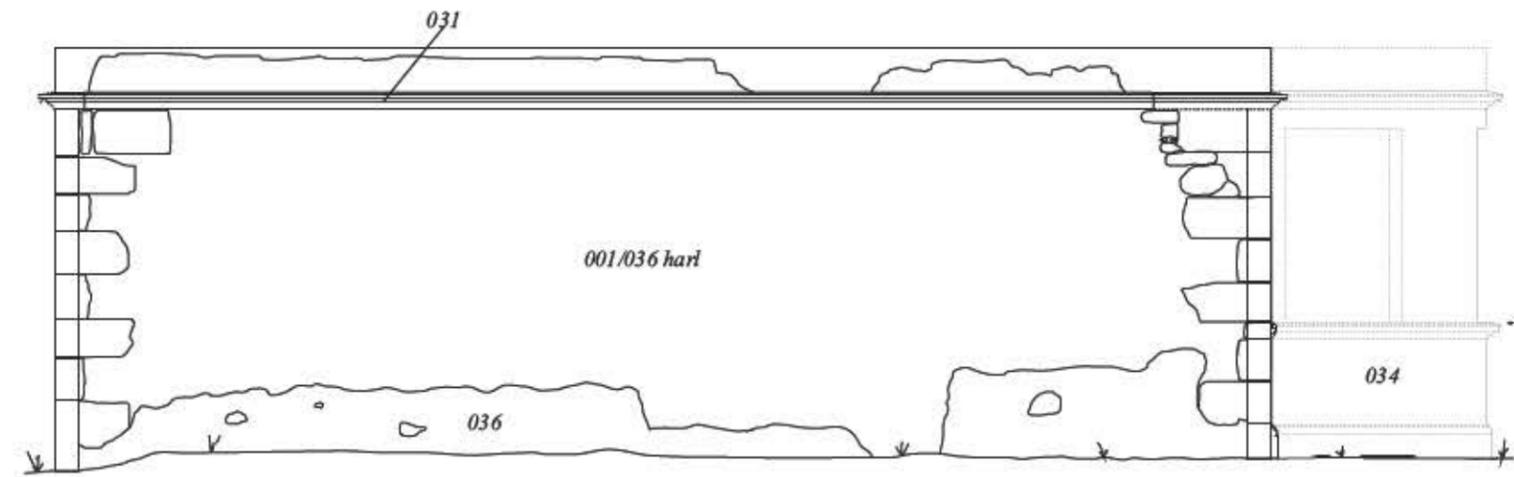
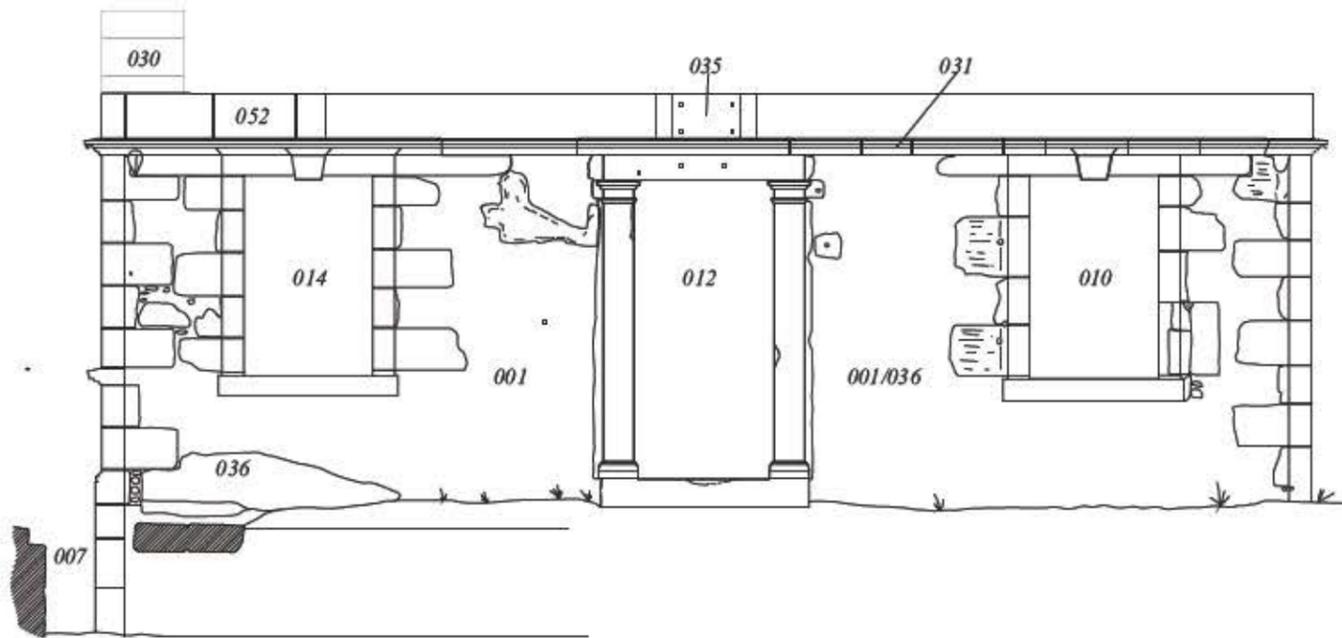
elevation location



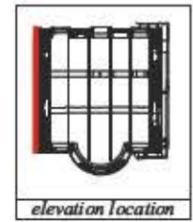
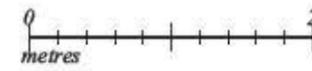
South exterior



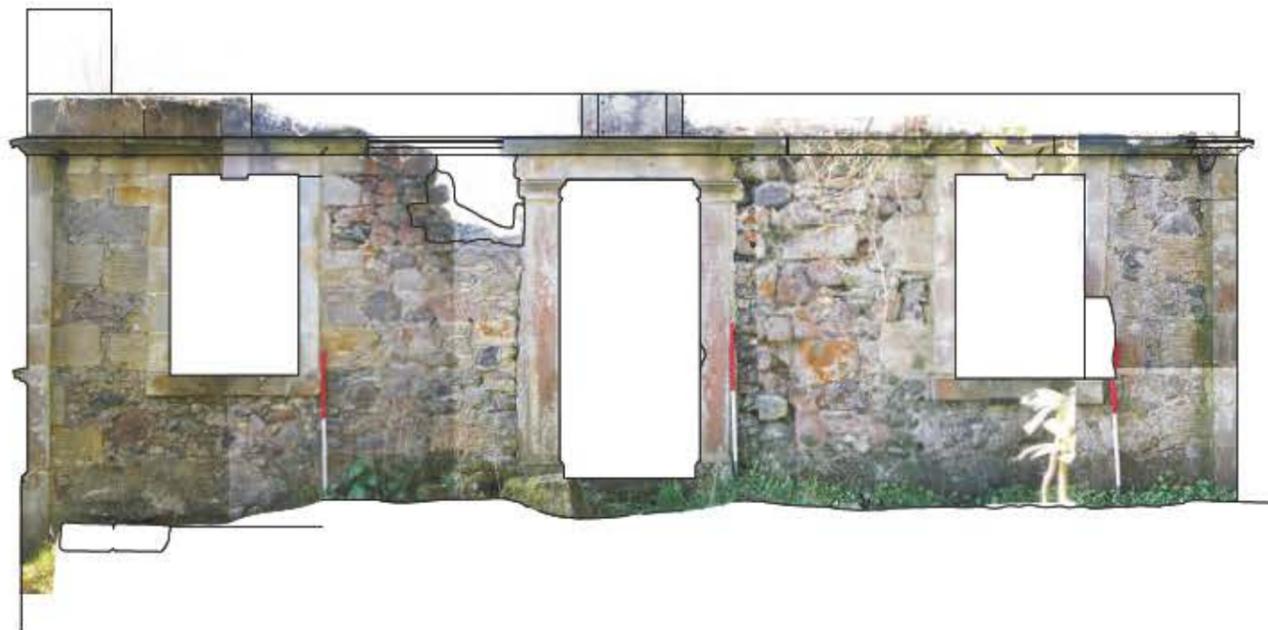
East exterior



elevation location



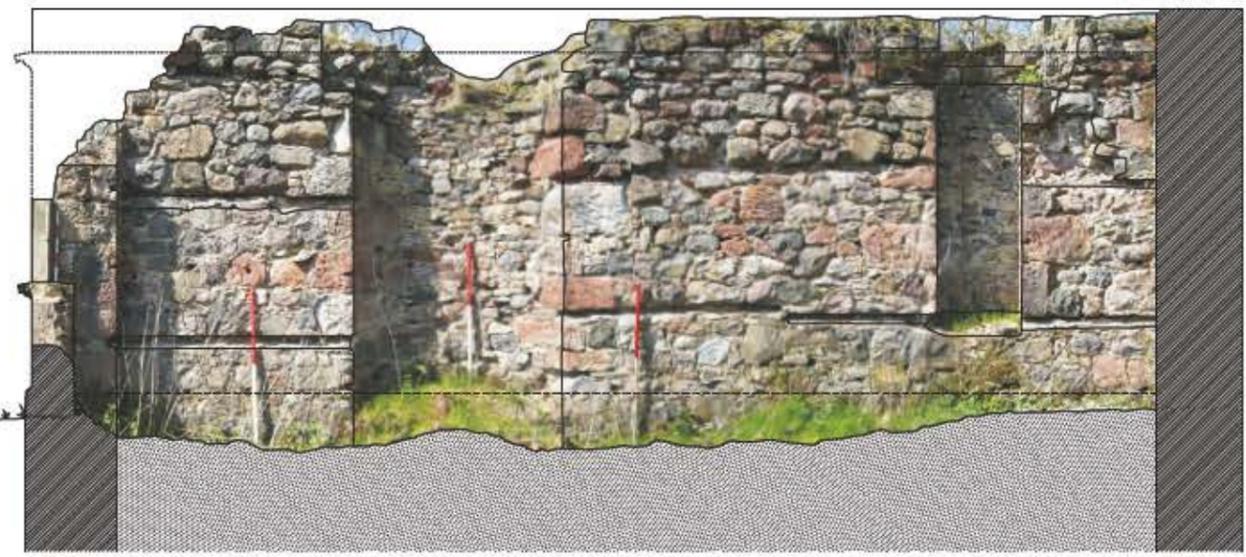
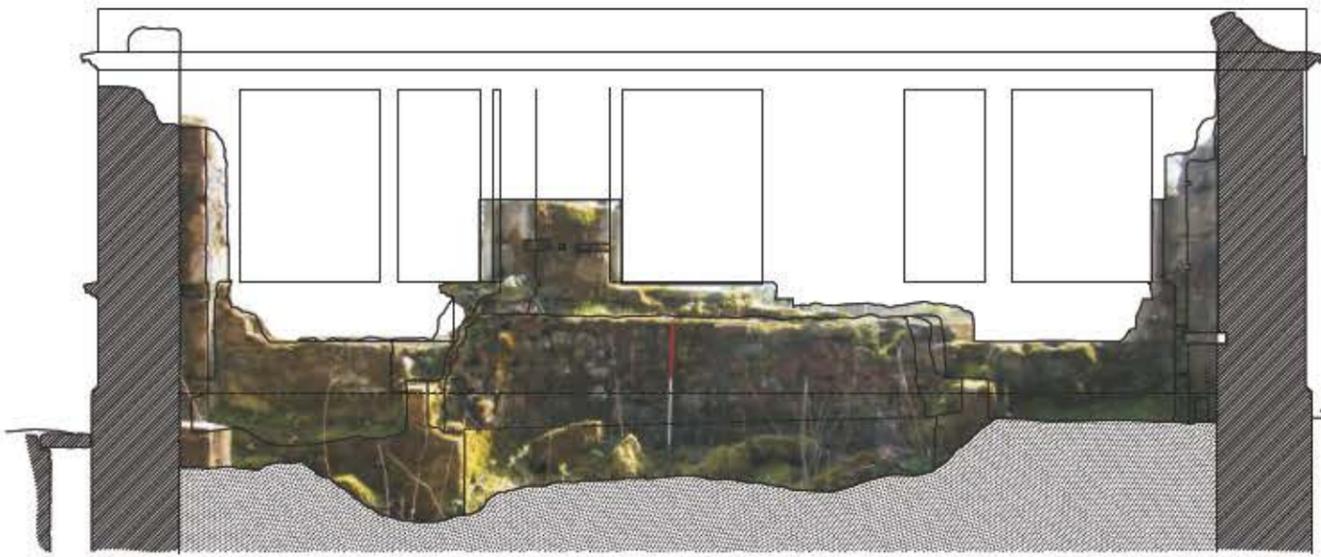
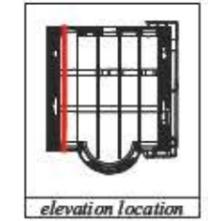
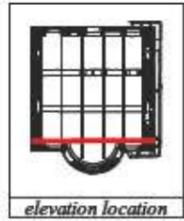
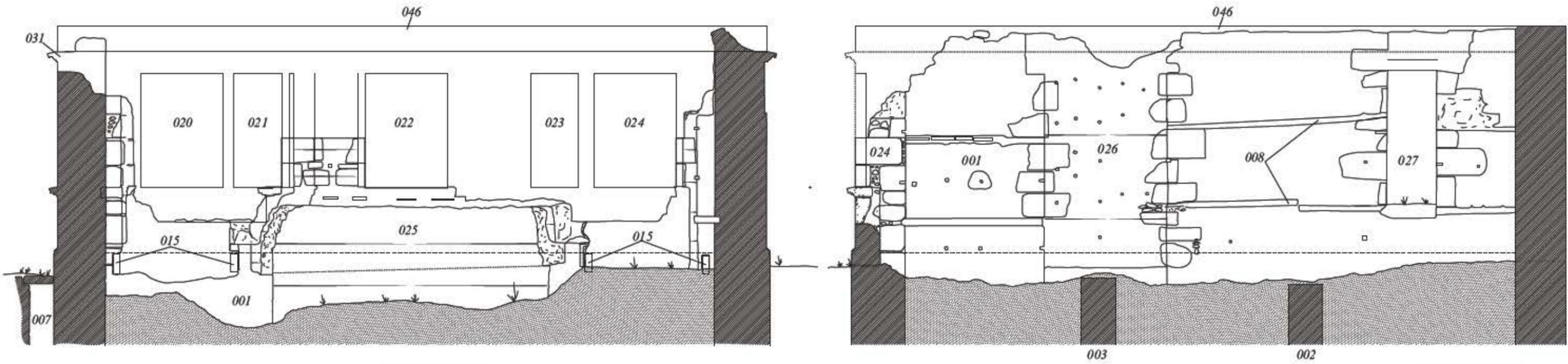
elevation location



North exterior

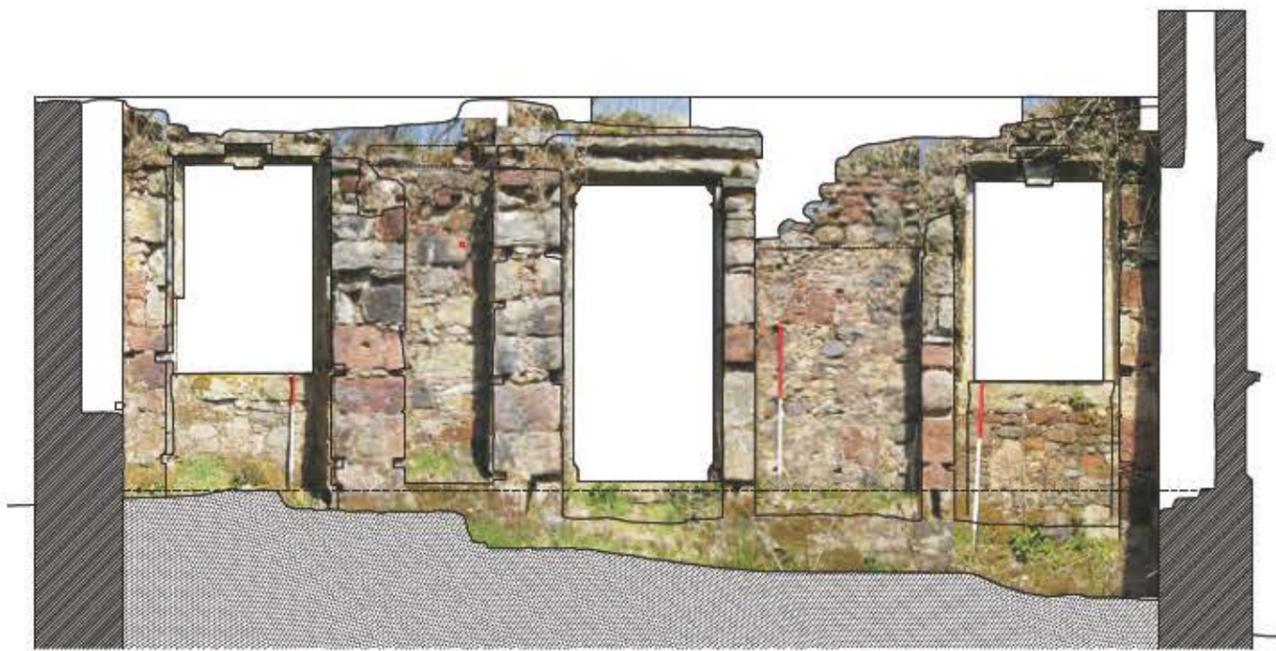
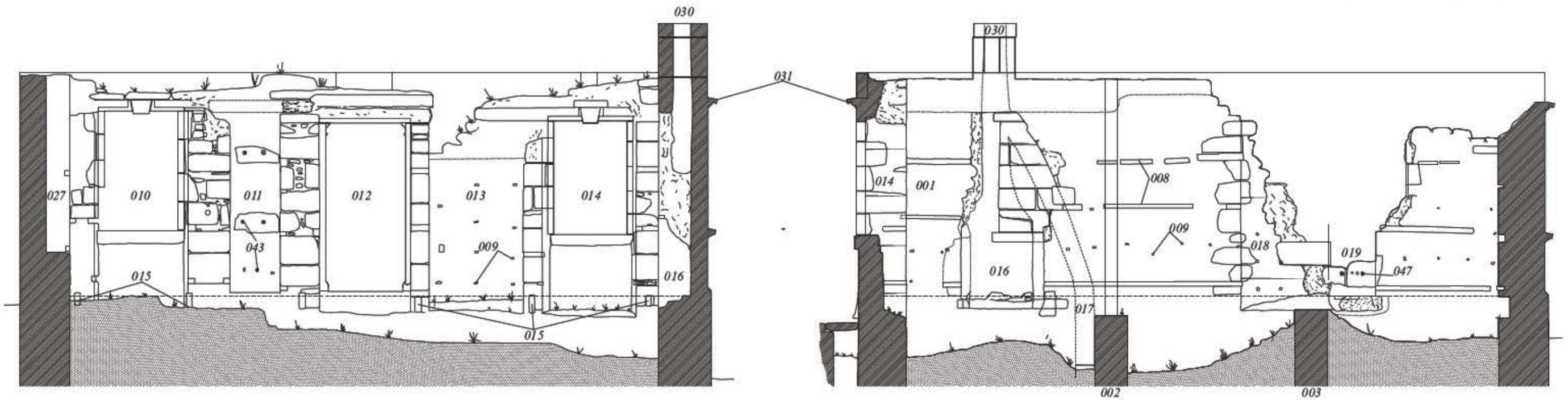


West exterior

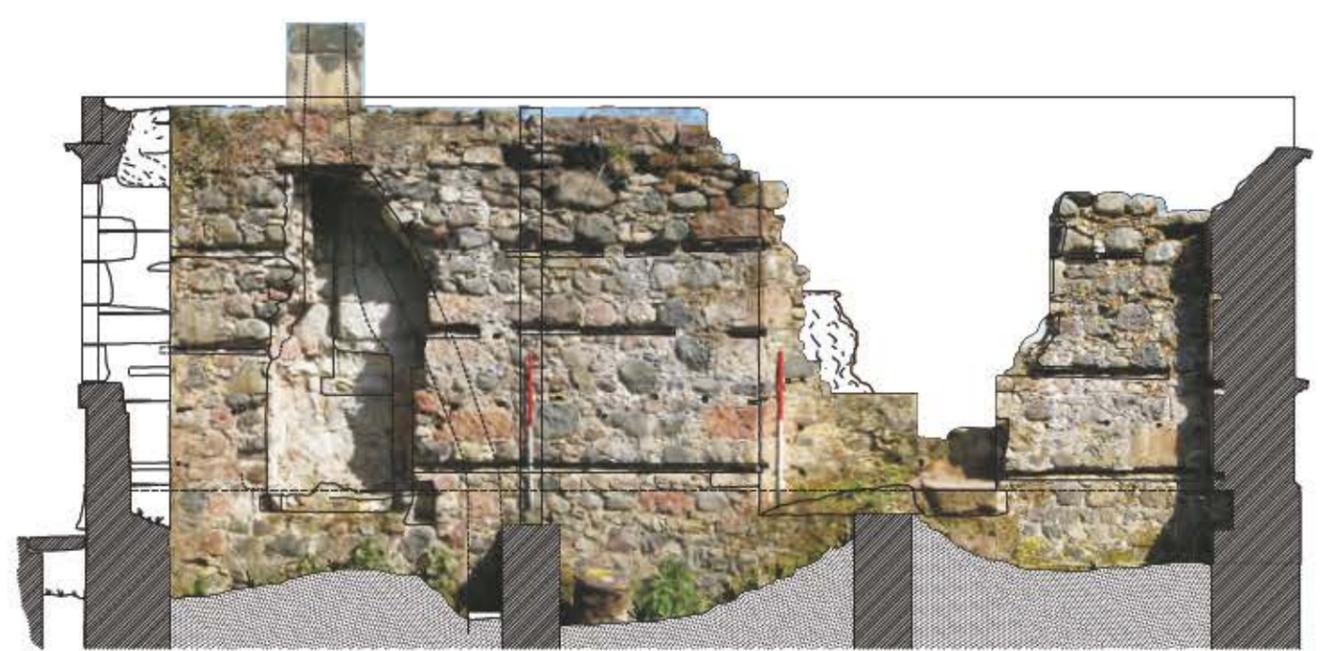


South interior

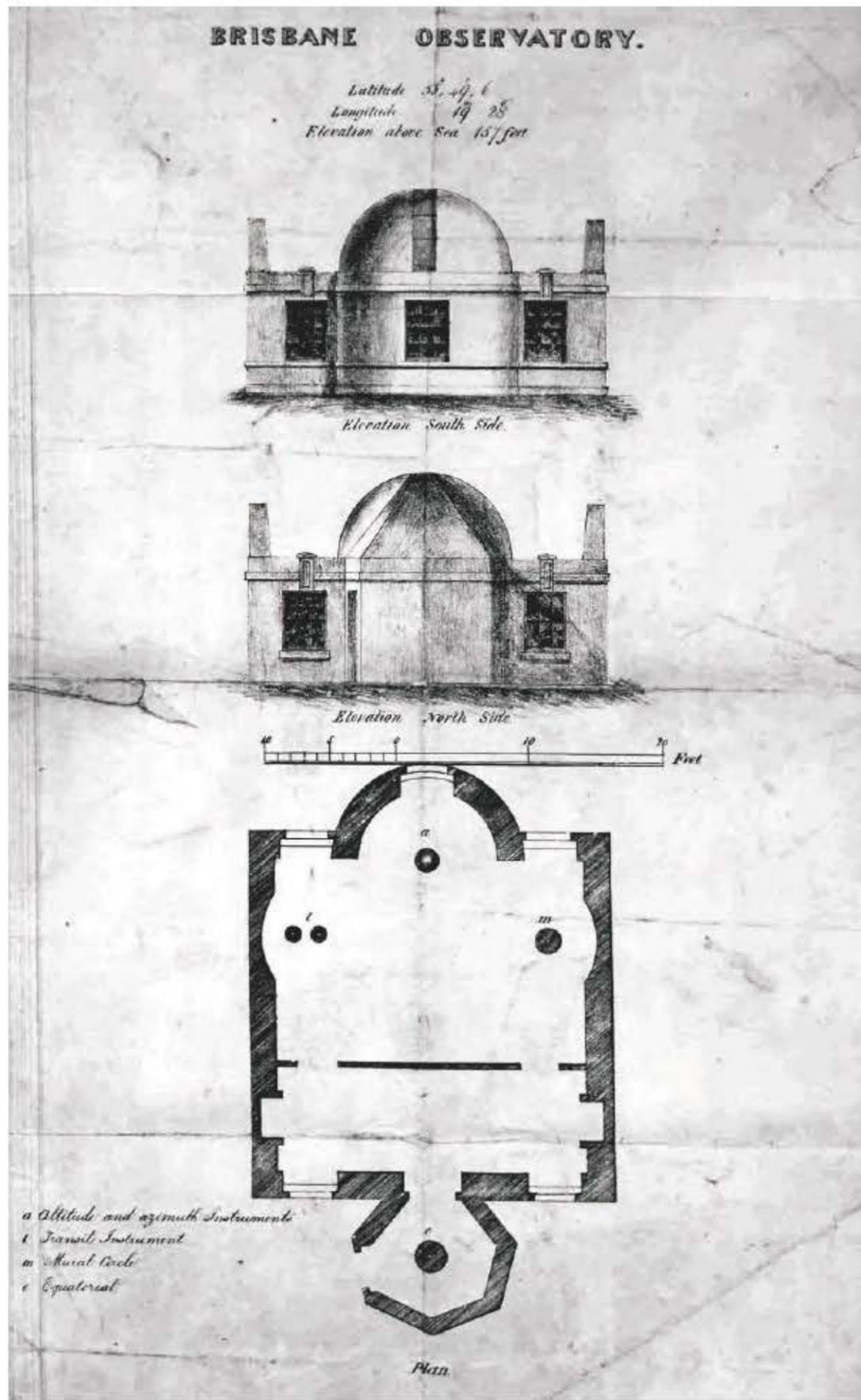
West interior



North interior

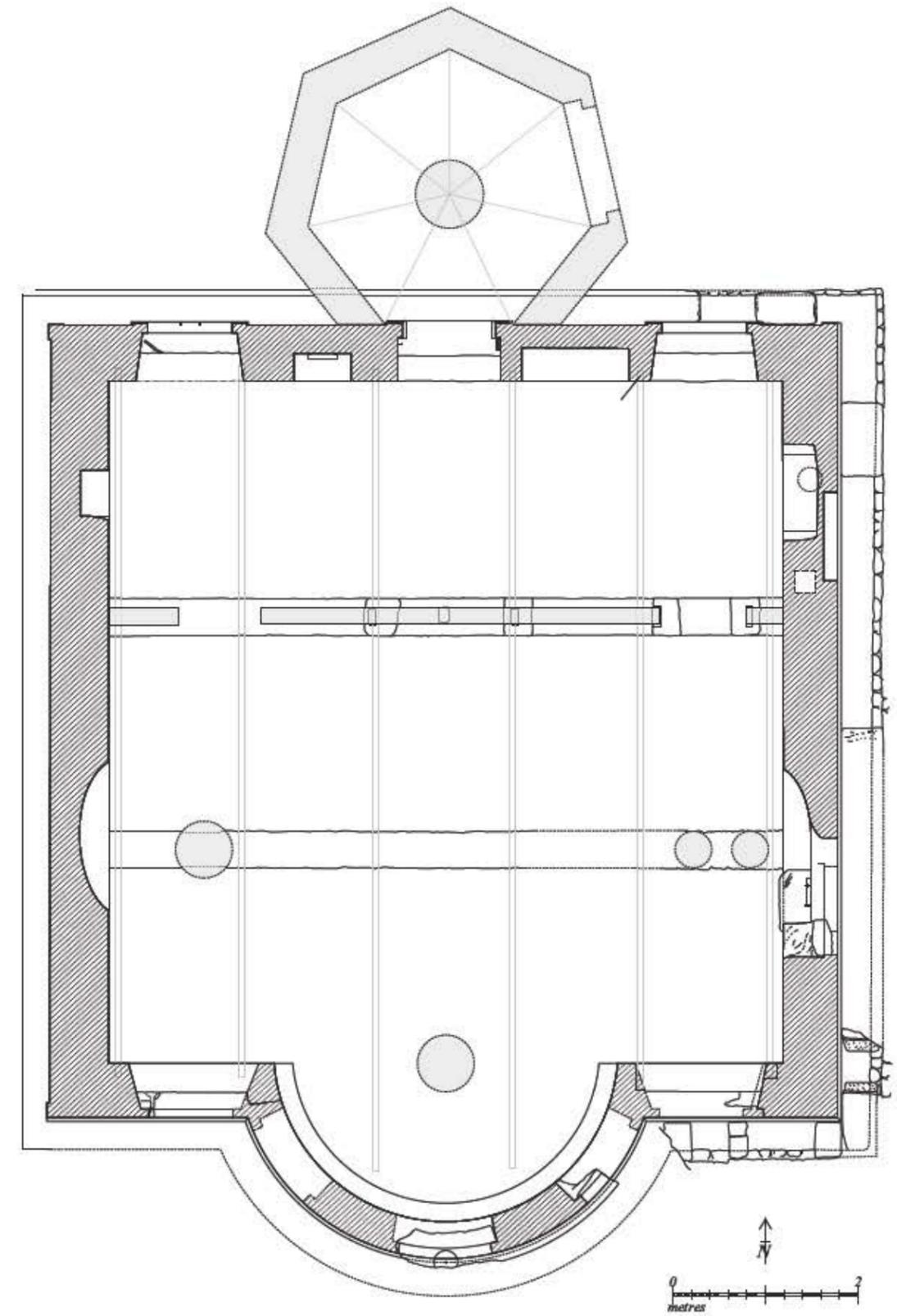


East interior



*Engraved plan and elevations of Brisbane Observatory, c. 1860
(Courtesy of the Librarian and Archivist, Royal Observatory, Edinburgh)*

Brisbane Observatory, Brisbane estate, Largs, North Ayrshire



*Plan showing projected walling and features as suggested by the engraving of c. 1860,
and from the archaeological evidence*