Hutton + Rostron
Environmental Investigations Limited

Grandpont House, Oxford: Roof drainage investigation

Site note 3 for December 2023-January 2024, job no. 160-42

CONTENTS

Distribution:

xavier.bosch@gmail.com
nico@studiostassano.com

Prepared by:	Technical review by:	Administration by:
Tim Jordan BSc MSc MCIOB MSFE	-	Kim Meredith

Hutton+Rostron Environmental Investigations Ltd, Netley House, Gomshall, Surrey, GU5 9QA

Tel: 01483 203221 Email: ei@handr.co.uk Web: www.handr.co.uk

1 INTRODUCTION

1.1 AUTHORITY AND REFERENCES

Hutton + Rostron Environmental Investigations Limited carried out site visits to Grandpont House, Abingdon Road, Oxford during December 2023-Jaunuary 2024 in accordance with instructions from Xavier Bosch by email on 15 January 2023. Drawings provided by Studio Stassano were used for the identification of structures. For the purpose of orientation in this report, the building was taken as facing west onto Abingdon Road

1.2 AIM

The aim of this survey was to investigate roof drainage and rainwater goods (i.e. gutters and downpipes) for construction, condition and viability for refurbishment. Recommendations are provided for remedial works as part of the proposed refurbishment scheme

1.3 LIMITATIONS

This survey was confined to the accessible structures. Concealed timbers and cavities have been investigated where necessary by the use of high-powered fibre optics. The condition of concealed materials may be deduced from the general condition and moisture content of the adjacent structure. Only demolition or exposure work can enable the condition of timber to be determined with certainty, and this destroys what it is intended to preserve. Specialist investigative techniques are therefore employed as aids to the surveyor. No such technique can be 100 per cent reliable, but their use allows deductions to be made about the most probable condition of materials at the time of examination. Structures were not examined in detail except as described in this report, and no liability can be accepted for defects that may exist in other parts of the building. We have not inspected any parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect or in the event that such part of the property is not free from defect it will not contaminate and/or affect any other part of the property. Any design work carried out in conjunction with this report has taken account of available pre-construction or construction phase information to assist in the management of health and safety risks. The sample remedial details and other recommendations in this report are included to advise and inform the design team appointed by the client. The contents of this report do not imply the adoption of the role of Principal Designer by H+R for the purposes of the Construction (Design and Management) (CDM) Regulations 2015. No formal investigation of moisture distribution was made

2 STAFF ON SITE AND CONTACTS

2.1 H+R STAFF ON SITE

Tim Jordan
Ellen Wise

2.2 PERSONNEL CONTACTED

Mr Xavier Bosch
House residents

3 OBSERVATIONS AND RECOMMENDATIONS

3.1 EXECUTIVE SUMMARY

As described within attachments, roof drainage has been much altered since original construction. It appeared that the entire Main House and west wing might have originally drained to a single point, perhaps with a view to rainwater harvesting but has since been altered during C20th works to run into the river below. Central valley gutters and internal drainage troughs have been a high risk of water ingress running directly inside the building and have often not been sufficiently maintained to mitigate this risk

Recommendations are detailed within attachments. H+R recommend total replacement of the rainwater gutters and detailing for fail-safe overflow routes as part of the upcoming refurbishment scheme. The west hopper of the main roof seemed to be the only remaining element of significant historic value (to be prioritised for retention)

4 H+R WORK ON SITE

4.1 H+R inspected specified parts of the building fabric using all available access and exposure

4.2 H+R deployed visual, tactile and specialist equipment techniques to interrogate the fabric

5 PROPOSED ACTION BY H+R

5.1 H+R will advise on repair and conservation, so as to minimise the risk of decay after refurbishment if instructed

5.2 H+R will advise on remedial detailing, so as to minimise the risk of damp and decay problems after refurbishment if instructed

5.3 H+R will advise on conservation of original fabric with regard to damp, decay and salt damage, as necessary and if instructed

5.4 H+R will review proposed remedial details as these become available if instructed

5.5 H+R will return to site to inspect sample remedial details if instructed

5.6 H+R will liaise with conservation and historic building authorities, if instructed, so as to ensure the cost-effective conservation of original fabric

6 INFORMATION REQUIRED BY H+R

6.1 H+R require up-to-date copies of project programmes, as these become available

6.2 H+R require copies of up-to-date lists of project personnel and contact lists as these become available

6.3 H+R require copies of proposed remedial details for comment as these become available

6.4 H+R should be informed as a matter of urgency if further significant water penetration occurs onto site; so that advice can be given on cost-effective remedial measures, to minimise the risk of cost or programme overruns and so as to minimise the risk of damp or decay problems during the latent defect period

7 ADMINISTRATION REQUIREMENTS

7.1 H+R require formal instructions for further investigations and consultancy on this project

7.2 H+R require confirmation of distribution of digital and printed copies of reports and site notes

Attachment A

SCHEDULE OF OBSERVATIONS AND RECOMMENDATIONS

REFERENCE	ITEM	OBSERVATIONS	RECOMMENDATIONS	CLIENT COMMENTS
SN3.1 MAIN HOUSE, MAIN ROOF, DRAINAGE				
SN3.1.1	Main House Main roof Drainage	The double-pile roof drained to 4no. parapet gutters around the perimeter and a central valley gutter (running north-south). These were lined in code 4 lead in bays of upto 2200mm (joints were often welted rather than stepped which is against good practice) The original gutter formwork has been overlaid (which previously ran to different falls) An internal lead-lined trough (200x250mm in section) originally ran from east to west at the centre of the building. This collected drainage from three outlets (east parapet, central valley, west parapet) before discharging onto the west wing roof below. During various C20th works, the east parapet outlet has been diverted to a drainpipe on the east elevation and the trough discharge route at the west elevation has been altered The east downpipe is a poor quality (temporary) PVCu 110mm dia. goods, installed when the east façade was clad in plywood (circa 1980s, when it was expected that full restoration of the frame and rendering would eventually follow). This pipe was embedded directly into the pathway and discharged onto the spit of land beside a pier in the bridge (eventually running into the river). There was not originally a drainpipe on the east elevation (on the basis that it visually disrupts the architecture of this principal façade). The 1910 era cast iron hopper has been set aside on the roof (measurements 550x400x250mm, vaguely imitating the historic hopper at the west elevation) The west downpipe began at a historic (cast lead?) hopper, suspected to be original to the Georgian era works. It was of a decorative design and fairly large capacity. A point on the outer lip of the hopper appeared to serve as a way of encouraging overflow water to shed clear of the wall. The pipework below has been replaced in 70mm diameter PVCu goods with a small hopper situated immediately below the historic hopper. The pipework ran into very crude and convoluted bends to connect with the downpipe serving the west wing eaves gutter (this seemed very much over-loaded). There was evidence to suggest that the west side of the roof previously had two outlet locations, it was assumed that these may have run into the central valley gutter of the west wing	*As per H+R Site Note 2, it has been recommended that all roof finishes (including lead gutter linings) should be replaced alongside works to upgrade detailing according to best practice* *Whilst the roof finishes are being lifted, modern formwork timbers should also be removed to allow inspection and recording of the original formwork design below. This can give an idea of how the original drainage strategy was composed (e.g. location of outlets)* *H+R would suggest that it might be desirable to remove the non-original downpipe location from the east façade. Restoring the 2no. original internal drainage troughs running through the roofs is an option but raises the risk of water ingress in future. H+R would therefore suggest that 2no. additional lead 'wiered overflow' outlets are provided (at locations marked on drawings) leading to new cast iron hoppers and 100mm dia. downpipes discharging onto the flat roof below. New hoppers should replicate the original example at the west elevation but can be marked with the year to aid future interpretation of the property. In this scenario, gutter falls would be changed and internal troughs decommissioned* *As per the above, the east downpipe is suggested for removal in order to restore the original Georgian aesthetic of the principal façade. The 1910 era hopper is not necessarily deemed worthy of retention* *As per the above, it has been suggested that new outlet locations in the north elevation carry the water from the east parapet and central valley. The west parapet outlet could therefore be omitted and the gutter diverted towards the suggested new outlets. The hopper could be used to serve one of the 2no. new outlets at the north elevation* *(If the conservation officer wishes to retain the west hopper and downpipe it its original location, it could be retained as a dummy or to carry only part of the run-off from the west parapet gutter. This would be seen as sub-optimal due to the clash with the west wing eaves gutter)* *(Note that there is the assumption for the Grandpont site generally that roof drainage directly into the river will continue to be acceptable to the local authority; this may require discussion and confirmation)*	

REFERENCE	ITEM	OBSERVATIONS	RECOMMENDATIONS	CLIENT COMMENTS
SN3.1.2	Main House West wing Drainage	This roof has been much altered from 'double-pile' format to a single pitched roof (by adding rafters and sarking to infill the original central valley gutter). There may also have originally been a parapet wallhead detail (since replaced with a sproketed eaves detail). This alteration was suspected to have been carried out circa 1900-1910 The original central valley gutter of the west wing (possibly also carrying water running off the main roof), drained through a small arched aperture in the chimney, towards an assumed hopper and downpipe at the west elevation The existing pitched roof with overhanging eaves was a mixture of PVCu and aluminium (ogee profile, 100x150mm). This was served by 3no. downpipes of 70mm diameter. The gutter runs seemed excessively long and the downpipes too narrow to efficiently drain the roof area (especially where the main roof shared one of these downpipes). The north gutter showed evidence of overspill due to these issues. Each of the downpipes appeared to terminate into the river eventually	*Although it remains an option to restore the original double-pile roof etc. it was assumed by H+R that the client would be unlikely to pursue this costly approach. The recommendations below assume an approach of improving the existing eaves gutter arrangement* - *H+R recommend that eaves gutter are fully removed and the fascia/soffit timbers are made good and re-decorated. If it is desirable to retain the south run of aluminium eaves gutter, the plastic north and west gutters can be replaced in matching aluminium (ogee profile). Otherwise, the guttering could totally be replaced in cast iron. 4no. downpipe locations are suggested (one at each corner of the west wing) using 100mm diameter cast iron*	
SN3.1.3	Main House Secondary roofs Drainage	As shown on drawings, there were various small roofs around the north and west side of the main house. These drained to eaves gutter and downpipes leading into the river The north-west flat roof drained to an aluminium ogee profile eaves gutter 75x100mm in section. This ran to a single downpipe dropping directly into the river. Note that this area also carried sequential drainage from one of the west wing drainpipes Pitched roof at the north side of the main house: The east pitch ran onto the flat roof mentioned above. The west pitch drained to eaves gutter and downpipe leading into the river (but the gutter has broken, meaning that it overflowed onto the wall before reaching the river) The hipped roof at the north side of the west wing drained to a 120mm diameter half-round PVCu gutter. The single downpipe was of 75mm diameter cast iron Storage rooms/sheds at the west side of the west wing also drained to 120mm plastic gutters. Downpipes were 70mm diameter PVCu. A linear drainage channel in the paving nearby appeared to be the means of carrying water from the foot of one of these downpipes in to the river; this has become blocked with debris, causing standing water	- *The recommendation above to redirect the main roof drainage towards the north elevation would entail a significant increase of water passing over the flat roof. H+R would therefore suggest that the leading-edge of the flat roof (over the river) should be fitted with a 300mm overhang projection and fitted with new eaves gutters and 2no. downpipes draining into river (125mm diameter cast iron goods)* *West eaves gutter (and downpipe draining into river) to be replaced in 100mm diameter cast iron goods* *Eaves gutter and downpipe to be replaced in 100mm diameter cast iron goods. Architect to consider how surface drainage can be captured and shed at the feet of downpipes (i.e. all those which do not currently drain into the river)* *Eaves gutters and downpipes to be replaced in 100mm diameter cast iron goods. Architect to consider how surface drainage can be captured and shed at the feet of downpipes (i.e. all those which do not currently drain into the river)*	

REFERENCE	ITEM	OBSERVATIONS	RECOMMENDATIONS	CLIENT COMMENTS
SN3.2 STABLES ROOF DRAINAGE				
SN3.2.1	Stables Roof drainage	Eaves guttering was of PVCu in a half-round profile 120mm diameter Downpipes were arranged as shown on drawings (4no.) which were of PVCu in 70mm diameter The centre of the south elevation had a parapet wall feature, necessitating a parapet gutter lining (finished in mineral felt) Various parts of the gutter were overflowing, often due to poor setting-out of the slates which did not allow a proper eaves overhang to shed water effectively into the gutter. There were also areas where the gutter had sagged or was poorly flashed into the felt parapet The back-gutter for the west hip abutment to the stone boundary wall has become disguised by built-up debris. It was assumed that this might have been lined in lead. There were no major leaks internally to suggest failure of this gutter but it was not otherwise possible to gather further data at this stage	*Eaves gutters and downpipes to be replaced in 100mm diameter cast iron goods. Architect to consider how surface drainage can be captured and shed at the feet of downpipes (i.e. all those which do not currently drain into the river)* *Careful detailing will be required to carry water from the south-central parapet gutter into the eaves gutters alongside, this may call for iron hoppers at each of these locations (2no.) to capture water from both the eaves gutter and the parapet gutter via a lead flashing* *As part of renewing the roof finishes (suggested within H+R Site Note 2), the existing eaves overhang deficiency should be rectified, fascia boards replaced (or made good and redecorated) and the west back-gutter replaced*	
SN3.2.2	'The Cottage' Roof drainage	The Cottage has been purposefully 'ruined' by removal of the roof several decades ago. No rainwater goods remained There were various storage sheds at the east side of The Cottage, some of which had been demolished in the past. One roof, which remained as a rudimentary bike store with corrugated plastic covering, drained to a PVCu eaves gutter and projected over the boundary wall into the river	*On the assumption that the cottage is to be rehabilitated, allow for new eaves gutters and downpipes in 100mm diameter cast iron goods. Architect to consider how surface drainage can be captured and shed at the feet of downpipes (i.e. all those which cannot drain directly into the river)*	

Attachment B

see stables drawing...

...River Isis runs alongside buildings...

gutter broken

north-east flat roof:
-aluminum eaves gutter
-ogee profile
-75x100mm in section

sequential run-off

additional rwp suggested

additional rwp suggested

gutter overspill (long run)

suggestion to re-divert main roof drainage towards 2no. new weired overflow outlets, hoppers and downpipes

roof overspill (no gutter) reinstatement required

historic photos suggest a second roof drain location here previously (tbc?)

surface drain blocked with debris

internal trough: decommissioned ~1910

capacity overloaded

main roof:
-code 4 lead parapet and valley gutters
-previous patch repairs to holes/splits
-poor detailing for movement joints

east drainage outlet:
-introduced ~1910
-iron goods replaced in PVCu ~1980
-110mm diameter pipe run directly into gravel footpath and eastward into river
-1910 era hopper remains set aside (nearby on bay roof, 550x400x250mm)
-suggestion that this should be removed

internal trough:
-200x250mm in section
-lined in lead
-maintenance access obstructed by modern plumbing tank
-runs to hopper at west elevation (original georgian cast lead?)
-hopper runs to poor quality secodary hopper and 70mm diamter PVCu downpipe
-suggestion that this should all be removed (with hopper re-used at one of the new northern downpipe locations)

west wing:
-central valley gutter (marked by dashed line) has been infilled ~1910
-originally drained through chimney towards assumed hopper and downpipe
-possible that there may have been a parapet gutter detail around the perimeter?
-south eaves gutter of aluminum (alumasc brand) ogee profile 100x150mm
-north and west eaves gutter in half-round PVCu 120mm diameter
-downpipes 70mm diamter PVCu (south pipe feet drop through stone paving into river below)

Grandpont House, Main House - Roof

Roof drainage investigation
December 2023 - January 2024

Hutton + Rostron Environmental Investigations Ltd
Netley House, Gomshall, Surrey, GU5 9QA Tel: 01483 203221
160-42 Site Note 3 -Not to scale-

Key:

- Indication of guttering and downpipes
- Previous drainage route (no longer operational/present)
- Suggested additional drainage

N

stone boundary wall

lead-lined gutter

gutter overspill
(sagged)

...River Isis runs alongside buildings...

inadequate eaves
overhang (slating issue)

capacity overloaded where flat
roof runs into eaves gutter (x2)

'The Cottage':
no roof (or drainage)

H+R

Grandpont House, Stables - Roof

Roof drainage investigation

December 2023 - January 2024

Hutton + Rostron Environmental Investigations Ltd
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160-42 Site Note 3 -Not to scale-

Key:

Indication of guttering and downpipes

Attachment C

Fig 1:

Main House, main roof

Showing general view with north orientated at head of image

The parapet and valley gutters originally drained to the west via two internal troughs

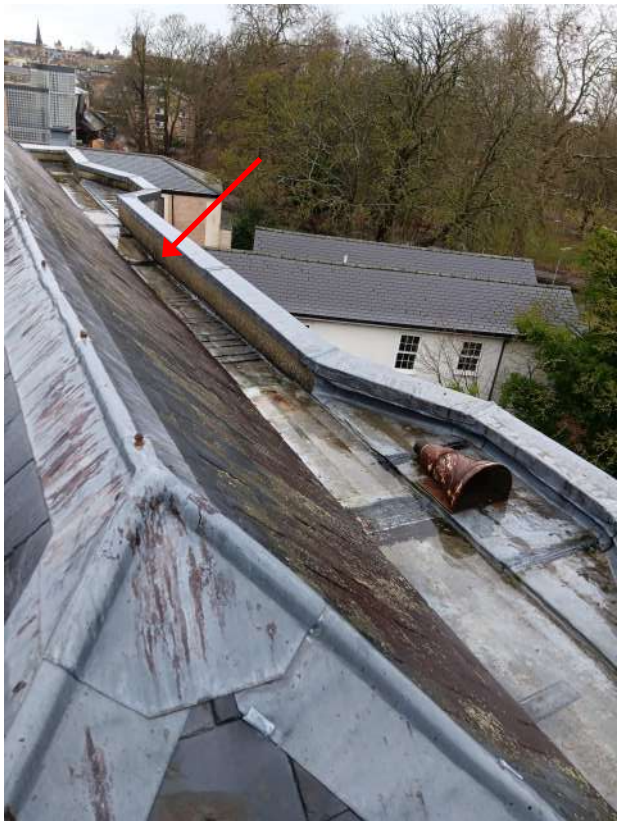

Fig 2:

Main House, main roof

Showing east gutter

Outlet position marked (arrow)

1910 era hopper has been set aside on the roof (rhs)

Grandpont House
Photographs
December 2023
Not to scale

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Fig 3:

Main House, main roof

Showing central valley gutter

Position of outlet to internal trough marked by arrow

Fig 4:

Main House, main roof

Showing west parapet gutter

Position of outlet (for both the parapet gutter and internal trough) is marked by arrow

Grandpont House
Photographs
December 2023
Not to scale

Fig 5:

Main House, main roof

Showing example of internal drainage trough. In this particular area, the trough has been decommissioned during the 1910 works with water diverted to the east elevation (see fig 6 below)

Fig 6:

Main House, main roof

Showing east parapet outlet; this was a non-original drainage position

When first installed in ~1910, there was an iron hopper here (currently set-aside on the roof)

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Fig 7:

Main House, main roof

Showing east drainpipe

Aesthetically, this spoilt the architecture of the principal façade

Fig 8:

Main House, main roof

Showing east drainpipe run below gravel path and onto spit of land beside river

Fig 9:

Main House, main roof

Showing outlet for central valley gutter

This was partially blocked by tree matter; in the past this has led to water flooding the interiors

Note mesh restricting bird access

Fig 10:

Main House, main roof

Showing drainage outlet to west façade

The historic hopper (Georgian cast lead?) appeared in reasonable condition although some stains in the paintwork suggested the metal may be deteriorating

Note rather crude detail where secondary hopper is provided. Also note modern downpipe which seemed under-size

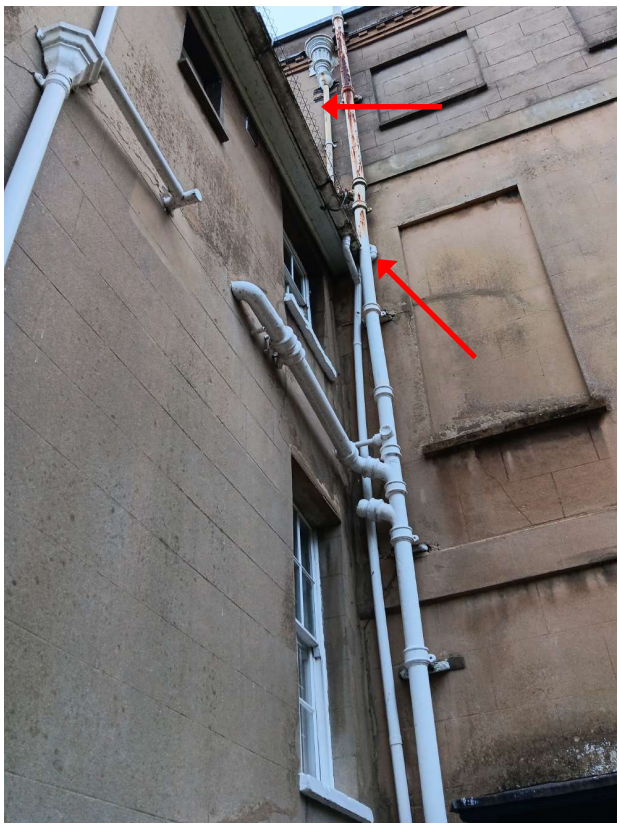

Fig 11:

Main House, main roof

Showing west rainwater downpipe in small diameter goods with various complex bends

Fixings into the masonry were scant and crude

Note cast iron soil stack alongside has become detached from its fixings to the wall

Fig 12:

Main House, main roof

Showing west rainwater downpipe penetrating the stone entrance slab (presumably dropping directly into the River running below)

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Fig 13:

Main House, main roof

Showing historic image from DIA heritage statement; this appears to show another hopper location at the west elevation (tbc)

Fig 14:

Main House, west wing

Showing general view with north orientated at head of image

Downpipe locations serving eaves gutter are marked

Note the roof shape has been changed circa 1910 from the original central valley gutter

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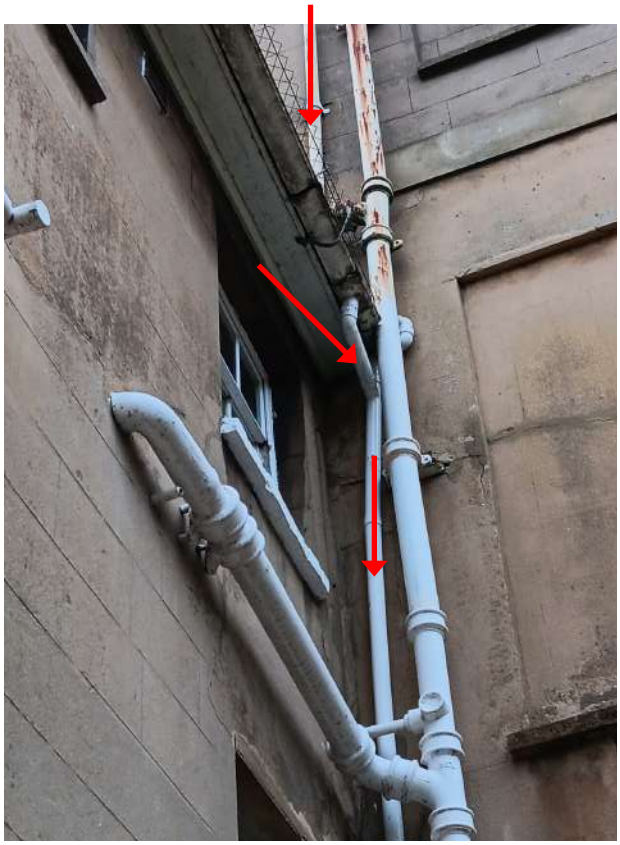

Fig 15:

Main House, west wing

Showing south-east drainpipe

Note the main roof drainpipe also teed-into this pipe which seemed to be overloaded as a result

Fig 16:

Main House, west wing

Showing south-east drainpipe which was of remarkably small diameter for the size of roof area drained

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Fig 17:

Main House, west wing

Showing south gutter where ‘Alumasc’ branding was evident

Fig 18:

Main House, west wing

Showing north gutter draining sequentially onto flat roof below

The gutter was in a very long run and appeared to overspill at the location marked due to lack of appropriate falls and undersize goods

Fig 19:

Main House, west wing

Showing north gutter draining sequentially onto flat roof below

Note ogee profile PVCu guttering

Fig 20:

Main House, secondary roofs

Showing north-east flat roof

Fig 21:

Main House, secondary roofs

Showing north-east flat roof

Note evidence of various leaks in the gutter (at joints)

Note downpipe discharges into river

Fig 22:

Main House, secondary roofs

Showing various pitched roofs draining to eaves gutters

A broken section of eaves gutter is marked by an arrow

Also note at upper LHS of image where it appears that the north gutter of the west wing is blocked with debris such that water is backing-up within the gutter

Fig 23:

Main House, secondary roofs

Showing storage rooms/sheds at west side of west wing

Overhanging eaves drained to plastic eaves gutters

Note downpipe marked by arrow was intended to run along a surface drainage channel (towards the river) but this has become blocked with debris

Fig 24:

Main House, secondary roofs

Showing storage rooms/sheds at west side of west wing

The gutter has been entirely lost from this location, allowing water to drain into the wall

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Fig 25:

Stables

Showing general view with north orientated at head of image

Fig 26:

Stables, north pitch

Showing eaves gutter and downpipe draining into river

Fig 27:

Stables, north pitch

Showing eaves gutter and downpipe draining into river

Fig 28:

Stables, south pitch

Showing slate overhang insufficient to reach gutter (leading to water running down brick face)

Fig 29:

Stables, south pitch

Showing eaves gutter and downpipe also carrying water draining from small parapet gutter/flat roof

Fig 30:

Stables, south pitch

Showing eaves gutter and downpipe also carrying water draining from small parapet gutter/flat roof

A defective flashing, vulnerable drainage detailing and blockage of the system were leading to water saturating the adjacent brickwork

