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Bunkers Hill Cottages, Bersham, Wrexham

Structural Appraisal Report

November 2021

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1.0 Executive Summary

The buildings are the remaining pair of workers cottages that originally formed part of a row of thirteen similar cottages built circa 1785 for workers at the nearby Bersham Ironworks. The properties were arranged over a single storey and would have been constructed traditionally using slated finishes over a purlin and rafter roof supported off solid brick external and internal walls. Floors comprise tiled finishes over compacted earth. At the time of listing the elevations were covered with render. A concrete apron/path is provided outside along both long elevations. The buildings would appear to have been complete and occupied until 1971, after which they have deteriorated to their current condition which could be considered as ruinous.

The buildings were designated Grade II in 1984 due to their significance as early examples of purpose-designed industrial housing in Wales.

The buildings are in a ruinous state having deteriorated significantly since its last apparent occupation in 1971. It is also apparent that partial collapse of external walls and chimney stacks has occurred since record drawings dated April 1993 were prepared by Clwyd County Council. Given the apparent age of the building and its lack of occupation, the condition is not outside that which could be expected.

The current owner wishes to convert the building into a single dwelling generally retaining the internal layouts and elevations postulated in the Clwyd Count Council drawings.

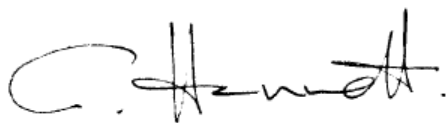
The site will need to be cleared before any works to the building itself can commence. Trees and saplings will need to be felled carefully to avoid excessive disturbance to walls and floors. Debris clearance internally and externally should be carried out carefully so that any original materials can be retained, sorted and assessed for re-use. Original floors within the building should be carefully taken up and materials stored for assessment and re-use. Areas within the site should be set aside for the storage and sorting of materials.

The deterioration of the mortar and brick units to the external and internal walls and chimney stacks is such that their retention would impose an unacceptable risk to the long term durability of the rebuilt property. It was not possible to confirm the condition or suitability of existing foundations at the time of inspection. Generally, the foundations appear to be satisfactory as no evidence of significant movement of the external or internal walls was noted. However, vegetation growth close to the external walls has resulted in several areas of displaced brickwork which will require repair.

Therefore, all external and internal walls will need to be carefully demolished down to a level where a solid base is encountered. Areas which have been disturbed will need to be rebuilt off new foundations following clearing of vegetation.

Whilst all due care will be taken to ensure that as much of the building is retained, it is imperative that any areas retained are suitable and can ensure the long term durability of the reconstructed building.

Report Compiled by:



Andrew Hannett
BEng(Hons), CEng, MICE

2.0 Client's Brief

This report was commissioned by Blueprint Architectural Services acting on behalf of Simon Edwards in support of the proposed planning application to rebuild and convert the buildings into a single dwelling. The purpose of the report is to identify whether the buildings are suitable for conversion and to confirm the extent of repairs required to ensure viability in the long term.

3.0 Inspection

3.1 General

The inspection was carried out during the morning of Friday 08th October 2021. The weather during the inspection was cool and dry. The inspection comprised a visual inspection of those elements of the buildings readily visible from ground level. No excavations were undertaken to uncover buried elements and any notes on the condition of these elements are made based on the visible condition of the property. Testing requiring the use of specialist equipment or training, e.g. electrical systems, gas appliances, water systems, etc., has not been undertaken. Manhole covers were not lifted and drains were not tested.

The buildings are the remaining pair of workers cottages that originally formed part of a row of thirteen similar cottages built circa 1785 for workers at the nearby Bersham Ironworks. The properties were arranged over a single storey and would have been constructed traditionally using slated finishes over a purlin and rafter roof supported off solid brick external and internal walls. Floors comprise tiled finishes over compacted earth. At the time of listing the elevations were covered with render. A concrete apron/path is provided outside along both long elevations. The buildings would appear to have been complete and occupied until 1971, after which they have deteriorated to their current condition which could be considered as ruinous.

The buildings were designated Grade II in 1984 due to their significance as early examples of purpose-designed industrial housing in Wales.

Record drawings prepared by Clwyd County Council dated April 1993 indicate the condition at that date and have been used by Blueprint as a base for their drawings. Refer to Appendix B for drawings of the buildings.

3.2 External Inspection

The site is overgrown with saplings and mature trees prevalent around the perimeter of the buildings. Low level vegetation of ferns, creepers and weeds is prevalent to all areas externally and internally and atop external walls.

The elevations where visible comprise brickwork to full height with areas of render finishes in isolated locations (see Photos 1 and 2).

The overall condition of the elevations is considered to be very poor.

Evidence of severe mortar deterioration is apparent throughout along with erosion of brick units, some of which have disintegrated (see Photo 3). The mortar is lime based and has become friable and weak due to exposure to the generally damp atmosphere generated by the overhanging vegetation. Brickwork of this age is quite weak and susceptible to damp penetration and spalling. Degradation to the units is prevalent throughout to varying degrees. However, where render finishes are provided, a significant number of the brick units have burst and broken apart.

Several saplings and mature trees are growing very close to or immediately adjacent to the elevations. In several areas the growth has caused disturbance to the brickwork (see Photo 4). It is also apparent that this may have also affected the foundations, though this was not proven at the time of inspection.

Excavations to determine foundation type and depth was not possible at the time of inspection due to the concrete apron/path around the property. However, given the date of construction shallow brick spreader footings can be assumed. Due to the condition of the elevations, it is not possible to confirm if the foundations are generally adequate. However, there is no significant evidence of cracking or distortion to visible areas.

No dpc was apparent.

3.3 Internal Inspection

The interior of the building was covered with debris and vegetation which prevented a full assessment of condition. However, the general condition of the interior of the buildings can be assessed as poor from the areas visible.

The internal chimney stacks are partially collapsed whilst the stacks to the end elevations would appear to have collapsed completely (see Photo 5). Significant quantities of brick debris are apparent internally which would confirm that the stacks have collapsed over time and not been demolished in a controlled manner. The condition of the debris is variable with some intact units visible. Internal walls show evidence of separation indicative of weather penetration and vegetation growth (see Photo 6).

Evidence of severe mortar deterioration is apparent throughout along with erosion of brick units, some of which have disintegrated. The mortar is lime based and has become friable and weak due to exposure to the generally damp atmosphere generated by the overhanging vegetation. Brickwork of this age is quite weak and susceptible to damp penetration and spalling. Degradation to the units is prevalent throughout to varying degrees.

Areas of the original floor finishes were visible which confirmed that quarry tiles have been used internally. Where visible, the floor condition is considered to be fair with most tiles intact and not excessively displaced.

Excavations to determine internal wall foundation type and depth was not possible at the time of inspection due to debris and floor finishes. However, given the date of construction shallow brick spreader footings can be assumed. Due to the condition of the elevations, it is not possible to confirm if the foundations are generally adequate. However, there is no significant evidence of cracking or distortion to visible areas.

No dpc was apparent.

4.0 Conclusions and Discussion

The overall condition of the building is considered to be very poor.

The buildings are in a ruinous state having deteriorated significantly since its last apparent occupation in 1971. It is also apparent that partial collapse of external walls and chimney stacks has occurred since record drawings dated April 1993 were prepared by Clwyd County Council. Given the apparent age of the building and its lack of occupation, the condition is not outside that which could be expected.

The current owner wishes to convert the building into a single dwelling generally retaining the internal layouts and elevations postulated in the Clwyd Count Council drawings.

The site will need to be cleared before any works to the building itself can commence. Trees and saplings will need to be felled carefully to avoid excessive disturbance to walls and floors. Debris clearance internally and externally should be carried out carefully so that any original materials can be retained, sorted and assessed for re-use. Original floors within the building should be carefully taken up and materials stored for assessment and re-use. Areas within the site should be set aside for the storage and sorting of materials.

The deterioration of the mortar and brick units to the external and internal walls and chimney stacks is such that their retention would impose an unacceptable risk to the long term durability of the rebuilt property. It was not possible to confirm the condition or suitability of existing foundations at the time of inspection. Generally, the foundations appear to be satisfactory as no evidence of significant movement of the external or internal walls was noted. However, vegetation growth close to the external walls has resulted in several areas of displaced brickwork which will require repair.

Therefore, all external and internal walls will need to be carefully demolished down to a level where a solid base is encountered. Areas which have been disturbed will need to be rebuilt off new foundations following clearing of vegetation.

Whilst all due care will be taken to ensure that as much of the building is retained, it is imperative that any areas retained are suitable and can ensure the long term durability of the reconstructed building.

5.0 Recommendations

The following items should be addressed as part of any works to the building to ensure structural viability in the long term:

- Carefully fell trees and saplings and clear all vegetation from the site.
- Set aside several areas within the site to allow for the storage, sorting and assessment of retained materials.
- Carefully remove all debris and floor finishes from within the building and set aside.
- Carefully demolish external and internal walls and chimney stacks down to a firm base where no loose brickwork is apparent. Remove all existing render finishes from external and internal walls. Allow for inspection by SE and conservation officer.
- Remove stumps and rebuild sections of wall and foundations disturbed by vegetation.
- Rebuild external and internal walls and chimney stacks using retained brickwork augmented by recycled brickwork of similar appearance. All brickwork shall be laid in a traditional lime mortar formed out of hydraulic lime mixed with sand, aggregate and water as required. Exact constituents shall be agreed with the Conservation Officer.
- Provide new roof over the building with slated finishes to match any identified at the site. Design details for the roof shall be agreed with the Conservation Officer.
- Install new insulated concrete ground floor with retained tiled finishes over.

6.0 Limitations and Liability

This report has been prepared for the exclusive use of the commissioning party and unless otherwise agreed in writing by Andrew Hannett Limited, no other party may use, make use of or rely on the contents of the report. No liability is accepted by Andrew Hannett Limited for any use of this report, other than for the purposes for which it was originally prepared and provided.

Opinions and information provided in the report are on the basis of Andrew Hannett Limited using due skill, care and diligence in the preparation of the same and no explicit warranty is provided as their accuracy. It should be noted and it is expressly stated that no independent verification of any of the documents or information supplied to Andrew Hannett Limited has been made.

The timber or other parts of the building which are covered, unexposed or inaccessible to the Structural Engineer without the assistance of a ladder in excess of 3m have not been inspected. The report does not cover the condition of the dpc, possible damp penetration or condensation unless specifically highlighted as part of the inspection. Where the property was furnished at the time of inspection those elements of the structure covered over have not been fully inspected. Therefore it is not possible to confirm that those elements are free from defect.

No excavations were undertaken to uncover buried elements or foundations and any notes on the condition of such elements are made based on the visible condition of the property. No intrusive testing was carried out. Manhole covers were not lifted and drains were not tested. Testing requiring the use of specialist equipment or training, e.g. electrical systems, gas appliances, water systems, etc., has not been undertaken.

This report is not intended to be an exhaustive list of all defects and only significant structural faults which could lead to instability of the structure in the present or future have been reported. Further defects may become apparent during more extensive investigation or during future refurbishment works.

Detailed calculations to determine the adequacy of structural members are outside the scope of this report and have not been undertaken. However evidence of distress as a result of overloading or deterioration will be identified so that provision for additional works can be made during any future refurbishment scheme.

The report shall be solely used by the Client to determine the extent of works to the property and liability in this respect will be limited to the instructing Client.

Nothing in the Contract confers nor purports to confer on any third party any benefit nor any right to enforce any terms of this Contract pursuant to the Contracts (Rights of Third Parties) Act 1999.

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Appendix A – Photographs



Photo 1 – Front Elevation.



Photo 2 – Rear Elevation.



Photo 3 – Typical condition of external wall.



Photo 4 – Tree growing close to/within the external wall.

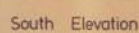
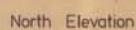
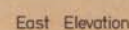
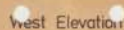
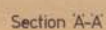


Photo 5 – Typical view of chimney



Photo 6 – Separation of solid brick wall.

Appendix B – Architect's Drawings



Notes:

Chloro
Naturally abundant in a weight of 1000 mg
100% soluble in water

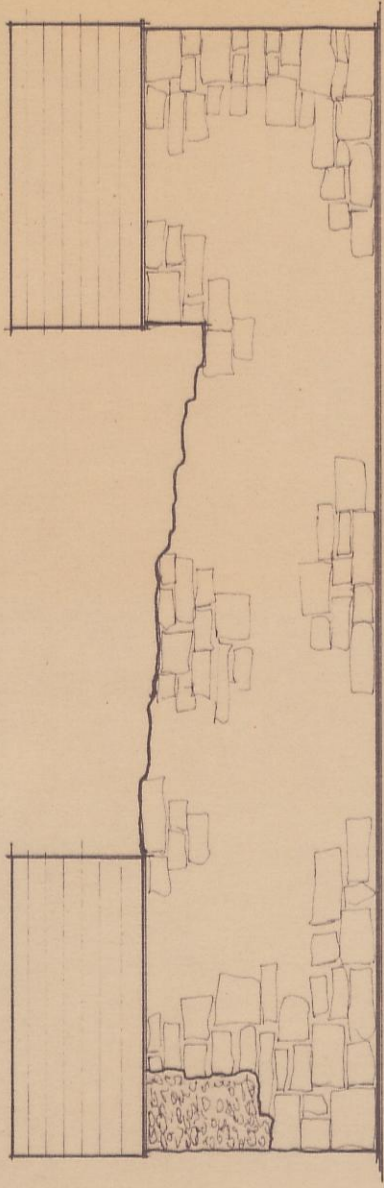
Al
Al salts have been prepared and used
as catalysts in polymerization and synthesis
of the building

Alkyl
Alkyl, derived from aliphatic C_{1-10} having
one or more hydrogen atoms replaced
by the function group shown on the
left-hand side

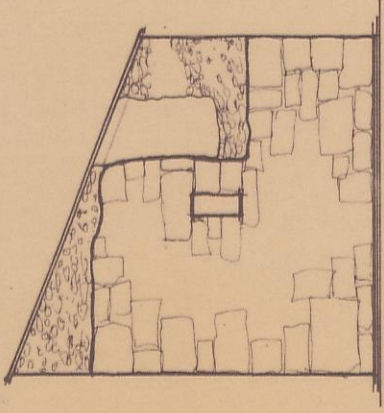
Catalysis
Catalysis: Each Ethenylene unit is described
as a single substituted by the function
On the side Ethenylene on the part of
the molecule, supported by another group

Alkylated Diols
Alkylated Diols: Diols substituted with
groups of members to form diols and
Alkylated
and have four fluorine on one side two

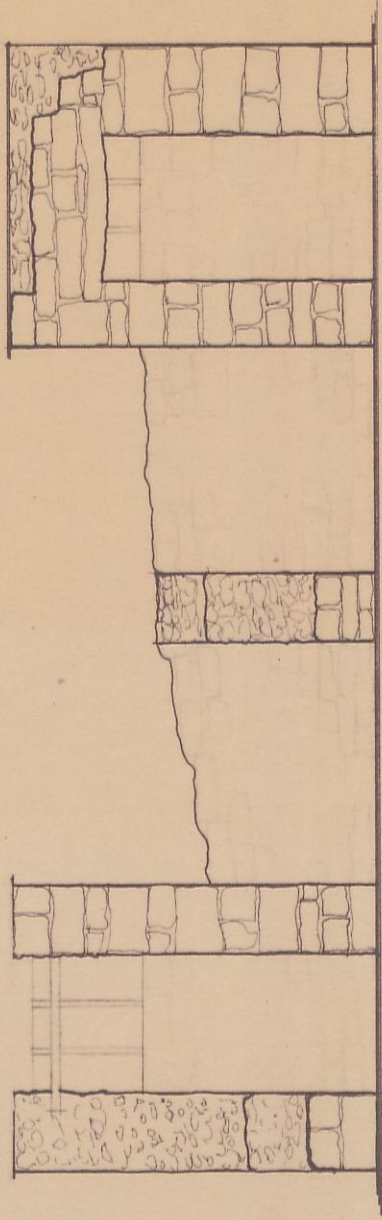
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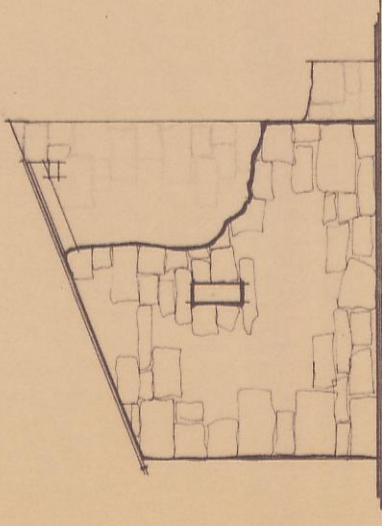
North Elevation



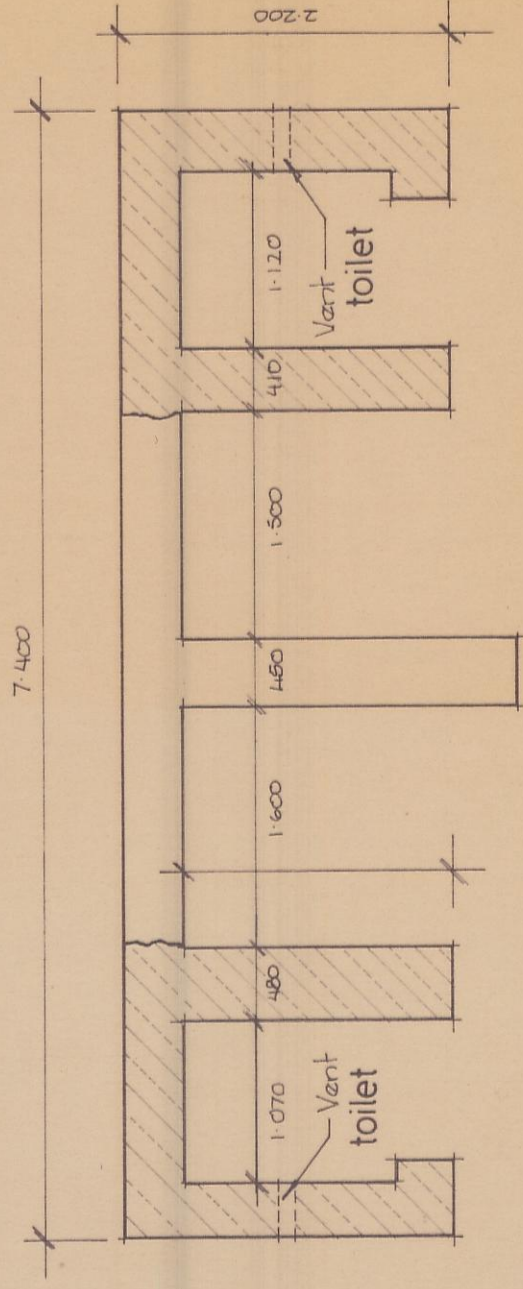
East Elevation



South Elevation



West Elevation



Plan

CLWYD
CYNGOR SIR • COUNTY COUNCIL

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Tel 0352 752121 • Fax 0352 757799

PROJECT
Bunkers Hill Cottages,
Bersham,
Nr. Wrexham -
Outside Toilet Block

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DATE	April '93			DATE	

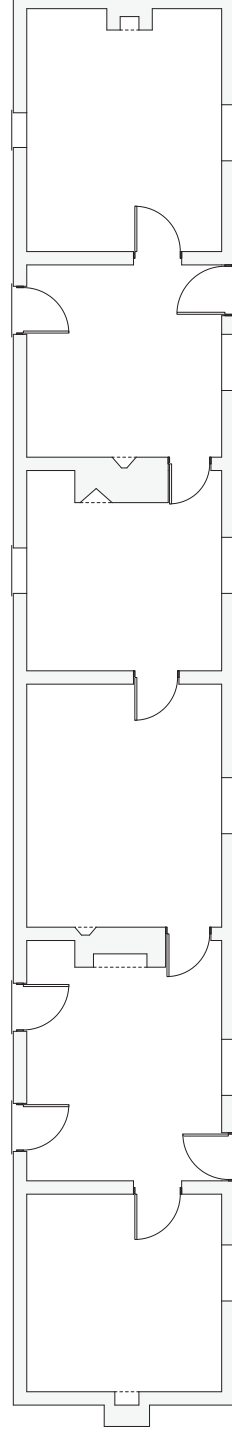
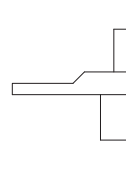
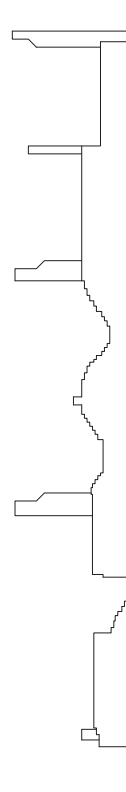
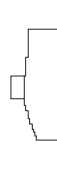
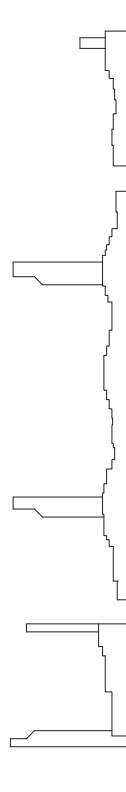
DESCRIPTION

Existing Plan

Existing Elevation

PROJECT REF / DWG No.	REV
F17/012/013 / 5	

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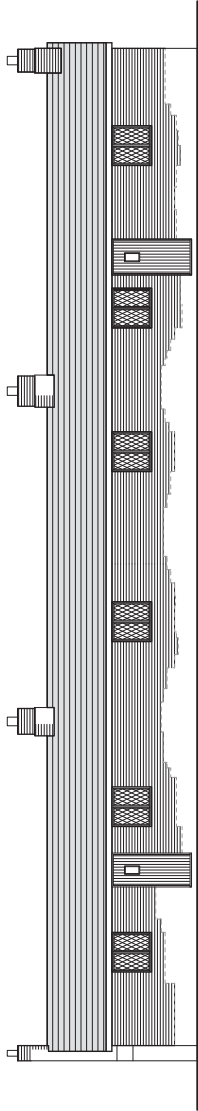
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A	01/21	Design Amends	D J F		
Rev	Date	Detail	Initial		

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Drawn By:	E.M.Jackson	Date: Dec 2020
Drawing No:	EL073/003	Sheet: 1 of 1

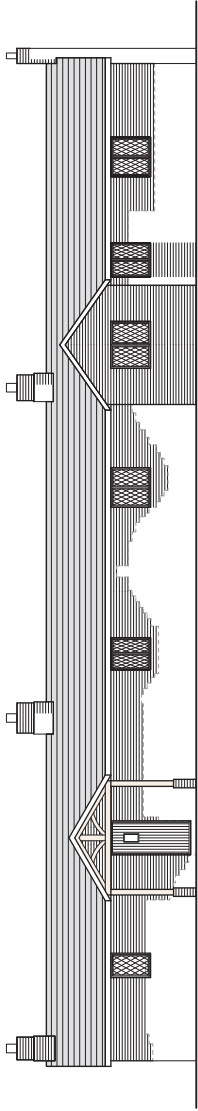




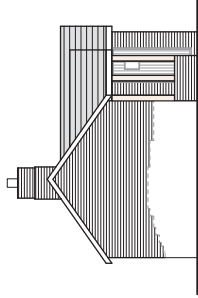
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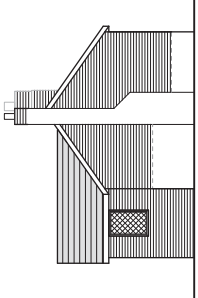
Front Elevation 1:100



Rear Elevation 1:100

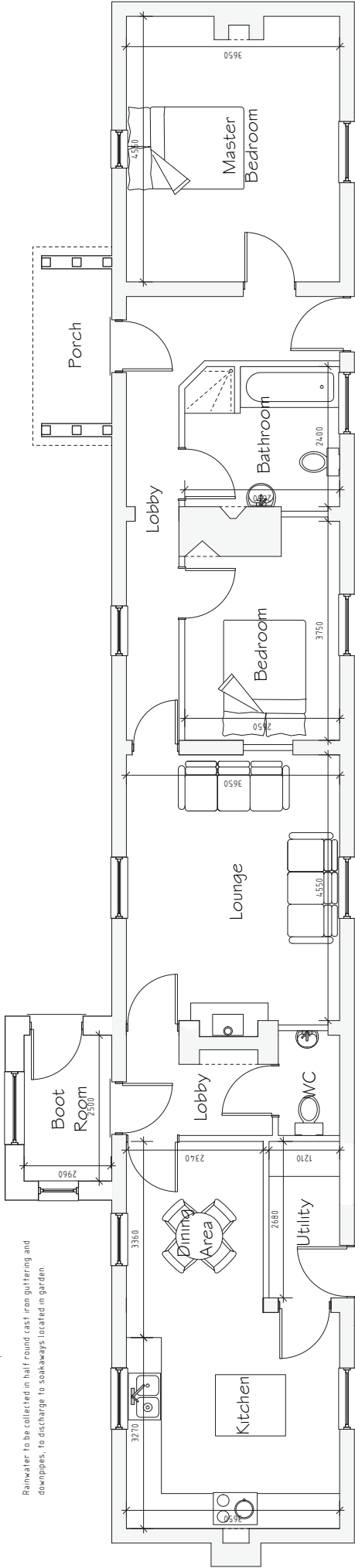


Side Elevation 1:100



Side Elevation 1:100

- External Facing Materials
External walls are to comprise facing brick to Local Authority approval and to match existing
- Roofing Materials
Roof coverings are to be reclaimed slates to Local Authority approval.
- All new windows are to comprise sealed double glazed units set in good quality timber frames. En-suite and bathroom windows are to be fitted with obscured glass.
- All fascias and soffits are to comprise timber to match windows
- Rainwater to be collected in half round cast iron guttering and downpipes, to discharge to soakaways located in garden



Ground Floor Plan 1:50