APPENDIX V : INTERNAL PHIOTOGRAPHIC RECORD
COACH HOUSE & SHED

Fig. 1 – Coach House – GF/01– View west

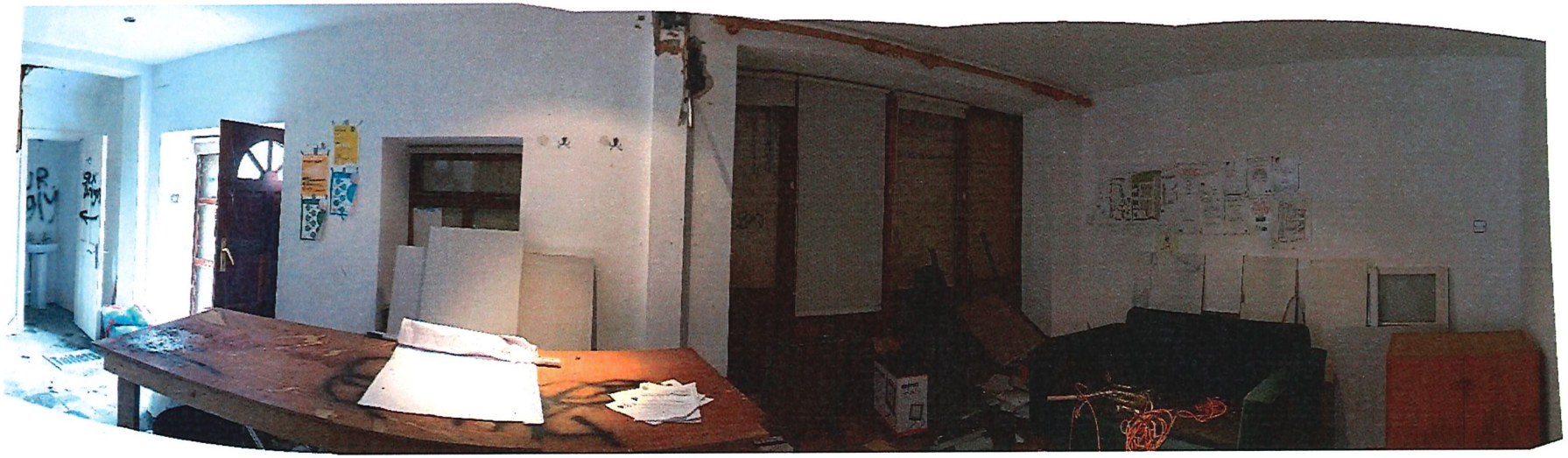

Fig. 2 – Coach House – GF/01– Views south & east

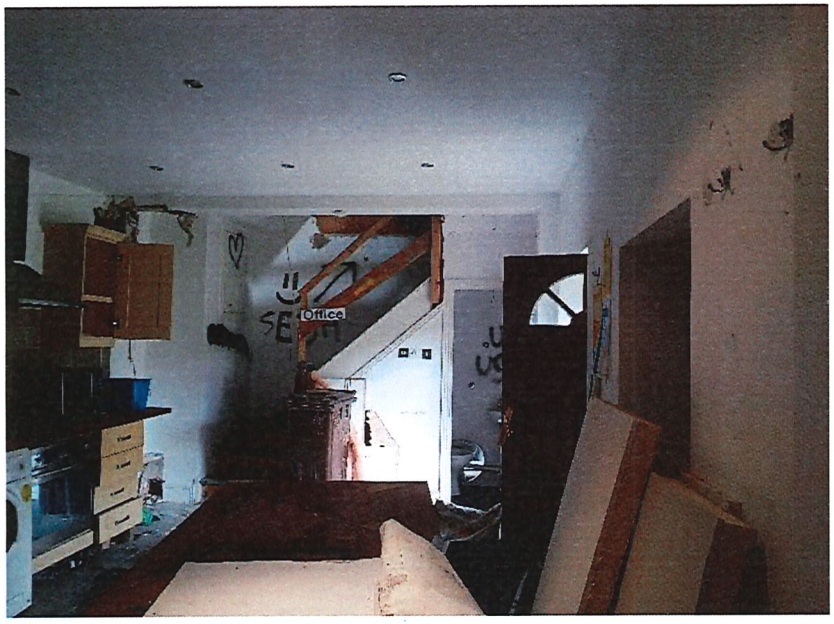

Fig. 3 – Coach House – GF/01– View north

Fig. 4 – Coach House – F01/01– View east, stairs

Fig. 5 – Coach House – F01/01– View south

Fig. 6 – Coach House – F01/01– View east

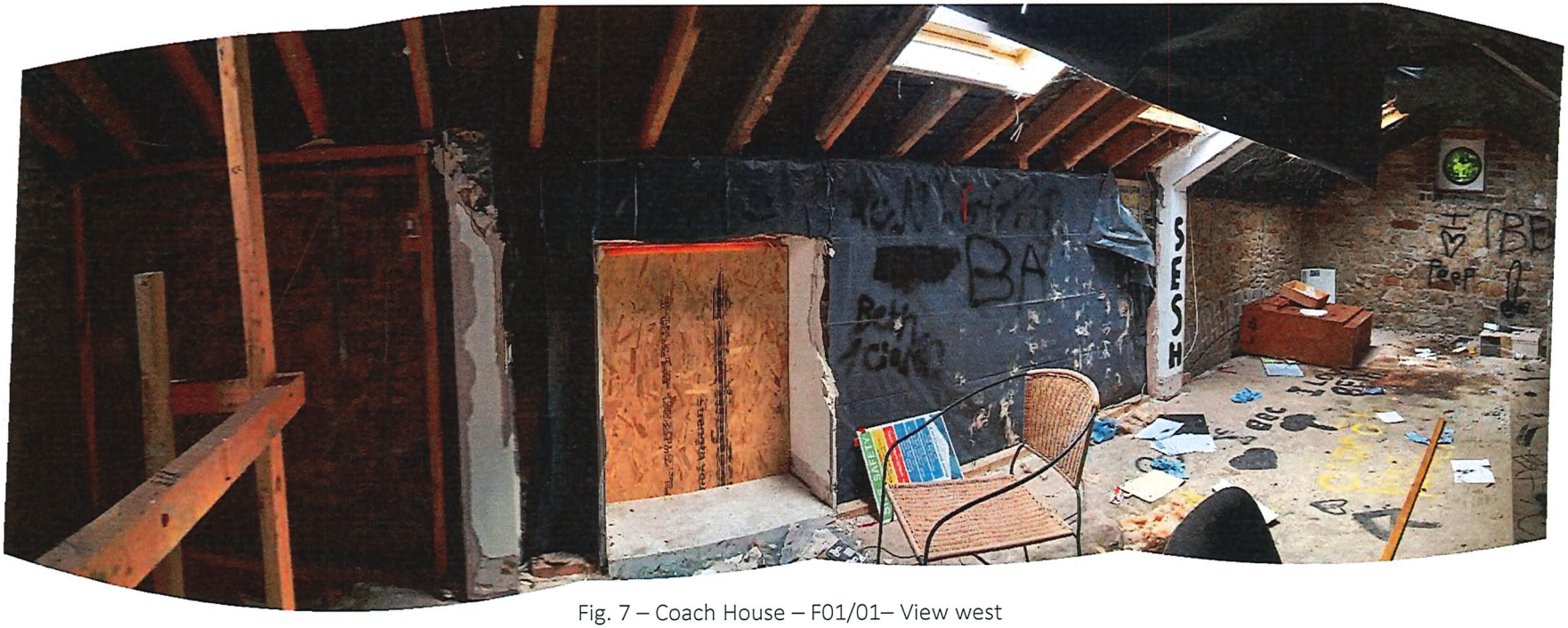

Fig. 7 – Coach House – F01/01– View west

Fig. 8 – Shed –View north

Fig. 9 – Shed –View south

APPENDIX VI : INTERNAL PHOTOGRAPHIC RECORD KNOCKRABO GATE LODGE (WEST)

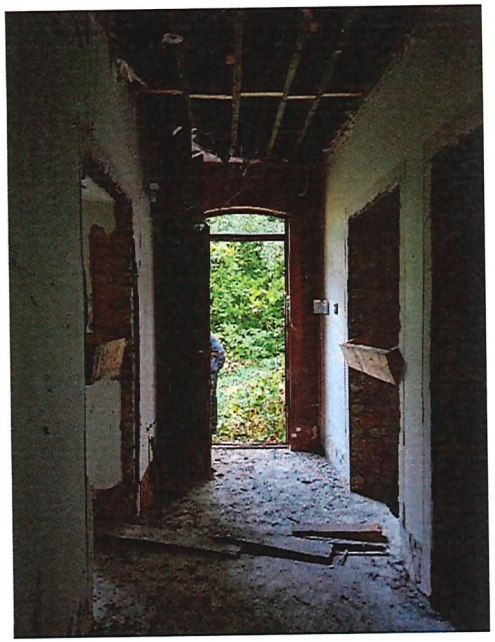

Fig. 1 – GF/01 - View east

Fig. 2 – GF/01 - View west

Fig. 3 – GF/01 - View roof internal

Fig. 4 – GF/02 - View northeast

Fig. 5 – GF/02 - View floor joists

Fig. 6 – GF/02 - View ceiling joists

Fig. 7 – GF/04 - View south

Fig. 8 – GF/04 - View west

Fig. 9 – GF/04 - View north

Fig. 10 – GF/05 - View southeast

Fig. 10 – GF/05 - View east

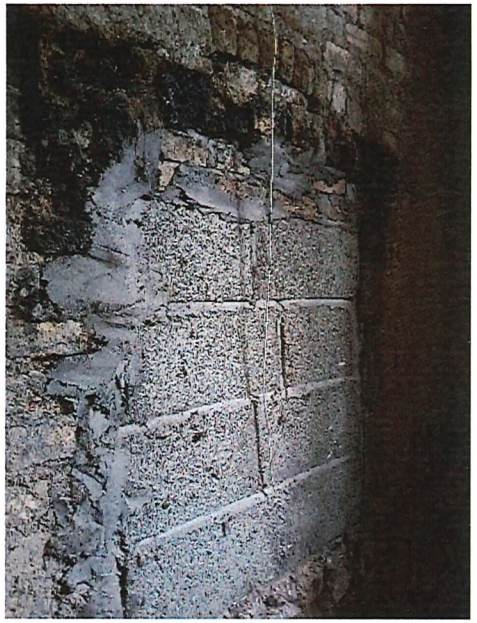

Fig. 11– GF/05 – Detail blocked-up fireplace

APPENDIX VII : OUTLINE SPECIFICATIONS

OUTLINE CONSERVATION

SPECIFICATION

FOR

WORKS TO BE CARRIED OUT

AT

KNOCKRABO, MOUNT ANVILLE ROAD

DUBLIN 14.

October 2024

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CONTENTS

Section 1 Introduction

1.1. General

The works shall be carried in compliance with *RIAI Guidelines for the Conservation of Buildings* (3rd edition December 2010), and the conservation charters referenced therein, in addition to the publication *Architectural Heritage Protection: Guidelines for Planning Authorities* (as issued by the Department of Housing, Local Government & Heritage 2011).

1.2. Preliminary Method Statement

General
The Contractor will be required to prepare a detailed method statement for the works and to amend or augment this statement to take account of matters discovered during the works. He will be required to obtain the Architect's approval for the statement at each stage during the works and amend the statement as necessary to achieve the Architect's approval.

Guidance
The contractor will be advised that all works must be completed in accordance with good conservation practice and in conformity with the publication "*Architectural Heritage Protection: Guidelines for Planning Authorities – DoHLG&H, 2011.*"

Guidance on the application of conservation practice is to be found in the following documents which shall be adhered to:

- Architectural Heritage Protection: Guidelines for Planning Authorities. Department of Housing, Local Government & Heritage 2011.
- Archaeology in the Planning Process. (Planning Leaflet PL13) Department of the Environment, Heritage and Local Government, 2007.

Drawings and Schedules
The Contractor may be required to prepare full survey drawings of each element to be repaired before commencing, together with full size details of the various components, joints, profiles etc. etc. and schedules of the various components to enable the correct procedure for repair. A full photographic record should also be kept. In addition, the various components shall be clearly labelled and recorded on the drawings. When fully examined, the full size details of the various repairs necessary will be prepared by the Contractor before commencing any repair works and all repairs scheduled. The Architect's approval to this documentation shall be obtained at each stage before proceeding to the next stage and two copies of all such documentation shall be given to the Architect for his records.

Deviations
No deviations from the Architect's details will be permitted without prior approval. No deviation from the approved full sized drawings will be permitted without the Architect's prior approval. All dimensions as shown on the drawings shall be finished sizes unless otherwise indicated.

General Matters
All components shall be carefully examined to determine the method of assembly. All items shall be referenced and locations logged. No damage to the items shall be result from these works other than that unavoidable arising from the examination. The full records shall be handed to the Architect upon completion.

Detailed Method Statement
Based on this document and the results of the contractor's preliminary inspection, the contractor will prepare a detailed method statement covering all aspects of the works. He will be required to submit this statement to the Architect before any works is put in hands and to adjust, amend and revise the statement until the Architect is satisfied that is offers the most appropriate methodology for the works and approves the statement. It should be noted that it will be necessary for the contractor to further adjust, amend and revise the statement as works progress to take account of particular matters encountered during the works. Such alterations will be subject to the same approval process as the original statement. Once the statement, or alterations to the statement have been approved, the contractor may embark on the works, however, such approvals shall not relieve the contractor for any liability for unavoidable damage to the items.

Tests
Should the contractor feel that, in order to prepare his detailed method statement, it would be necessary to undertake test disassembly or removal operations, he will be permitted to do so with the prior approval of the Architect and under the constant monitoring of Architect's representatives. The Architect will co-operate with the contractor in designating the most appropriate items to be the subject of such tests. However, if any test is deemed to be causing damage to any item, it must be stopped immediately upon the Architect's request to do so. In such cases, an alternative item may be designated for test if the Architect deems such a course of action is appropriate.

Records
All items shall be fully recorded by photograph, highlighting all extant damage to the items and any other means considered necessary to properly record the extant appearance and condition of the items. The Contractor shall include for all costs in connection with the proper photographic recording of all necessary items including ceilings, walls, tiling, stonework and repair works to same. The contractor will be held responsible for any damage not recorded before removal or disassembly. The precise location shall be recorded and coded so each item or dismantled part of each item can be precisely located. This code shall be marked on each item or dismantled item by such means as cannot be accidentally removed but can be easily removed without blemish upon completion of the repairs at a later stage. Similarly, each individual disassembled part of an item shall be coded so that its relationship to adjoining parts can be precisely identified and recorded on drawings, photographs or other approved means. Two copies of the above records shall be handed to the Architect upon completion of these works.

Detailed Inspection
Before commencing disassembly or removal and following the approval of the Detailed Method Statement, the contractor shall very carefully examine the item to confirm or otherwise the accuracy and effectiveness of his proposed method. The Contractor's attention is drawn to the fact that items may have different methods of assembly or that individual parts may differ from those already disassembled or removed and he will be required to adjust his work methodology to accommodate these variations. He will be required to undertake such detailed inspection on a continual basis during the complete disassembly and removal operations.

Damage
Any damage not recorded before disassembly and removal or arising from disassembly and agreed with the Architect as unavoidable, shall be the responsibility of the contractor. He will be required to repair the damage at his own expense or to reimburse the Architect for the

cost of such repairs by means of deductions from any payments made by the Architect to the contractor.

Repairs
The Contractor shall prepare all necessary full sized details to illustrate each and every type of repair and agree the details with the Architect before commencing the repair operations. All repairs shall be executed as specified later in this document. The Contractor shall note that existing repairs shall be undone and remade if the standard is not acceptable or may be left if the standard is acceptable. The repaired work shall be finished to match the original.

Reinstatement
Reinstatement shall be undertaken in the reverse order or removal. Great care shall be taken to ensure that each item and component is reinstated in its original location. Any damage caused by the reinstatement shall be made good or replaced at the Contractor's expense to the Architect's satisfaction. Any damage to the finishes shall be repaired in such a manner that the repair is not visible.

1.3. General Conservation Methodology

1.3.1. Protection Of Existing Structures And Materials

The Contractor shall ensure that no damage occurs to the Existing Structures as a result of the execution of the Works.

1.3.2. Protection Method Statement

The Contractor shall prepare a site specific method statement detailing the proposed protection measures to be implemented in respect of the Existing Structures. This shall include, as a minimum, details of the following:

- Measures to ensure protection of the materials during the course of the Works;
- Measures to ensure protection of existing building fabric, both external and internal, during the course of the Works;
- Measures to prevent water ingress during execution of the Works;
- Measures to ensure the stability and protection of Existing Structures during repair and replacement works to the structural fabric of the Existing Structures; and
- Details of other measures required to address Site specific issues.

The Conservation Architect shall review all such method statements for compliance with conservation best practice.

1.3.3. Protection And Storage

The Contractor shall ensure that retained floors along the main construction route must be protected.

Storage of builder's equipment and materials must be in designated compound Area/s.
While works are underway, equipment and materials being transported around the Project Facility, temporarily stored and used, must be carefully positioned so that retained historic fabric and surfaces are not damaged.

1.3.4. Movement Of Equipment And Material

Transport & erection of scaffolding poles / planks pose a particular threat to fabric. These and all long items such as floor boards must be carried by minimum of two operatives at all times to ensure no damage and impact to fabric.

Loading
Positioning of any removed or stored materials shall not overload the existing structure.

Fixing to Historical Fabric
Scaffolding and working platforms must be independently supported and may not be fixed to the Existing Structures. Full plywood protections must be provided between scaffolding supports and retained historic flooring / paving of Existing Structures.

Specialist Contractors
The Contractor shall ensure that all parties engaged to undertake works to Existing Structures are competent to undertake the elements for which they are engaged. Contractors must have the relevant training and experience to carry out specialist works within historic buildings.

1.3.5. Works Methodology

The Contractor shall prepare a Site specific method statement detailing the proposed methodology and sequencing to be implemented in respect of the retained fabric of the Existing Structures.

The methodology shall also describe how mitigation measures set out in the conservation impact assessments forming part of the Planning Decision are complied with.

1.3.6. Recording

The Contractor shall clearly and comprehensively record all Areas opened up within Existing Structures through the use of good digital photographs (minimum 10.1MP). Photographs shall record all principle features uncovered including architectural and structural elements, service routes, chases, floor voids and areas that will be closed up. As-built record drawings are to be provided to the Authority at the completion of the works including with referenced digital photographs.

1.4. Extent of Conservation Works

The following is a outline of the work to be carried out. Please refer to drawings, schedules and specifications for more detailed descriptions of the proposal.

The proposed works includes conservation works including:

Internal

- Removal of non-original window units to Cedar Mount House, the Coach House
- Removal of sections of non-original and original wall to Cedar Mount House, Coach House, removal of internal partition wall to the Knockrabo Gate Lodge (West)
- Timber floorboard to be removed and retained for future use
- Original skirting in Cerdar Mount House B1/01 to be used as sample for replacement/new skirting in Cedar Mount House.
- Repair wall plaster
- Hack-off non-original cementitious plaster and replace with a lime-based plaster
- New cornice coving in Cedar Mount House to match existing coving in GF/03
- Repair of non-original windows
- Repair of original shutters, casing and apron if required
- Retain and repair non-original doors
- Repair fireplace if required

External

- Clean fanlights in Cedar Mount House
- Repair of entrance door and doorcase
- Lime-based render to external walls of Cedar Mount House, Coach House
- Hack-off cementitious render to Knockrabo Gate Lodge (West) and replace with a lime-based render
- Repair to roofs
- Vegetation removal, hack-off cementitious render and replace with lime render to chimney stacks to Knockrabo Gate Lodge (West)
- Reinstatement of new chimney stacks to Cedar Mount House
- Clean granite entrance steps to Cedar Mount House and repoint if required
- Cedar Mount House entrance gate: existing stone pillars and section of walls to be dismantled and re-positioned/ assembled in new location and construction of new section of stone wall
- Garden wall to the west of Cedar Mount House: western section of wall to be dismantled and re-positioned/ assembled in new location, section of the eastern section to be removed to create opening and stone to be salvaged for construction of new section of stone wall to adjoin Cedar Mount House.
- Cast-iron watergoods repair

Section 2 Specifications

2.1. Taking Down and Removals

TAKING DOWN AND REMOVALS

2.1.1. General

Code of Practice
The works shall comply with the requirements of B.S. 6187.

Taking Down Works
The works may be undertaken by the Main Contractor provided he can demonstrate that the workforce employed on the site has the skill and experience to complete the works without damage to the adjoining structures retained or a specialist approved by the Architect and/or Engineer. In addition, the Contractor shall ensure that no additional damage is caused to the Existing Structures by the removal of services fittings and brackets.

No portion of the works shall be sub-let without the prior written approval of the Architect.

Should approval to sub-let be given it will not relieve the Contractor of his responsibility under this contract and any sub-contractor must accept fully the conditions of contract and work in accordance with the Specification. Furthermore, the Architect shall be empowered to instruct the sub-contractor who will in turn carry out such instructions as if he were the Contractor.

Nature of Site
The Contractor is specifically informed of the restricted and confined nature of the site, the proximity of other buildings. All reasonable measures shall be taken to ensure the minimum disruption to these and to the need for express specific consent regarding any proposed works adjacent to adjoining sites (or buildings).

All plant and equipment to be used in taking down shall be appropriate to the confined location and the sensitive nature of the works.

The Contractor is specifically informed of the historical nature of the site and will be obliged to report any finding which may be of historical interest to the Architect and Structural Engineer and shall await inspection by Archaeologist to assess the significance of any such finding prior to removal or further disturbance of same. In addition, the Contractor shall note that any works which would disturb the ground or other archaeological strata will be the subject of constant inspection by an Archaeologist appointed by the Employer. The Contractor will be required to co-operate with the Archaeologist and to suspend or re-programme the order of the works to facilitate archaeological investigation that may be deemed necessary by the Archaeologist. The Contractor will be deemed to have taken all the matters into account at the time of tender and no extras will be allowed for his failure to do so.

Superintendence
The Contractor shall give all necessary personal superintendence during the execution of the works and keep constantly thereon a competent general foreman with power to act in the Contractor's absence and for all purposes as his general agent.

Survey
Before starting work, the Contractor shall examine all available information, and shall carry out a survey of the structure(s), site and surrounding area and submit a survey report and method statement to the Architect and Structural Engineer covering all relevant matters listed below and set out in the relevant Health and Safety Authority Guidance Notes and the relevant clauses of B.S. 6187:

-The form, condition and removal methods of the structures.
-The form, location and removal methods of any toxic or hazardous materials.
-The type and location of adjoining or surrounding premises which may be adversely affected by noise, vibration, dust or removal of structure.
-The identification and location of services above and below ground.

Investigate risks
In accordance with BS 6187, clause 4, the Contractor shall investigate the features of the structure to determine if shock of vibration could damage the buildings being retained, surrounding building, equipment contained in the buildings, buried services and check for the existence of toxic of flammable substances or asbestos. In addition, the Contractor shall decide which portions of the existing structures need to be secured.

Bench Marks
Report to the Architect any bench marks and other survey information found on structure(s) to be taken down. Do not remove or destroy unless specifically instructed.

Feature(s) to be retained
All structure, components and features not specifically identified for removal are to be kept in place and adequately protected.

Insurance
As provided in the contract under insurance clauses, the Contractor shall prior to commencement of the works obtain the Employer's approval for all insurances. Such insurances shall indemnify the Employer against all claims arising out of:

(1) Collapse, subsidence, vibration or weakening of supports.
(2) Liability assumed under the Contract.
(3) Use of mobile or lifting plant.
(4) Claims for consequential damage and consequent loss
(5) Fire.
(6) Public and Employers Liability Insurances against injury to persons and property as required by the contract.
(7) All Risks Insurance in the joint names of the Employer and the Contractor for the full value of the works and ancillary items required by the contract.
(8) Collapse, subsidence, vibration or weakening of supports not arising out of the negligence of the Contractor.

Service Regulations
Any work carried out to or which affects new or existing services must be in accordance with the bylaws or regulations of the relevant statutory authority.

Location of Services
The Contractor is specifically informed that live services are located in the vicinity of the site, and he shall ensure that these are investigated, located and adequately protected during the

course of the work. Locate and mark the positions of services affected by the work. Arrange with the appropriate authorities for the location and marking of the positions of the mains services.

Existing Services
Disconnect and remove existing services made redundant by the works. Carefully protect all services to be re-used. All structure, components and features not specifically identified for removal are to be kept in place and adequately protected.

Drains in Use
Protect rainwater pipes, hopperheads, vent pipes and fittings still in use and ensure that they are kept free of debris at all times. Make good any damage arising from demolition works and leave clean and in working order at completion.

Old Materials
In general, old materials removed by the works shall become the property of the Contractor, who will allow credits for any salvage value against the costs of the works. However, materials such as brick, stone, slate etc. which are to be salvaged for re-use shall remain the property of the Employer and shall be sorted and set aside for re-use as specified later. In addition, items of finishes, such as the various joinery elements, access hatches, doors and surrounds etc. shall be carefully removed where necessary, protected as necessary to ensure no damage occurs, and set aside for re-use.

Any coins, fossils, curiosities, money or articles having a monetary or intrinsic value (including historic, artistic or other values) other than ordinary building materials shall become the property of the Employer and must be handed over to the Employer.

Taking Down Methods
The Contractor shall only employ such methods that cause no shock or vibration to adjacent buildings and equipment or buried services being retained. In general, sections being taken down should be disconnected from sections being retained by hand methods before any removal is undertaken in order to prevent any accidental damage to the fabric or structure retained. The use of explosives is forbidden.

The Contractor should note the particular difficulties in connection with the taking down works and make his own assessment as to the most appropriate methods to be used at the time of tender. He should note that it may be necessary to undertake the removal works in part or in total by hand demolition.

Where necessary, leave adequate temporary support and protection at each stage and arrange for inspection by the Architect. Maintain and alter temporary supports and protection as necessary as work progresses.

Arrange inspection and approval of a suitably qualified Engineer where any works will involve Mechanical and/or Electrical services.

Take down structure(s) causing a minimum of damage to the houses to be retained and to adjacent property and leave no unnecessary or unstable projections.
Report to the Architect any defects exposed or becoming apparent in adjoining property.

Promptly repair any damage caused to adjacent or adjoining property by demolition work. Make good to ensure safety, stability, weather protection and security.

Structure(s) to be retained
Adequately protect parts of existing structure(s) which are to be kept in place.

Cut away and strip out the minimum necessary and with care to reduce the amount of making good to a minimum.

Prevent debris from overloading any part of the structure which is not to be taken down.

Services which are to remain
Notify the Architect and service authority of any damage. Make all arrangements for repair to the satisfaction of the Architect and service authority. Bear any costs arising.

Method Statement
The Contractor will be required to prepare a method statement detailing the precise details of his proposals for the demolition works and submit same to the Architect for this approval before the work is put in hands. He will be required to modify the method statement as necessary until such approvals are obtained. Such approvals, once given by the Architect shall not relieve the Contractor of any responsibility for any aspect of the taking down works including safety, preventing damage to fabric retained, preventing damage to materials to be salvaged for re-use etc. etc..

Schedules of Works and Programme

The Contractor shall submit to the Architect:

(a) A Schedule of his intended working procedures and taking down works for approval.
(b) An itemised programme chart. This shall be kept continuously up to date during the progress of the works.

The Contractor shall include for the erection of shores and ties where required. He shall satisfy himself that the proposals are adequate, and shall include for, and put forward his alternative proposals if he feels they are not. Drawings and details of such alternative proposals shall be submitted for comment by the Architect in advance.
All propping, needling and shoring required shall be designed, erected (and, where applicable, removed) in accordance with latest codes of practice.

No approval issued by the Architect shall relieve the Contractor of his responsibility for the safety of the general public, site personnel and adjoining properties during the course of the demolition works.

Safety Precautions
Take all safety precautions necessary, including those noted in BS 6187, Clause 5, and relevant Health and Safety Authority Guide Notes. Site staff responsible for supervision and control of the work are to be experienced in the assessment of the risks involved and in the methods of taking down to be used.

Taking down in confined areas and adjacent to structure and fabric to be retained shall be carried out by hand. On no account shall the buildings, scaffolding etc., become overloaded by debris etc. The site shall be kept secure at all times.

General Precautions to Avoid Damage

The Contractor shall carry out the work in such manner as to cause as little inconvenience as possible to the owners and/or occupants of the adjoining premises or the public and shall include in his tender for any costs such as the provision of water for sprinkling the debris to keep down dust. In particular, noise and vibration shall be kept to a minimum, and the Contractor shall take all necessary steps to abate these to avoid inconvenience to others.

The Contractor shall protect adjoining properties roads and footpaths from damage and provide adequate support to them at each stage of taking down, and adapt and re-arrange such support as necessary from time to time. He shall provide all necessary temporary shoring, screens and coverings.

The Contractor shall make good at his own expense any damage done to public roads and footpaths which may be caused by his operations.

The Contractor shall provide all necessary watching and lighting including lights on hoardings or scaffoldings projecting over public footpaths during the progress of the works and shall be responsible for any damage arising from insufficient watching or lighting.

Temporary Supports
The Contractor shall be responsible for the design and provision of all necessary temporary supports, needling, shoring, raking shoring, horsing etc.

Nuisance
The Contractor shall be responsible for the prevention of all nuisance arising from the works, in particular, noise, dust etc. To this end, all dry material shall be periodically dampened to prevent dust rising and no debris shall be allowed to be deposited on the public roadway or adjoining building either during the works and transport of debris from the site.

Health Hazard
Take adequate precautions to protect site operatives and the general public from health hazards associated with dangerous fumes and dust arising during the course of the works.

Debris
All debris, demolished materials etc., shall be removed from the site and deposited in an approved site provided by the Contractor.

Burning Material
On no account will the burning of material be permitted on site,

Gas or Vapour Risks
Take adequate precautions to prevent **fire** or explosion caused by gas or vapour.

Decayed Timber
All decayed or infested timber shall be carefully removed to prevent the spread of spores or larvae, immediately wrapped before removal from the building and disposed off site. Similarly, other materials adjoining the site of such decayed timber shall, if necessary, be carefully removed and disposed off site or treated with an approved chemical to prevent contamination spreading to adjoining retained structures.

Adjacent Structures

Areas for taking down shall be disconnected from areas being retained by hand by means least likely to cause damage to the retained structures and approved by the Architect. All unnecessary projections shall be removed.

Make Good
The Contractor shall make good as required to ensure safety stability and security of the retained buildings and provide such weather protection to the retained structures as may be necessary.

Protection
Provide all necessary protection as required under BS 6187, Clause 5. In addition, the Contractor shall provide all necessary temporary screens etc., as required for safety, control of noise and dust, temporary weather protection, security etc., or to facilitate the works.

Partly Demolished Structure(s)
Leave partly demolished structure in a stable condition, with adequate temporary support at each stage to prevent risk of uncontrolled collapse.

Prevent debris from overloading scaffolding platforms.

Prevent access of unauthorised persons to partly demolished structure(s). Leave safe outside working hours.

Asbestos-based Materials
Report immediately to the Architect any suspected asbestos-based materials discovered during taking down work. Avoid disturbing such materials. Agree with the Architect / Engineer methods for safe removal.

Unknown Hazards
Inform the Architect of any unrecorded voids, tanks, chemicals, etc., discovered during taking down work. Agree with the Architect and Engineer, methods for safe removal, filling, etc.

Completion
Clear away all debris and leave the site in a tidy and safe condition on completion.

2.2. Roof work

2.2.1. OUTLINE SCHEDULE OF ROOFWORKS

The following schedule should not be considered to be exhaustive, but is indicative of the principal tasks to be undertaken. This schedule should be read in conjunction with the drawings, photographs and the rest of this specification. The schedule should also not be assumed to be a sequence in which the works are to be carried out. Refer to drawings for the extent of the works.

All repair work shall be carried in accordance with the "Guidelines on Architectural Heritage Protection for Planning Authorities : 2011", published by the Department of Housing, Local Government and Heritage, and in accordance with best conservation practice.

1. Provide support to roof during the following operations.

3. Carefully strip all slates and tiles and assess the limited amount of natural historic slate for salvage and re-use, in accordance with the specification. The contractor is to refer to the specification in detail in relation to standards of materials and workmanship etc. required for slating. Salvaged slates are to be stored as close to the roof as possible, in order to avoid possible damage to them in transit. If possible, they should be kept in the working area at roof level, making sure they are secured and cannot be a falling hazard.

4. Carefully take up all metalwork to flashings, ridges, gutters, aprons, etc.

5. Carefully take up all existing battens, counter battens, parapet gutter and valley boarding as necessary.

6. Cut away any decayed structural roof timbers to good sound timber in accordance with structural engineer's requirements.

7. Remove any decayed wallplates in short sections, including concrete bearing pads, and renew in new treated timber of appropriate section (approved by structural engineer), laid on damp proof course.

8. Splice repair existing decayed ceiling joists, collars hangers, struts, etc., and renew as necessary, as directed by structural engineer's requirements.

9. Cut out all decayed rafter ends, and splice in new treated timber to match existing strength grade, depth, thickness and sufficient to meet Building Regulations and structural engineer's requirements.

10. Treat all existing retained timbers with approved preservative.

11. Treat all retained timbers and irrigate surrounding masonry against future insect and fungal attack.

12. Lay new area of breathable felt underlay (TYVEK Supro or similar approved) over repaired structure.

13. Fit new timber battens and boarding as necessary to take new and salvaged slate to match historic coursing and pitch. Include for ridge slates and proprietary in-line eaves ventilation (Glidevale FV250 or equal and approved) sufficient to meet Building Regulations requirements (while preventing pest ingress).

14. Lay new/salvage slates and ridges, as specified later, on new battens over new underlay. New slates are to be pre-holed, centre-nailed Blue Bangor slates from Penrhyn Quarry in Wales to match existing sizes unless approved otherwise by Conservation Architect.

15. Repair existing valleys as necessary and fit new RWPs and hopper heads in aluminium (to match historic profile) where necessary, repair existing cast-iron rainwater goods in accordance with specification and ensure correct falls to outlets to meet Building Regulation requirement.

16. Fit new lead to any damaged flashings, ridges, valleys, gutters abutments and dpcs in accordance with the specification.

17. Renew existing outlets.

18. Fit new insulation (as specified elsewhere) on completion of repairs sufficient to meet requirements of Building Regulations.

19. Clean up roof and leave in weather and water-tight condition.

2.2.2. CARPENTRY

RELEVANT STANDARDS

BS 1202 Parts 1-3 1974	Specification for nails.
BS 1204 Part 1 1979 (1991)	Specification for gap filling adhesives.
BS 1204 Part 2 1979 (1991)	Specification for close contact adhesives.
BS 1579 1960	Specification for connectors for timber.
BS EN 10143 1993	Specification for continuously hot dip metal coated steel sheet and strip.
BS 4169 1988	Specifications for the manufacture of glued laminated timber structural members.
BS 4190 1967	Specification for ISO metric black hexagon bolts, screws and nuts.
BS 4471 1987	Specification for sizes of sawn and processed softwood.
BS 4978 1988	Specifications for softwood grades for structural

	use.
BS 5268 Part 2 1991	Code of practice for permissible stress design, materials and workmanship.
BS 5268 Part 3 1985 (Including amendments)	Code of practice for trussed rafter roofs.
BS 5268 Part 4 1979 (Including amendments)	Fire resistance of timber structures.
BS 5268 Part 5 1989	Code of practice for the preservative treatment of structural timber.
BS 5950 Part 1 1990	Code of practice for design in simple and continuous construction: hot rolled sections.
BS 6399 Part 1 1984	Design loading for buildings. Code of practice for dead and imposed loads.
BS 6399 Part 2 1995	Code of practice for wind loads.
BS 6399 Part 3 1988	Loading for buildings. Code of practice for imposed roof loads.
IS 193 1986	Timber trussed rafters for roofs.

GENERALLY

Design of Timber Structures

Where the design of timber structural members or connections is not provided by Consulting Engineers, the Contractor shall make provision in his rates for all costs associated with the design of the timber structures by a competent firm of Engineers experienced in the design of comparable structures. The Contractor shall submit to the Engineer for his approval, design calculations and stress diagrams for all structural members and connections as well as the specification for the proposed materials to be used.

Member and connection design shall comply with BS 5268 Part 2 1991, IS 193 and BS 5950 Part 2 where applicable, and shall be submitted in such detail as the Engineer may require to satisfy himself as to the adequacy of the structure through all stages of construction and the serviceable life of the building.

Dead loads shall be based on all the materials and finishes used and shall take into consideration any slopes etc., which may affect the structure.

Fire Resistance

Where a fire rating is stipulated on the drawings, specifications or required by the building regulations Fire Protected member design shall be carried out and calculations etc. submitted to the Architect for approval.

Shop Drawings

Shop drawings are required for assembled components. Drawings should give full details of connections, cuts and grades of timber. Approval of such shop drawings will in no way mitigate the Contractor's responsibility in respect of the adequacy of the structure during erection and through its serviceable life, in accordance with conditions of contract.

MATERIALS

Species and grade

In the absence of notes on drawings to the contrary: Imported Whitewood Special Structural grade or an approved equivalent of comparable strength and stiffness (i.e. strength Class 4 BS 5268 Part 2 or an equivalent Irish Timber strength class C to SR11 : 1988) unless otherwise specified on the drawings.

Other species/grade combinations or strength classes may be used subject to the Architect's approval providing member sizes are adjusted as necessary to compensate for lower design stresses and reduced stiffness.

The Contractor's attention is specifically drawn to the requirement to match the grain pattern, density, durability and all other properties of the existing timber to be repaired. To this end, he will be required to specially select new softwood for these repairs including an end grain density – the historic softwood would typically exhibit a grain density of 24 to 26 annular rings per 25mm when cut at right angles to the line of vertical growth whereas modern commercially grown softwoods currently available on the open market tend to have a grain density of 8 to 12 annular rings per 25mm. He will be required to source softwood, if necessary from overseas, that will match the historic grain density.

Stress Grading

The timber shall be stress graded and marked in accordance with BS 4978 or to an alternative acceptable standard to which the Engineer's approval has to be given.

Grading shall be carried out by persons deemed qualified to do so by Eolas or mechanically in accordance with BS 4978.

The marking of the graded timber shall conform to the requirements of Eolas and NSAI.

The Contractor shall make provision for segregating and storing the graded material in secure compounds, pending fabrication.

Moisture Content

The moisture content of timber at erection and in service shall not exceed the requirements of table 1 BS 5268: Part 2 1984.

Timber shall not be exposed to conditions likely to increase moisture content or otherwise induce deterioration.

Preservation

All new structural timbers shall be factory treated with preservative. Refer to BS 5268 Part 5 for guidance on the preservation of structural timbers.

Treatments shall be double vacuum treated with organic solvent (OS) preservative including a contact insecticide. Composition of treatment shall be in accordance with the relevant specifications of the British Wood Preserving Association (BWPA) Nos. 112 - 116 and 188. A water repellent grade shall be used for timber in an external situation.

Proposals for the treatment of each structural element should be submitted to the Architect

and Engineer and approved by him prior to fabrication.

Approval should be obtained in writing from the Architect and Engineer prior to fabrication for any structural elements where the contractor considers that no treatment is required.

All existing timbers to be retained shall receive an application of preservative to be spray applied once the damaged timbers have been removed.

Wallplates
Wallplates shall be stress graded in accordance with the Structural Engineer's specification.

Floor Joists
Flooring timbers, including joists trimmers and bridging shall be stress graded in accordance with the Structural Engineer's specification.

Boarding
Flooring boards shall be square edged, straight and free from defects.

Rafters and Ceiling Ties.
Rafters and ceiling joists shall be graded as beams. No increase in the size of knots outside the middle of their length shall be allowed.

Internal struts and Ties.
When visually graded these members shall be graded as compression and as tension members in their respective classes.

Battens
Joints in battens shall be sawn square ended and not more than 25% of battens shall be joined on any one rafter. Joined battens shall not occur in a continuous sequence.

Fixing nails shall be 10 gauge round wire and 38mm longer than the batten thickness. At joints the nails shall be skew driven on each side of the joint.

Shakes and splits
Shakes and splits will not be permitted.

Wane
Wane shall not be permitted within 100mm of the edge of metal plate fasteners, nor within the area of any joint at the time of fabrication.

Fissures
Fissures shall not be permitted within 100mm of the edge of metal plate fasteners at the time of fabrication.

Dead Knots
Dead knots or knot holes shall not be permitted within 100mm of any plate fastener.

Live Knots
Live knots shall be allowed within the plate area provided that nails and teeth can be embedded satisfactorily in the material of the knots.

Underlay

Roofing underlay felt shall be non-tearable reinforced with polyester fabric, to conform to the relevant British and Irish standards.

Roof Ventilation
Refer to Architects drawings for ventilation details.

Connectors
Connectors shall conform to BS 1579. Bolts shall conform to BS 4190 and BS 5950 Part 2. Screws and nails shall conform to BS 1202. End and edge distances and spacings, shall not be less than the dimensions recommended in BS 5268: Part 2.

All nails, screws, and bolts, in joints likely to be exposed to the weather, shall be galvanised or sheradized or otherwise treated to the Engineer's satisfaction.
Where necessary nails shall be driven into pre-bored holes of diameter not greater than four fifths of the nail diameter.

Nails shall never be driven into splits.

Spacing of nails, screws and bolts shall conform to BS 5268 Part 2 and in no case shall be so spaced as to induce splitting.

Metal Fasteners and Connections
The material used shall be hot-dip zinc coated steel sheet or coil conforming to Class 2A BS 2989, or equivalent approved.

The plate shall be so manufactured that it conforms with the characteristics of the fastener on which the calculations were based. The minimum thickness of plate shall be 0.91mm.

Patent Connectors
Patent connectors, where used, shall carry an Agreement Board Certificate, either No 73/232 or 76/358, and shall be designed and fixed in accordance with the stipulations and conditions of these certificates. All metal plate fasteners shall be stamped with the manufacturers' identification mark.

The fasteners shall be at least the size specified and shall be located to ensure that the correct number of teeth as required by the design are embedded in each member.

Metal plate fasteners shall not project beyond the upper or lower edges of the connecting members.

Fasteners shall be fully embedded to ensure full penetration of teeth only, and plate to a maximum depth of one quarter of its thickness.

Plywood Gusset Plates
Plywood gusset plates shall comply with BS 5268: Part 2: and shall be designed in accordance with correct and relevant standard structural engineering analytical methods for direct, bending and shear forces.

Plywood shall be suitably protected against damp and the type used shall be appropriate to the exposure condition.

Inspection and Testing

The Architect and Engineer shall have access at all reasonable times to the fabricators yard and works, and shall be provided with the necessary facilities to inspect and test materials at their discretion and at no expense to the Employer.

WORKMANSHIP

Timber Dimensions

All timber shall be sawn, planed, drilled or otherwise machined in accordance with the detailed drawings and specifications. The dimensions of the various structural elements shall conform to the Engineer's drawings or otherwise the specialist supplier's approved drawings, subject only to those permissible deviations given in BS 4471. Dimensions and spacing shall not be scaled from drawings or prints.

Bolted joints, toothed plate connector joints, split ring connector joints, shear plate connector joints and glued joints shall be in accordance with BS 5268.

Joints

Surfaces at any joint in the structure shall have a good sawn or planed finish.

Bearing surfaces or notches shall be true and smooth in relation to the other surfaces of the assembly.

Surfaces at any joint will be such that the parts may be brought together over the whole area of the joint before connectors are inserted or any pressure or restraint from fastenings is applied.

Joint details including those of nailed joints, screwed joints, bolted joints toothed plate connector joints split ring connector joints, shear plate connector joints and glued joints shall be in accordance with BS 5268 Part 2 and BS 5950 Part 2.

Patent Metal Plate Connectors

In the case of patent metal plate connectors being used the fabricator's assembly procedure shall utilise the plant and equipment and written instructions of the manufacturer of those connectors.

Fixing and Strapping

Gable and wall plate strapping should be in accordance with the Building Regulations.

Handling

Erection and handling procedures shall be such that the structures are not over stressed during these various stages.

When erected, structural elements shall be braced and fixed in position until complete. The Contractor shall provide for all anchorages, ties and bracing for maintaining stability during all phases of erection, and during the serviceable life of the structure.

Storage of Timber

Timber and timber products shall be stored in such a manner as to ensure that it is not damaged by the elements, in that the moisture content will be increased or that uneven heat is applied.

If site storage is unavoidable treatment with approved moisture retardants may be required by the Architect at no extra cost.

Should timber or timber products be stored under polythene provision shall be made for adequate ventilation.

Timber should be ordered to a programme that will reduce site storage time to a minimum.

Safety Regulations
All statutory safety regulations shall be adhered to in respect of the erection of the structure and all reasonable care shall be taken as a precaution against accidents. The Contractor shall provide for the necessary labour and materials to meet those requirements.

Decayed Timbers
All decayed timbers shall be carefully cut away to good sound timber under the direction of a specialist. Existing and new repair timbers shall be liberally treated with preservative. Surrounding masonry shall be drilled and irrigated by an approved specialist. Sawn ends of repair timbers to be vulcanised by wrapping in self-adhesive bitumen-based membrane.

Roof Timbers
New wall-plates shall be sized to match the original, correctly lapped and fixed to masonry in accordance with the Structural Engineer's specification.

All rafters and ceiling joists to be repaired shall be prepared by carefully cutting away defective timber to a sound sawn end. Sawn ends and surrounding surfaces should be liberally treated with an approved preservative, applied by a specialist. New timber to be inserted into external wall shall be isolated by d.p.c. from the masonry.

Timbers to be splice jointed shall be overlapped, new to existing, by 900mm, with 4 No. bolted joints incorporating toothed plate connectors.

STRUCTURAL TIMBER IN CUT ROOFS

Ceiling formers, rafters, wallplates and other structural timber should be in accordance with BS 5263 Part 2 and section A of this specification. Sizes of structural timbers to be in accordance with the drawings, and shall generally be in line with existing timbers being removed. However when these sizes are less than those given in the relevant tables of SR11 the requirements of SR11 should be adopted.

Connections
Particular care shall be exercised to make all necessary connections at eaves level to prevent spreading of the roof. In general this shall be by nailing of ceiling joists to rafters. Continuous tying shall be assured by secure nailing of any lapped ceiling joists.

Propping
Purlin props shall be supported on load-bearing masonry or on timber studwork specifically stiffened for the purpose or off spanning members appropriately designed and arranged to accept the point load.

Splicing
Spliced rafters should be cut square to clean un-decayed timber. The new replacement timber should match in section and overlap the retained portion by not less than 900mm.

The new timber should be securely attached to the existing by 4 No. bolted timber connectors.

Repairs
Timbers to be repaired shall be cut back to clean undamaged wood. Cuts shall be neat and square and shall be formed to suit the joint type or splice being made. Rafters and truss members shall be temporarily supported during repairs. Wallplates being retained shall be adequately spiked to existing walls. Where wallplates are to be renewed, loose material shall be removed from the top of the wall, and topped off in concrete to provide a smooth, level, bearing surface. All timber being retained shall be treated with spray applied preservative, with particular attention being paid to cut ends, where brushed on application will be permitted. The cut ends of new timbers shall be similarly treated. When the new timber has been inserted, joints shall be reinforced with steel straps, connectors, bolts, plywood etc., as appropriate.

Boarding
Gutter boarding shall be 25mm thick waterproof grade plywood. Gutters shall be formed to replicate existing falls, and shall discharge to existing outlet points.

Battens
Slating battens shall be 75mmX38mm softwood, or other sizes to match existing battens. Counter battens, if required, shall in all cases match original in size and spacing.

Roof Boarding
Roof boarding, if required, shall be 25mm waterproof, external grade plywood, securely fixed to rafters.

TIMBER PRESERVATION - ON SITE

On-Site Preservative
Where treated timbers are cut, the exposed cut shall be treated, and all existing timbers to be retained in roof and ceiling structures shall be treated as follows:

Method of application	Brush (Cut Timbers). Spray (Retained Timbers).
Number of Coats.	Two.
Preservative.	Cuprinol or other approved.
Timber location or use.	All new cut surfaces. All existing timber surfaces.

Brush or Spray Preservative
On to clean dry timber in flood coats with a soft bristled brush, or approved spray. Apply second and any subsequent coats after previous coat has soaked in but before it has dried. Treatment shall extend a minimum of 300 mm from ends of timbers, unless otherwise indicated.

2.2.3. ROOFING

Slating
The slating shall comply in all respects with the requirements of BS 5534 and 8000. In special circumstances, deviations from this standard will be permitted by prior approval of the Architect provided the Contractor shall satisfy the Architect that the proposed deviation shall not reduce the standard of the completed work.

The Contractor shall note that the condition of the slates indicates that an amount of original slate will be available for salvage and re-use. Therefore, he shall include for carefully removing the existing slate to the entire area of the roof, grading and setting aside for re-use as referred to under Taking Down & Removals.

Slates
Slates shall be sourced from the Penrhyn Quarry of the Cambrian deposits of Gwynedel, North Wales and shall satisfy the requirements of B.S. 680. They shall be fixed in strict accordance with the manufacturer's recommendations to B.S. 534 incorporation all required battens, counter battens, felt etc.

The use of salvaged slate, either from the building or other sources, will be permitted provided the Contractor can satisfy the Architect that they comply with BS 680 or that such compliance can be reasonably inferred.

New slates are to be pre-holed, centre-nailed 600 X 300 X 6-7mm thick Blue Bangor slates from Penrhyn Quarry in Wales unless approved otherwise by Conservation Architect. The contractor is to refer to the specification in detail in relation to standards of materials and workmanship etc. required for slating. Salvaged slates are to be stored as close to the roof as possible, in order to avoid possible damage to them in transit. If possible they should be kept in the working area at roof level, making sure they are secured and cannot be a falling hazard.

Grading
The Contractor shall note that the existing slates may be graded according to size, the largest at the bottom and the smallest at the top. This pattern of size shall be carefully recorded before any work of stripping the roof is commenced and the new or salvaged slate shall be laid in a matching pattern.

Salvaged slates shall be graded for re-use. In general, the salvaged slates will be of a larger size than the new slates and shall be used on the outer visual pitches of the roofs.

Ventilation
Ventilation of the roof timbers, where indicated, shall be achieved by means of proprietary p.v.c. continuous eaves ventilators, and/or proprietary p.v.c. in line slate vents, all fitted in accordance with the manufacturer's recommendations. Ventilating slates shall be size and colour matched to the new or salvaged natural slates, shall be fitted with insect mesh, and shall be self-draining.

Ridge and Hip fittings
The existing ridge and hip fittings shall be re-used where they are in good condition and undamaged. Where insufficient are available from the works, new or re-cycled fittings to match the originals shall be provided to match the original in all respects. All new fittings shall

comply with BS 402.

Underlay
Underlay shall comply with BS 747 and shall be reinforced breathable fabric.

Battens and Counter-battens
All battens and counter-battens (if required) shall be completely replaced with new material. New battens and counter-battens shall be pre-treated with double vacuum pressure impregnated softwood, in sizes to suit the application as defined by BS 5534, and replicating the original as previously specified. They shall be free of decay, insect attack, splits, shakes, wany edges etc. and shall have a moisture content of less than 18% when fixed. They shall comply with BS 881 and 589 as regards species and shall comply with BS 4978 as regards grading. All timber shall have the grade marked on each and this shall be re-marked with the prefix 'R' where the original marking is removed by working. The timber shall be of the appropriate grade for the use intended as defined by BS 4978.

All cuts etc. that break the treated timber shall be brush coated with two coats of the same preservative used for impregnation, using the type appropriate for brush application. It is imperative that the pressure impregnation treatment does not adversely affect the fixings.

Boarding
All damaged or defective boarding shall be replaced with new boarding as previously specified in the exact sizes of the original. All relevant aspects of the previous clause shall apply to this clause.

Nails
Nails for fixing slates shall comply with BS 1202 and shall be copper clout nails. Nails for fixing battens shall comply with BS 1202 and shall be galvanised steel. Nails for fixing underlay shall be galvanised-steel extra-large head to BS 1202.

Mortar
Mortar shall be as specified elsewhere for bedding and pointing.

Undercloaks
Undercloaks shall be formed from the specified slate.

Storing and Handling materials
Shall comply generally with the relevant clauses elsewhere in this specification.
Underlays shall be stored upright on clean, flat, dry surfaces. Slates shall be stored upright on a level surface of timber battens or in the original pallets and kept dry.

Removal of existing
The existing damaged slates shall be carefully removed by manual means, avoiding all unnecessary further damage to adjoining slates. The Contractor shall note that this is a difficult operation to complete without damaging the slates etc. In special circumstances, areas where the slate is not of sufficient quality to be re-used shall be agreed with the Architect before the stripping commences and these may be removed and disposed of by the most efficient means.

Protection
The Contractor shall be responsible for providing and maintaining all necessary protection, temporary coverings, temporary roofs etc. to ensure that no water is permitted to enter the building during these works. This shall be deemed to include all work necessary to the roofs,

leadwork and other areas affected by the works.

Repairs
The Contractor shall carefully examine the roof structure, wall plates, fixings etc. and carry out all necessary repairs to ensure the roof is structurally sound upon completion. All defects noted during this examination shall be brought to the Architect's attention and the methodology of repair agreed with him before any work is put in hands.

Following the removal of the damaged slates, battens and counterbattens, all the boarding shall be carefully examined. All areas of defective or damaged boarding shall be replaced or repaired as instructed by the Architect.

Preliminary checks
Before commencing the insertion of replacement slates, the Contractor shall check that all necessary repairs, all works to the flashings, rainwater goods, penetrating pipes etc. are complete and shall ensure that all the necessary materials etc. for the completion of the works are on site.

Counterbattening
Counterbattens (if required), as previously specified, shall be laid at the required centres and securely fixed with nails to satisfy BS 5534. Only long lengths, with a minimum length of 2 meters shall be used unless the particular detail on the building demands a shorter length. All the relevant matters of the Clause 'Battening' below shall apply to this clause.

Abutments, Parapets
The slate shall be cut to the required line and fixed with all necessary metal soakers etc. to ensure a watertight finish. The previous requirements in relation to short slates shall apply here.

Completion
The entire work shall be completed to the Architect's satisfaction, all debris removed and the roof left in a neat weathertight condition.

2.2.4. LEADWORK

Generally

The existing parapet gutters, linings, abutment flashings, etc., where formed in lead and where repairs are required, the new lead should match the existing in gauge.

Lead flashings, counter flashings, cover flashings, gutters, etc. shall comply in all respects with the requirements of CP 143 and the Lead Sheet Association.

MATERIALS

Milled sheet lead shall comply with BS 1178 and shall be minimum Code 6.

Solder shall comply with BS 219.

Copper Clips shall comply with BS 2870 and be minimum 0.6mm thick.

Screws shall be brass to BS 1202 with large flat heads.

Underlay shall be inodorous sheathing felt to BS 747.

Storage and handling
Lead shall be stored rolled on a clean, level, smooth surface.

WORKMANSHIP

Existing Flashings
All existing flashings to the gutters, parapets, abutments, shall be completely removed.

New Flashings
Abutment and ridge flashings, shall, if necessary, be executed in Code 6 lead (or Code 8 where falls dictate), laid and fixed in accordance with the Lead Development Handbook recommendations. Soakers where required shall be accurately cut to match the slate size.

Underlay
The underlay shall be laid on 25mm marine grade plywood securely fixed to the substrate. The underlay shall be laid with butt joints on flat surfaces and with a 50mm overlap on inclined surfaces. It is imperative that the underlay is kept dry at all times and no more than can be covered with lead the same day shall be laid at a time.

Cutting
The lead shall be prepared for cutting by rolling out on a clean, level, smooth surface. It shall not be marked with sharp tools.

Laying
The lead shall be set out in the appropriate bays sizes within the bay size limitations and shall be laid in close contact with the underlay to ensure that not pockets of air, debris etc. are trapped between the various layers.

Dressing
The lead shall be dressed to the necessary profiles and the drip formed without reducing the thickness of the lead. At welted joints, the drip shall be carefully formed to ensure a neat, weathertight joint. All welts shall be so formed that the do not restrict the thermal movement of the sheets etc.

Fixings
The lead shall be securely fixed using copper clips turned into the welted joints at minimum centres as recommended in the Lead Development Association Handbook. In general, 2 clips should be provided in each joint, but more may be necessary at corners, large flat areas etc. The maximum centres for clips shall be 400mm. The welt shall be finished by lightly dressing flat.

Angles
Angles shall be formed by cutting and folding where the angle cannot be dressed. It shall be finished to form a neat weathertight joint.

Pipe Penetrations
Pipe penetrations shall be weathered in lead dressed tightly to the pipe, and counter flashed with a proprietary butyl rubber collar, bedded in silicone sealant and clamped with a "jubilee"clip.

Finishing
The lead shall be cleaned and Patination Oil applied in strict accordance with the Manufacturer's recommendations.

Isolation

All lead shall be electrically isolated from other metals that would cause electrolytic action using bitumen or other approved isolating membranes. The lead shall also be protected from any risk of corrosion from contact with soluble salts in masonry, renders etc. and from acid attack from timbers or any preservatives applied to the timbers.

Completion
The completed leadwork shall provide a neat, weather-tight finish to the Architect's satisfaction.

2.2.5. ROOFING

Parapet guttering, flashings, counter flashings, cover flashings, etc., where existing in copper, shall be renewed in copper and shall comply in all respects with the requirements of the relevant clauses of CP 143, and the Copper Sheet Association.

Materials
Copper sheet shall be to ASTM B370: class H02 (half hard).

Solder shall comply with BS 219, Grade A.

Clips shall comply with CP 143 and shall be cut from the roofing copper no thinner than the copper being fixed, min width 40mm.

Screws shall be brass or heavily copper coated steel to BS 1202 with large flat heads.

Wood rolls shall be wrot softwood as specified under Carpentry to tapered profiles and sizes shown on CP 143.

Underlay shall be inodorous sheathing felt to BS 747 Type 4A (ii) No. 1 inodorous.

Bitumen shall be black coating solution to BS 3416 type 1.

Storage
Copper shall be stored in dry conditions on a clean smooth level surface. Rolls shall be stored on end, sheets shall be store flat. Underlay shall be stored on a dry, clean, smooth, level surface with the rolls upright. Store underlay rolls upright on a clean, even, dry surface.

Extent of the Works

The works shall comprise of the removal of all existing flashings, counter flashings, cover flashings, soakers, gutters, linings, etc. Copper is to be used in gutters, and other flashings as indicated.

Replacement of the existing structural timberwork, boarding etc. etc. is specified elsewhere.

Existing Roofing, Flashings etc.
All existing metalwork etc. shall be carefully removed and the areas prepared for the installation of copper. All boarding and other supports, decking etc. shall be carefully replaced as necessary to the Architect's approval. This will be deemed to include for all necessary adjustments to the bay sizes, falls, steps etc. as may be necessary to ensure the new copperwork etc. comply with all current Standards, Codes of Practice and manufacturer's recommendations.

Preliminary Checks
Before commencing work, ensure that:

1 All surfaces to receive copper or underlay are clean, dry, smooth and flat or inclined as required.

2. Screws or other mechanical fixings are finished below the surface of the copper or underlay.

3. All edges or boards, abutments are smooth and level.

4. Falls are correct and steps are correctly located for the sheet size limitations.

5. All grooves, outlets, etc. have been formed and have smooth edges.

6. All necessary fixings, battens, rolls etc. have been fixed or preparations completed.

7. All other necessary trades are complete.

Laying Underlay

The underlay shall be laid in accordance with the standards noted earlier. All joints on flat surfaces shall be butted and a 150 mm overlap provided on all sloping and vertical surfaces. The underlay shall be laid loose on flat surfaces and fixed with approved fixings on sloped and vertical surfaces. The underlay shall be carries into all gutters, downstands, upstands etc., at all times the underlay shall be kept dry and only as much as can be covered with copper in that day shall be laid at one time – on no account shall any underlay be exposed overnight or during rain etc.

Cutting Copper

Copper to be cut shall be prepared by rolling out onto a clean, flat, smooth surface and allowed settle flat. On no account shall it be marked by tools that would inscribe or deform the surface.

Laying and Dressing

The copper shall be set out in bay sizes not to exceed Table 1 of CP 143. As far as practicable, all sheets shall be cut and bent to profile before laying. Avoid all unnecessary re-bending and any metal that exhibits any distress, fatigue or distress shall be immediately removed form site and replaced with new sheets. Lay copper in close contact with supporting surfaces and underlay and avoid all air entrapment.

Isolation

All copper shall be electrically isolated from other metals that would cause electrolytic action using bitumen or other approved isolating membranes. The copper shall also be protected from any risk of corrosion from contact with soluble salts in masonry, renders etc. and from acid attack from timbers or any preservatives applied to the timbers.

Fixings

Fix all copper in a secure manner but not to restrict thermal movement. Clips shall be turned into the welted joints at minimum centres as recommended in the Copper Development Association Handbook. In general, 2 clips should be provided in each joint, but more may be necessary at corners, large flat areas etc. The maximum centres for clips shall be 400mm. The welt shall be finished by lightly dressing flat. Cover Flashings shall be fixed into the groove or raked out joint by means of folded strip lead wedges or brass screws at max. 500 centres.

Clips

Clips shall be securely fixed with min. 2 No. screws.

Free Edges

All free edges shall be finished by forming welts or beads to stiffen the edge or make secure.

Screwing

All screws shall be weathered and shall be unseen. Washers to be used as necessary.

Wedging

Strips of malleable copper or lead to be folded and wedged in for the full depth of the groove to securely hold flashings, counter flashings, weatherings etc. etc. at max. 500mm centres. Point groove with approved two pack polysulphide or silicon mastic. Alternatively, such flashings etc. may be fixed with screws and washers and pointed as before.

Jointing

Generally:

Allow for thermal movement in all joints. Joints to be formed to naturally reject water and to allow to drain freely. All joints to be weathertight.

Soldering

Soldering shall generally not be permitted except in certain special circumstances when specifically allowed by the Architect. If permitted, all residues, flux etc. shall be carefully removed.

Angles

Angles shall be formed by cutting and folding where the angle cannot be dressed. It shall be finished to form a neat weathertight joint.

Cross welts

Form single welts with min. two clips per bay only on slopes exceeding 150.

Drips

All edges of flashings, steps etc. shall be properly formed with drips. All edges shall be turned up and welted to form a straight and durable termination.

Laps

Where lapped joints are to be formed, the upper sheet shall overlap the lower by min. 100 mm.

Flashings

All areas to be flashed with copper shall be 0.8mm copper, laid and fixed in accordance with previous specification clauses. It shall be dressed to form a min. 150mm upstand against all abutting surfaces, with a cover flashing fixed into a groove or raked joint and pointed with polysulphide or silicone mastic approved by the Architect. The leading edge shall be dressed down over the vertical surface and turned up and welted to form a drip with a projection of minimum 6mm below the bottom edge or return of the stone.

Gutters

Pre-form gutter sections to comply with the previous relevant clauses and fix in place, ensuring an adequate fall to the outlets. Dress into roof outlets and form a watertight joint with downpipes or hopper heads. Form welted joints between sections as previously specified. Ensure that water has a free drainage passage to the outlets. Provide leaf grills to outlets to prevent debris gathering and blocking the outlet.

Roof Outlets

Outlets shall be 300x200mm, 150mm deep, pre-formed in copper, set into gutter and brazed as necessary, with 150mm diameter pipe brazed to base. The pipe shall be formed to pass through the existing wall aperture, and discharge into the existing hopper head. The contractor shall include for bedding and pointing the copper outlet pipe to the existing parapet stonework.

Finishing

The copper shall be cleaned and Patination Oil applied in strict accordance with the Manufacturer's recommendations.

Internal Outlets

25mm diameter copper piping shall be fitted to the outlet points in the lead condensation trays, sealed with neoprene gaskets and connected to the existing pipework

Completion.

The completed copper-work shall provide a neat, weathertight finish.

2.3. Metalwork

PRODUCTS

Standards

Cast iron pipes, fittings and joints to BS 437:2008

Cast iron spigot and socket pipes and fittings to BS 78-2:1965

The new over-ground rainwater disposal system shall comply with BS 5572.

Finishes:
Metal products for making components must be either pre-finished, or suitable to receive the specified finishes.

Accessories:
Unless otherwise specified fastenings to be of the same metal as the item being fixed, with a matching coating or finish.

Protection:
During fabrication protect all surfaces which will be visible in completed work.

Cold Formed:
Work to be free from warping, buckling and fractures. Form bends with a brake press or by cold rolling.

Holes:
Form without distortion of surrounding metal.

Cleaning:
Remove all burrs and sharp arises which should be visible after fixing or a hazard to the user.

Riveted Joints:
To be drawn tightly together, with rivets closed to completely fill holes.

Mechanical Joints:
To be tight with no visible gaps.

REPAIRING CAST IRON AND WROUGHT IRON

Scope
Repairs to ironwork shall include profiled guttering, railings and gates.

Removing Ironwork.
Where ironwork is to be removed from masonry, it will be necessary to heat the lead packing sufficiently to release the seating. Great care should be exercised to avoid damage to the stone. In the event of failure to release the seating by means of heating, or where in the opinion of the Architect damage to the masonry will result, the Contractor may, with the approval of the Architect carefully cut the component from the masonry. On the removal of

the component, the residual metal may be removed by drilling, and the stone repaired as described in the Stonework section.

Welding Cast Iron.
Welding of cast iron is only possible with great expertise and careful supervision, and it is not always possible to be sure of the integrity of the repair. Welding of cast iron will require the removal of the section to a workshop where it can be preheated before welding and post-heated after welding to ensure a gradual temperature change within the metal. Welding of large sections of cast iron on site will not be permitted.

As fusion (arc) weld of high integrity is especially difficult to achieve, where welding of cast iron is necessary, metallic bond (gas) welding shall be used.

Welding Wrought Iron.
Structural joints shall be butt welded to ensure that all sections of any laminations which may be present will be attached. Fillet welds can be used provided they incorporate a sound edge of wrought section.
Rivets should not be replaced by welded joints. Welding near rivets will not be permitted as distortion may stress these, forming a gap between the joined materials.

Cold Repairs – Castings.
Fractures in cast iron may be repaired or stabilized by several `cold' methods. Stainless steel or non-ferrous metals should be used whenever possible. Cold repair techniques include: straps, threaded studs and dowels or plain pins.
Straps shall where possible be hidden. The plate should be bedded on a suitable medium to prevent a water trap.
Threaded studs should be screwed into both sides of a fracture.
Dowels or plain pins, should have one or both ends threaded and/or glued into prepared recesses.
Generally, cold repair method shall involve the insertion of a shaped piece of wrought iron across a fracture. Once the fracture is realigned, groups of holes shall be drilled across it , to form a series of slots, and locked with work-hardening nickel alloy driven in. Holes are drilled along the line of the fracture between these, then tapped and filled with studs, each stud interlocking with its neighbour. All excess metal is then sheared off and the surface is ground and painted.

Fillers
Damaged but otherwise serviceable component may be filled with the approval of the Architect. Fillers for this work shall be based on steel particles with an epoxy resin binder.
New Castings
Seriously corroded, broken or missing castings may need to be recast. Grey cast iron should be replaced in the same material. Replacements in cast aluminium shall not be used. Where possible, existing pieces may be used as patterns. Where shrinkage cannot be tolerated or where the shape of the item does not permit direct moulding, a new pattern will need to be made.

Replacement Wrought Iron.
Where sections of wrought iron is in need of replacement, re-cycled or salvaged iron should be used.

Rehousing Ironwork.
Metalwork should be positioned and maintained plumb, level and square.

Metalwork shall not be distorting when tightening or adjusting.
The ends of all existing ironwork which is to be reset into masonry must be either cleaned and treated thoroughly or replaced. If they are to be reclaimed abrasive cleaning will be necessary to remove completely all corrosion prior to painting with epoxy paints and fixing with lead or lead wool packing.
Severely corroded ends shall be tipped with stainless steel, Delta bronze or new wrought iron for the distance of the housing plus at least 12 mm from the masonry face. For bronze a lapped joint shall be formed and bolted with a bed of sealant between the bronze and iron to prevent water penetration. In the case of stainless steel a welded butt joint shall be formed.
Missing studs, stools, etc., should be reattached by welding.
The studs shall be inserted into the housings packed with lead wool, and with hot lead and caulked when cool.

Protection.
All metalwork should be protected to prevent distortion, damage to arises, projecting features, and surface which will be exposed in the finished work during transit, handling and storage.
All contact with mud, ashes, plaster and cement should be prevented.

CLEANING AND SURFACE PREPARATION

General.
The preparation of a sound surface shall involve removal of old paint, rust, loose mill scale and soluble corrosion salts. It should be noted that paint removal may reveal cracks, corrosion and casting defects which were not previously visible. Allowance should therefore be made at the outset for dealing with these.

Old paint and repainting
All paint which is loose, perished or flaking shall be removed. Only wet hand processes should be used because of the risk from dust from lead pigments.
Small areas of paint can be removed with thixotropic paint strippers such as methylene chloride. Their residues must be removed by white spirit or water, as appropriate.
Flame cleaning and hot air blowers are also effective paint removers. These must be used with care on thin cast iron because of the thermal stresses which can be set up by localised overheating.

Mill scale.
Loose or defective mill scale must be removed. Evidence suggests that wrought iron receives corrosion protection from sound, adherent mill scale, and for this reason flame cleaning is the preferred treatment.

Soluble corrosion salts
Ferrous sulphate and ferrous chloride and other water soluble salts must be removed from the bottom of pits within an iron surface. They are not readily removed by cleaning with large-sized abrasive particles.

Degreasing.
All oil or grease shall be removed. Large quantities should be physically removed by scraping. The rest is best removed by warm water and detergent followed by thorough water rinsing. Non-caustic degreasing agents will also be permitted.

Manual preparation.

The simplest form of surface preparation of iron involves chipping, scraping and brushing with hand-held implements. It should be noted that while surfaces prepared in this way may appear burnished and clean, only about 30% removal of rust and scale may be achieved. Scoring of valuable surfaces and loss of detail may also occur. Manual preparation should therefore only be used where alternative methods are not available. A corrosion-inhibiting primer such as red lead or zinc phosphate should then be used.

Mechanical preparation
These processes involve use of power-driven tools such as grinders and rotary wire brushes and provide a marginal improvement in efficiency over manual preparation. Rust or other deposits in pits and crevices are rarely removed. Needle.guns, however, can be used successfully to access awkward corners and angles inaccessible to other equipment.

Flame cleaning.
An oxyacetylene or oxypropane flame should be passed across the iron, resulting in the detachment of rust and loose mill scale, which should be removed by wire brushing. Thin sections of wrought iron of less then 2 mm may warp during flame cleaning unless the method is used with care. Extreme care should be taken to avoid the fusing of unbonded scale and other foreign matter.

Acid pickling
Items should be immersed in a bath of warm dilute sulphuric acid or dilute phosphoric acid to dissolve and remove mill scale and rust. On removal from the bath the iron must be. thoroughly rinsed with clean water. Hydrochloric acid and sodium hydroxide (caustic soda) leave soluble salts on the metallic surface and should not be used. Site application of acid washes will not be permitted.

Dry abrasive cleaning
Dry abrasive cleaning may be used for cleaning cast iron. However, due to the softness of wrought iron it should be noted that the milled or beaten surface will be removed or roughened unless great care is taken, and the success of abrasive cleaning of cast iron and wrought iron is highly dependent on careful work by skilled operatives, the right grits and the right supply of air pressure. Test areas should be carried out to determine the correct air pressure and size of grit.

Wet abrasive cleaning.
Wet abrasive cleaning reduces the level of dust, and is preferable to dry especially where lead-based paint is to be removed. Cleaning should be carried out using a nozzle with independent control over air, water and abrasive. Wet abrasive cleaning may, however, cause unwanted water penetration at junctions, and the surfaces should be allowed to dry thoroughly prior to priming.

Precautions for wet and dry abrasive cleaning
For both methods great care must be taken to mask surrounding surfaces. All caulking which is dislodged must be replaced. It is necessary to ensure that operatives are adequately protected and the potential environmental hazards such as dust, spent abrasive, and abrasive-laden run-off are dealt with properly.

Re-rusting of cleaned surfaces
Cast iron or wrought iron members which have been cleaned by flame or dry abrasive should be primed before rust starts to form. If this is not possible the surface should be flash cleaned immediately prior to priming.

Galvanising.
On completion of the cleaning and repair work all components shall if possible be hot dip galvanised. Where, in the opinion of the Architect, the assembly of the components precludes galvanising, the Contractor shall prime all surfaces with an approved primer prior to painting.

PAINTING

Primers and inhibiting pigments
All surfaces to be painted shall first be primed with a zinc phosphate primer. A zinc primer may require a sealing coat and subsequent coatings need to be non-saponifiable, such as epoxy paints. As it is almost impossible to produce with one coat a continuous film of adequate and even thickness, free from pinholes, two coats of primer shall be applied.
In the case of galvanised surfaces, appropriate etching primers shall be used.
Where components have been remover from site for workshop repairs and in the case of new work, primers shall be applied prior to delivery, and touched up which fixed in position.

Application of Paints.
All metal surfaces to be painted shall received two brush applied coats of a selected two-pack epoxy paint such as 'Cotech' or other approved paint, in strict accordance with the manufacturer's instructions.
It should be noted that two-pack epoxy paint are not always suited to brush application, and the manufacturer's specification should be accurately followed.

RAINWATER DISPOSAL

Pipes.
Rainwater pipes, gutters, hopper heads, swan necks, toes, holderbats and associated fixings, clips and the like shall be of cast iron in historic designs, manufactured to B.S. 460. The various elements shall be selected from a proprietary system and all components shall be fixed and jointed in accordance with the manufacturer's recommendations. Support ears for pipes and other fittings shall not be integral with the pipe or fitting.

Holderbats.
Holderbats shall be single pin or saddle type, capable of supporting the weight of the pipe and shall be designed to facilitate the easy removal of pipes, etc., from the wall faces for maintenance purposes.

Manufacture and Reference.
All pipes, fittings and accessories to be from same manufacturer. Only dedicated fixings, clips cleats, spacers, restraints, etc., may be used.

WORKMANSHIP

Pipework.
Vertical pipework shall be fixed to walls or other backgrounds, to true line and shall be set sufficiently clear of backgrounds to enable future maintenance. Fixing centres shall be in strict accordance with the manufacturer's specification.

Holderbats.

Single pin holderbats shall be grouted in suitable sized holes, preformed or drilled in the wall faces, and pointed flush. Saddle type holderbats with half moon caps shall be plugged and fixed to the wall with appropriate screws or mechanical annchors or as directed by the manufacturer.

Sealed Joints:
All surfaces to be joined shall be thoroughly clean. Jointing compound spread evenly over surface of socket.
Fixings shall be tightened sufficiently to squeeze out some compound, but shall not be over-compressed.
All surplus compound shall be removed and neatly cleaned off.

Open Joints.
Vertical external pipes may be left unsealed, seating and wedging as necessary to prevent movement.

Testing Pipes.
Sealed piping shall be tested by inserting suitable test plugs and tee pieces to open ends of pipework, and introducing water, air or smoke as required by the manufacturer.

2.4. Stonework

2.4.1. CLEANING GRANITE ENTRANCE STEPS

Standards
These works shall comply with the requirements of BS 6270 and BS 5390

Materials
Chemicals for cleaning stone shall be approved by the Architect. Algaecides would include Alkutex paste from the Remmers range of chemicals, Algae-Rem from the Intrachem range of chemicals or Neolith 800 from the Neolith range of chemicals. Cleaning chemicals will be from the Neolith range of chemicals and will include Neolith HDL, or from the Intrachem range of chemicals, including HD400s and SC100 or from the Prosoco range of chemicals, including 766 Limestone & Masonry Prewash, Limestone & Masonry Afterwash and 1217 Heavy Carbon Poultice. Trials must be completed in advance of the cleaning programme to determine the appropriate times for application of chemicals. As these chemical cleaners differ slightly in their effectiveness on differing substrates, the Contractor shall allow for the Architect to select whichever chemical he deems most effective to be used on the works. The Contractor should keep in mind that these materials contain injurious chemicals and the manufacturer's safety precautions must be prominently displayed, and adhered to at all times. The chemicals must be applied in accordance with the manufacturer's recommendations. The recommended safety First Aid Kit should be maintained on site and readily available during operations.

Cleaning generally
Only fully experienced and trained workpeople shall be permitted to carry out cleaning works, and full protection for the operatives, scaffold, woodwork, glass, ironwork, different adjoining masonry material types etc., shall be provided. In addition, full protection for persons and property in the vicinity of cleaning operations shall be provided. All safety recommendations shall be strictly adhered to.

Extent of Cleaning
The Cleaning shall be undertaken before any loose pointing is raked out and, following raking out, the Contractor shall agree areas of residues to be cleaned as part of the final rinse down operation.

Procedures to be followed
The Contractor shall note that he will be required to undertake a series of test cleanings of the methodology described below to confirm or otherwise its effectiveness. When the results of these tests are available, the Architect may require alterations to this methodology, including the reversal of the order to commence with chemical cleaning and to subsequently move on to mild abrasive cleaning if the tests indicate that this is necessary. The Contractor will be deemed to allow for such matters at the time of tender and no extra will be allowed for such tests or adjustments.

Initial cleaning shall comprise of the removal of all algaecidal, biocidal and fungicidal growths, particularly where these have built up on the surface of the stonework. The stonework shall then be treated with an approved sterilising fluid as specified earlier (Remmers Alkutex Paste, Intrachem Algae-Rem or Neolith 800) used strictly in accordance with the manufacturer's recommendations and safety requirements. Particular care must be taken to ensure that the chemical is well worked into the friable surfaces of the stone without damaging the stone. It shall be permitted to remain in contact with the stone for the length of time recommended by the manufacturer or as determined by the on-site trials. Upon completion of this contact time, it shall be rinsed off as recommended by the manufacturer using warm water where appropriate, care being taken to ensure that none of the stone is saturated. If necessary, repeat applications shall be applied to ensure all spores, seeds, etc. etc. are fully sterilised.

Following the application of the sterilising fluid, all stone shall be cleaned as specified below. The Contractor should note that while a single manufacturer's product is included in this specification, he may use similar chemicals of other manufacturer's as specified under 'Materials'. The Contractor should note that the Architect may require that the material chemical from one particular manufacturer must be used in the works if the tests indicate that this particular chemical is the most effective. The general intention is that material from a single manufacturer should be used for all stages in this cleaning process.

Stonework shall be cleaned with specific manufacturers' materials as previously specified, always used in strict accordance with the manufacturers' instructions and safety recommendations. In all cases, the cleaning shall be undertaken in panels coinciding with a natural break in the building - details of these panels to be agreed with the Architect before the works commence.

All/any adjoining different masonry materials, quoins, etc, in granite, glass, metalwork etc. shall be carefully protected before commencement. On no account should any chemical, or rinse water from areas cleaned with chemical, be permitted to come in contact with dry masonry. Areas at particular risk are those underneath the current site of operations. It is imperative that all such areas are either fully protected before operations commence and fully rinsed down upon completion.

Particular care must be taken at junctions between stone to be cleaned and areas not being cleaned, particular at the faience surrounds to the 'shopfronts'. On no account shall the cleaning be allowed to affect adjoining materials or to alter the appearance of these materials.

In such instances, the Contractor will be required to provide plywood cut-outs or similar and approved protection to ensure that the adjoining stonework is not affected.

Sample panels are to be completed before the cleaning commences in areas selected by the Architect, to enable contact times to be established. In all cases, tests to ensure the surface is chemically neutral shall be undertaken 3 days after completion of the cleaning using litmus or another approved method.

Cleaning Methodology
Cleaning shall be achieved by the following methodology in strict accordance with the manufacturers' recommendations.

The masonry shall be cleaned using the NeoClean 300 System or similar and approved mild abrasive cleaning system in strict accordance with the manufacturers' instructions and safety recommendations. The abrasive to be used shall be calcium carbonate of the appropriate grade with the water metered to the abrasive at the base of the blast pot or at the nozzle as approved. Only the minimum of water to control dust shall be used and on no account shall the stonework be permitted to become saturated. Great care will be required to ensure that no salts within the stone are liberated by the cleaning which may result in staining due to the deposit of the salt on the surface of the stone, Iron ores are particularly damaging in this respect. On no account shall the pressure of the abrasive at the nozzle be permitted to exceed 25 p.s.i. and shall be, wherever possible, less to obviate the possibility of damage. As far as practical, the finer grades of abrasive shall be used, but the Contractor's attention is drawn to the fact that heavy encrustations of dirt, plaster residues etc. may have to be removed using the coarser grades to reduce the necessary contact time and prevent damage to adjoining fragile stonework.

Before the work commences, the Contractor shall undertake sample panels as directed by the Architect to determine the grade of abrasive, the contact time and the optimum pressure for the operations.

The cleaning operations shall be undertaken by holding the nozzle approximately 1 meter from the surface of the stone at an angle of 45 degrees to the plane of the surface of the stone, unless the 'Joss' type nozzle, which delivers the abrasive mixture moving in a spiral motion, is being used in which case the nozzle shall be at right angles to the plane of the surface of the stone. The nozzle shall be moved over the surface in gentle, even strokes both vertically and horizontally to achieve an even clean appearance to the stone without causing any damage to fragile areas, particularly fine, weathered arrises. In areas where there is any doubt, cleaning operations shall be suspended before any damage occurs and the residual dirt allowed to remained until such time as the Architect has inspected the work and given instructions as to the procedure to be followed to complete the cleaning work. On no account shall 'gun shading' be permitted to occur or the surface of any stone cleaned by these operations.

The Contractor shall complete the initial cleaning of each area in a single pass operation and subsequently return to clean isolated areas that have particularly heavy or stubborn accumulations, plaster residues etc. until a clean even visual appearance to the Architect's satisfaction is achieved. The Contractor may, if he so wishes, commence operations by removing heavy or stubborn accumulations at the outset before the general cleaning, but in either case, each section must be completed in a single operation and there can be no instances leaving any section incomplete.

The Contractor shall, before the work commences, agree with the Architect the programme and limits of the areas to be cleaned. As far as possible, the boundaries shall occur at natural breaks in the facade, changes of plane, string courses, cornices etc.

Spent abrasive shall never be allowed to accumulate on the scaffold or on the face of the building and must be bagged and removed at appropriate times during the day's work. The Contractor should note that the calcium carbonate abrasive tends to form a slurry and stick to the surface of the stonework. This must be cleaned away immediately as the effectiveness of the completed cleaning cannot be determined while such deposits contaminate the surface.

Under certain exceptional circumstances, the Architect may permit the use of J Blast Finesse without water except where it is necessary to use nebulous water to control dust. The pressure shall not exceed 25 p.s.i. at the nozzle and shall be lower whenever possible. The Architect's approval must be obtained prior to the use of Finesse.

At all times, a pressure gauge incorporating a hypodermic type needle shall be on site to enable the pressure to be checked.

As noted at the beginning of this work section, the Contractor will be expected to have made all necessary allowances for all necessary test cleaning to establish the most appropriate cleaning methodology. This would include a number of distinct visits to site to complete individual trials, time to assess the effects of the cleaning over a period of weeks and the provision to reverse the cleaning process to commence with the NeoClean system and to subsequently clean areas by the chemical cleaning where the NeoClean system has been unsuccessful. No extra will be allowed by his failure to make such allowances or the inadequacy of his assessment.

As an alternative, or in addition to the liquid chemical cleaning, AB57 Poultice may be used on Calcareous materials. The recipe for the poultice and use methodology is contained in an Appendix to BRE Digest 280 and these instructions shall be strictly followed. In particular, the precise type, strength, chemical composition and use of the constituents of the poultice shall be strictly followed and no deviations will be permitted.

Metallic staining shall be removed by poultice or other methods recommended in B.S. 6270 or B.R.E. Digest 280 and approved by the Architect.

Graffiti or other paint disfigurement shall be completely removed. This may be achieved by the use of Neolith HDL or Intrachem SC100 as specified above, but where this is unsuccessful, or where a 'shadow' of the stain remains, these shall be removed by 'Peelaway', Remmers (Interchem) or Tensid 'AGS Graffiti Removers' or similar and approved paint removal poultice, used in strict accordance with the manufacturer's recommendations.

As with all operations involving water on the surface of the building, operations shall be suspended during time when freezing conditions apply or can be expected. To this end, no work shall be undertaken below a temperature of 4 degrees centigrade on a rising thermometer or below 6 degrees centigrade on a falling thermometer. In addition, the effect of wind conditions may also require the suspension of operations.

Where the cleaning operations are undertaken above the roof level or at junctions with roof finishes etc. great care must be taken to ensure that these operations do not cause damage to adjoining finishes etc.

2.4.2. STONE PILLARS AND STONEWALL DISMANTLING AND RE-POSITIONING

2.4.2.1 EXTENT OF THE WORKS

The works will consist of:

- Cedar Mount House entrance on Mount Anville Road - Dismantling the stone pillars and sections of stone walls to the wall and relocating them. A new section of stone wall will be required. The wall is constructed with random granite rubble built to courses with a cement-based ribbon pointing. It seems to be crowned with a cement capping.

- Garden wall to the west of Cedar Mount House - Dismantling the stone pillars and sections of stone walls to the wall and relocating them. Removing a section of stone wall for a new opening and building a new section of stone wall with salvaged stone. The wall is constructed with uncoursed random granite rubble with a flush joint. It is crowned with a projecting copping.

2.4.2.2 OUTLINE SCHEDULE OF WORKS TO THE STONE WALL AND PILLARS

The following is an outline of the work to be carried out. Please refer to drawings prepared by O'Mahony Pike Architects. The following schedule should not be considered to be exhaustive, but is indicative of the principal tasks to be undertaken. This schedule should be read in conjunction with the drawings, photographs and the rest of this specification. The schedule should also not be assumed to be a sequence in which the works are to be carried out.

1. It is proposed to carefully take down the subjects walls and reconstruct them as illustrated on the accompanying drawings.

   The western section of the Garden Wall to the west of Cedar Mount House will be removed and relocated. A new opening will be formed to the eastern section and a section will be built to adjoin Cedar Mount House. The vegetation will be removed.

   A section of the front boundary wall to Mount Anville Road including the entrance will be dismantled and relocated. A new section of stone wall will be required. It is noted that much of the wall has been repointed in a hard cement which will make its deconstruction difficult and will require particular care in order not to damage the masonry. The relocated wall will be repointed with a lime-based mortar with a brush-backed flush finish.

2. The salvage and sorting of granite will be carefully carried out in accordance with the Specifications that follow - any new granite required sourced from the McEvoy or Ryan Quarries.

3. The subject walls will be reconstructed in their new location with a new footing below the roadway level/ground level and with a new fill in limecrete or concrete replacing the historic fill.

4. The construction and bonding of the unsquared granite must match the existing. Sample panels will need to be prepared by the specialist stone contractors in advance of works proceeding. It should be noted that additional mechanical fixings and ties may be required in order to achieve the random appearance of the granite.

5. Pointing and bedding to the stone is to be in a lime mortar with lime and aggregate sampled to match the bedding in the granite and brick as closely as possible. The finish is to be a brushed-back, flush finish on both sides.

6. The cement capping to the wall to Mount Anville Road is to be replaced with a granite capping. The capping of the Garden Wall to the west of Cedar Mount House is to match the existing projecting capping.

7. Additional drainage to the high side of the wall is to be installed given the less permeable nature of the new construction to the footing below the road level.

8. Prepare a comprehensive photographic record of the stone walls before carrying out the works. Number individual elements and record numbering sequences on detailed drawings for later reassembly of the elements.

9. New granite to be to correct and matching tone, grain tightness with correct profile to match existing. All in accordance with Conservation Specification by David Slattery Conservation Architects Ltd. Suggested suppliers of stone are McEvoys and Ryans in Wicklow. Note that a number of different tones of stone may be required to correctly match to the existing and a number of samples will need to be provided for approval.

2.4.3. VEGETATION REMOVAL

All vegetation is to be cut back and undergrowth to be cleared by hand, using scythes, slash-hooks. Nearby tree stumps to be treated with an appropriate systemic herbicide. Ivy to be removed from the wall face is to be treated with an approved herbicide at the stump or root and cut at it base prior to its removal from wall face. Loose stones uncovered by clearing vegetation shall not be moved until site recording of cleared area has been carried out. Any loose stones are to be tagged and stored in secure location on site.

2.4.4. GRANITE REPAIR AND RE-POINTING

Raking Out Stonework Prior to Repair

Areas for raking out are limited to areas where the pointing material has failed, or is required by virtue of adjacent repairs.

Raking out.
Selected areas of stonework, as shown on the drawings or indicated on site shall be raked out. The raking out shall be carried out using hack saw blades only. Mechanical systems using fine bladed saws or discs for raking out, may be used with the Architect's prior approval. Hand

tools such as chisels should be avoided to reduce the risk of damage to arises. The pointing mix shall be as specified earlier.

The Contractor shall note the extremely fine joints exhibited in many areas of the stonework and the friable nature of the stone. He will be required to take special care when raking out to avoid any damage or widening of the joints. The Architect shall have the right to direct that special tools be used in any or all locations without any additional cost to the Employer. The Contractor must take these matters into consideration at the time of tender and no extra will be allowed by his failure to do so.

All joints shall be carefully raked out to a depth equal to twice the width of the joint with a minimum depth of 20 mm. For very fine joints, the Architect may permit a lesser minimum depth. Great care shall be taken to ensure that the stone, arrises etc. are not damaged. Upon completion of the raking out all loose matter shall be carefully removed. Where necessary where the raking out has removed the original material beyond the specified depths, or where the original material has perished or weathered away, the joints shall be filled to the specified depth to ensure as even a depth as possible, that the joints are fully filled and that there is a firm backing to enable the pointing mortar to be fully rammed home during later works not part of this contract.

Existing Mortar repairs.
Any existing Mortar repairs will be removed by the works. All marks, residues etc. of this mortar left on adjoining stone shall be carefully removed without damage to the sub-strata.

Bedding Repairs
Bedding repairs shall be undertaken as specified earlier. The joints having being first wetted to adjust suction shall be filled with mortar to the depth specified, all mortar being carefully rammed well home into the joints to ensure no voids remain. To this end, the use of a pointing trowel will not be permitted and the Contractor will be required to use special pointing tools which enable a horizontal force to be applied. The finished surface shall be lightly brushed when the initial set is complete to removed any surface laitence.

All joints shall be taped to prevent the mortar staining the surfaces of the masonry, and it is imperative that the tape is able to withstand the repair operations. Samples shall be approved by the Architect before the work is put in hands.

Repairs to Stonework

Materials

Stone
The new stone shall match the existing as regards type, colour, texture, porosity, crushing strength etc., sourced from an appropriate quarry. Samples of such stone shall be delivered to the Architect's office for his selection. It shall be free of all vents, cracks, fissures, soft beds, etc. or other defects which may affect durability. The Contractor shall note that these stone can exhibit many variations of colour, texture, veining, particle size and distribution, type, void, etc. He will be required to provide a series of samples of each type of stone for the Architect's approval. The Architect will indicate the extent of the variation he will permit for use in the works and these approved stone samples are to be retained on site until the conclusion of the works. These approved samples will be used to judge the permissible level of variation in the stone to be used on the works and any stone that exceeds this permitted level of variation will be rejected by the Architect. Any stone rejected by the Architect will be

immediately removed from the site by the Contractor and replaced with new stone to comply with the approved samples at no expense to the Employer. If the rejected stone has been worked, carved, moulded, decorated or built into the works, the Contractor will be required to remove and replace it with stone complying with the approved samples at no expense to the Employer. In addition, the Contractor should note that he will be required to match the surface finish, tool markings, saddles, mouldings, carvings and decorations etc. as required.

Salvaged Stone
Salvaged stone for re-use shall be set aside in an area designated for the purpose. Stone for re-use shall be carefully selected and any damaged or defective areas removed, preserving, as far as possible, the original weathered face.

The stone shall be worked to the required size, profile etc., and shall match the adjoining stone as closely as possible in all respects. Great care shall be taken to ensure the stone is not damaged by rough handling, overworking, etc., during these operations.

The requirements of the clauses above, relevant to this clause, shall apply.

Stone for Repair
All stone for repair shall be worked from stone specified by the Architect. The finish shall match the original as closely as possible, following the original tooling when such is still visible or as directed by the Architect when such is no longer visible. In addition, the Contractor should note that where repairs are being inserted, he will be required to replicate the surface texture of the adjoining stones and should make allowances for all necessary needle punching, acid etching, blasting, sparrow pecking, fluting, drag combing, bush hammering etc., to obtain the required texture. Full sized drawings and templates shall be prepared for approval by the Architect before any work is put in hand. All repairs shall be so worked and finished that they are not visible when viewed from a distance of 4 meters.

In all respects, the relevant matters of the previous 'Stone' clause shall apply to this clause.

Repair Mortars
The Contractor should note that it is virtually impossible to obtain a suitable repair mortar for granite and consequently repair mortars shall not be used.

Water
Water for the works shall be clean, potable and free from any impurities, deleterious matter or harmful chemicals.

Lime
Lime shall conform to B.S. 890 for the purpose required and shall be dry hydrate or lime putty

Sand
Sand shall comply with B.S. 1200 or as specified under Coarse Stuff and Fine Stuff later. Where sands are to be used in lime mortars or gauged lime mortars, great care shall be taken to ensure that no water retaining properties are contained within sands which would interfere with the carbonation of the lime.

Mortar Mix
The mortar mix shall be in accordance with Tables 4 and 5 of B.S. 6270 part 1, or as specified elsewhere in this document.

Fixings
All fixings, dowels, cramps, restraints etc. shall be of non-corrodible, non-ferrous metal or stainless steel grade 316 as selected by the Architect to the appropriate B.S.

Removal of Damaged stone etc.
All damaged stone, substandard repairs etc. shall be carefully removed, either in part or in total as directed by the Architect on site. Temporary support shall be provided as required. Care shall be taken to ensure that no damage occurs to any adjoining stone etc. Where large amounts of any course are to be removed, great care shall be taken to ensure that the support for the wall above is maintained, this may demand the work to be undertaken in a series of short lengths or other methods approved by the Architect. As far as possible and wherever relevant the removals shall comply with the requirements of BS 6187, Code of Practice for Demolitions.

The Contractor shall note that the limits of the defective sections to be removed shall be marked for the Architect's approval before any work of removal is put in hands. When cutting out is being undertaken, all cuts shall be carefully made, being square and at right angles to the surface of the stone being repaired and no damage shall occur to the original stone being repaired, or to adjoining stones will be permitted. The Contractor shall note that, in this respect, the use of mechanical cutting tools will have to be carefully controlled by the operative. In circumstances where damage occurs, the Contractor will be required to make good the damage at his own expense as directed by and to the Architect's satisfaction. The Contractor should note that this may involve either enlarging the repair or the complete replacement of the stone. The architect's decision as to the most appropriate action will be carefully followed by the Contractor in each individual case at the Contractor's own expense.

All damaged stone shall be cut back until a strong, stable strata is achieved and in such a manner to ensure that the minimum thickness for any repair shall not be less than 30mm unless otherwise permitted by the Architect. Wherever possible, the repair shall be designed to achieve a "shelf" for seating the repair.

Removal of corroded metal, fixings etc.
All corroded ferrous metal, fixings etc. shall be removed and where necessary replaced by non-ferrous metal as previously specified. If, for structural reasons, it is not possible to remove all of such metal, then it shall be cut back as far as possible, grit blasted to remove all visible rust, primed with red lead or a zinc-rich primer and painted with two coats of Bituminous paint.

Inserting new stone
The reconstruction of the granite walls is to be carried out using a matching style by specialist stone contractors. The pattern of construction and proportion of visible stone to mortar must be identical to the deconstructed walls. Overly prominent course-lines, underuse of snecks etc will not be accepted. Sample panels of the random granite are to be produced for approval by the Architect (and potentially by Compliance Condition to the Planning Authority).

Where a complete new stone is to be inserted the area shall be carefully cleaned and all loose or deleterious material removed. The stone shall be laid on a full bed of mortar, using lead or slate "skids" or timber wedges as required, and all joints fully filled, including the back and sides of the stone. It is imperative that the top bed is filled with mortar, well rammed home, so that the loadings within the wall are correctly transferred to the masonry below. If deemed necessary by the Architect, the work shall be carefully grouted by hand to ensure all cavities around the repair are fully filled using a method and material approved by the Architect. On

no account shall any mortar, grout or other substances be allowed to come in contact with adjoining masonry. All mortar or grout splashes shall be immediately washed off and on no account allowed to dry or stain the masonry. All faces of joints shall be raked out for pointing. The surface finish of the new stone shall precisely replicate the original before damaged or weathered and all necessary tool markings, joint saddles, mouldings, carvings and decorations shall be provided. It is imperative that the stone is inserted precisely on the line of the original, and that the correct spacing, geometry etc. etc. of the original design is maintained by the new stone. The Contractor shall note that he will be required to undertake necessary works to the surface texture to ensure that the new stone visually blends with the extant original.

The Contractor shall provide for all necessary non-ferrous metal fixings, cramps, dowels, armatures etc. that may be required by these repairs or as directed by the Architect.

Cramps, Dowels, Bolts etc.
All cramps, corbels, dowels, bolts, etc., shall be phosphor bronze to BS 2870/PB102 or Grade 316 ss stainless steel. They shall be used in positions and to sizes as shown on the drawings or as approved by the Architect and shall be grouted with cement mortar on part cement to 3 parts crushed stone.

Profiles
Where profiles are being replaced the Contractor will be to provide full sized drawings of the proposed profile and to adjust this as necessary to gain the Architect's approval. In all instances, the original joint pattern shall be replicated.

Replacement of missing features
Where a missing stone feature is to be replaced (in particular column capitals and door case consoles, etc.), it shall be copied from an existing detail on the building as selected by the Architect. In all aspects, the provisions of the last clauses shall apply.

Indents
Damaged stone shall be neatly cut back square and new matching stone inserted on resin bed and pinned in stainless steel. Joints to be finished in resin containing fine matching stone aggregate.

Jointing
All stones shall be set on a full bed of mortar and tapped home. All joints and joggles etc. shall be completely filled with mortar, and all mortises and cramps must be completely grouted to ensure that no cavities are left. All beds and joints shall be the same width as the existing. Form all joggles with air escape holes as required, mortises, sinkings or ties, cheeks, perforations and grooves for flashing. All arrises shall be left clean.

Re-pointing

Mortar for bedding and pointing.
In general, the properties of the original mixes as determined by laboratory analysis, with certain allowances for the availability of replica materials, shall be replicated by the new mixes. Therefore, the particulars specified below as regards the materials shall be treated as provisional until such time as an analysis can be completed. The Contractor shall provide for samples of the various mortars to be submitted to an approved laboratory for analysis. The Contractor shall note that there are variations in the methodology for non-hydraulic and hydraulic lime mortars.

Sand for mortars shall conform to BS 1200 with variations permitted below and shall be non-staining. Lime shall be as previously specified. Sand for use in the preparation of Coarse Stuff and Fine Stuff shall be as specified in that section. All mortars for bedding and pointing shall be slightly weaker and slightly more porous than the masonry being bedded or pointed. In particular, the Contractor shall ensure that the sands do not contain any material that would tend to retain water or slow the natural drying of the mortar, thus interfering with the proper carbonation of the lime.

The Contractor shall refer to the relevant Technical Guidance Documents published by Historic Scotland for guidance on the proper preparation and use of lime and ensure that the methodology implemented on site complies with their recommendations.

Mortar mixes shall be defined by volume and unless otherwise indicated shall be of the proportions of one part lime putty to three parts sand, , prepared from Course Stuff or Fine Stuff as specified below.

Where for reasons of additional strength, cementitious mortars for bedding, jointing, pointing and re-pointing porous brickwork and stone are considered necessary, and with the prior approval of the Architect, such mixes shall be either one part lime putty to six parts sand, or one part cement, two parts lime putty and nine parts sand, prepared from Course Stuff or Fine Stuff as specified below. On no account should the Contractor proceed with the use of cementitious mortars without the Architect's approval.

Preparation of Course Stuff and Fine Stuff.
Sands shall generally conform to B.S. 882 and 1199/1200. The particles shall be sharp and angular and samples delivered to the Architect for approval before work is put in hands. On no account shall the sands contain any materials that would retain or attract water as such properties will restrict the proper carbonation of the mix. For Coarse Stuff it shall be graded as the table below:

Sieve Size	% Particles passing
5.00mm	95%
2.36mm	80%
1.18mm	60%
0.60mm	35%
0.30mm	22%
0.15mm	7%

The Contractor shall note that the joint dimension between masonry units may require variations in the grading of the particle size, particularly where in the grading indicated in the table above would result in too coarse a mix resulting in the requirement for Fine Stuff. Proposals for the suitable grading of sands for Fine Stuff shall be submitted to the Architect for his approval and samples will be required to be prepared.

The Contractor shall note that slight variations may be required in the lime/sands ratio and the Contractor shall refer to publications by Historic Scotland, particularly Technical Guidance Document No. 1, for details of the correct method of assessment. The Contractor should note that the preparation of a number of mixes with differing grading of sands may be necessary to allow for the optimum mix for each joint type and size. He will be expected to have made the necessary allowances for such mixes at the time of tender, including the preparation of

test mixes and no extra will be allowed by his failure so to do. Approved mixes shall be retained in situ to act as a standard until a panel of executed work has been approved to act as the standard.

Lime Putty:
If the lime putty is delivered in 25kg tubs, it shall be allowed to stand undisturbed for 48 hours before use to allow the fines to settle. Any limewater on top of the tubs when opened shall be carefully decanted or siphoned off and stored for possible use.

Coarse Stuff and Fine Stuff:
Coarse Stuff and Fine Stuff shall be prepared by thoroughly mixing the lime putty and sand. The mixing operation is critical and compression will be required - a roller pan mixer is advisable as the normal rotary drum mixer does not provide the necessary compression. The proportions shall be 1 parts of lime putty to 3 parts sand, by volume which may be adjusted to suit the individual sand with the Architect's approval. There should be adequate water in the lime putty for mixing provided sufficient compression and / or beating and chopping is provided during mixing. If additional water is required, the decanted limewater shall be added in small quantities under strict control. The actual proportions of lime / cement to sands may vary depending on the particular characteristics of the sands. This shall be determined by test and on-site trials. If the lime putty contains an excess of water, it shall be removed from any packaging and allowed to drain, being covered to prevent any drying out or carbonation of the lime, before use.

The mixed Coarse Stuff and Fine Stuff shall be set aside to mature, stored in air-tight containers or a heap covered with hessian or straw etc., kept moist at all times and the air excluded, for a minimum period of 3 weeks.

Knocking up:
When required for use, the coarse stuff or fine stuff shall be taken from storage and re-mixed until such time as the workable material has returned. This may be achieved successfully in a rotary pan mixer, to enable full compression. Any material that has dried or shows any signs of carbonation shall be discarded before the knocking up commences. It should be noted that hand preparation will require a minimum of 15 - 20 minutes mixing and often considerably longer. In general, no water or decanted limewater should be added to achieve an acceptable workability, this should result from the knocking up.

Where the mortar is required to have a specific colour, the sands and cements shall be carefully selected to achieve that colour. Sample panels executed as directed earlier shall also demonstrate that the required colour can be achieved when the mortar has fully cured.

It is essential that the sands, water content, etc. are carefully monitored to ensure that air is able to permeate the mixture to achieve carbonation of the mortar. To this end, trial mixes shall be prepared at the start of the contract for the Architect's approval as to colour, carbonation etc. well before the mortar is required for use.

Hydraulic Lime Mortars.
Hydraulic Lime shall be delivered in the manufacturers original bags and stored in a clean dry place, protected from all moisture. It shall be grade NHL 3.5 or NHL 5.0 as directed by the Architect. It shall be used in strict rotation in order of delivery. A certificate will be required

from the manufacturer or supplier stating that no additives, cement etc. have been added to the lime, that it is burnt from stone containing free silica in its natural state and that no materials were added during burning, slaking, drying or other time to engender the hydraulic properties. In general, the preparation of the mortar for use should follow that set out in the last clause for Coarse Stuff and Fine Stuff, with the significant difference that the material must not be stored once the water has been added. All mortar that has had water added must be placed within 30 minutes of the water being added and any remaining after that time must be disposed of and not used in the works. As each manufacturer has particular requirements in terms of the preparation and use, their requirements shall be supplied to the Architects and their approval gained before any mixes are prepared. In general, the manufacturers' recommendations shall be strictly followed.

Pre-Mixed Lime Mortars.
Should the Contractor desire to use pre-mixed lime mortars, details shall be provided to the Architects for their approval. Should the Architects refuse to approve this course of action, the Contractor will be required to mix the mortars on site as specified earlier. The Contractor should note that the Architect will only consider requests to use pre-mixed mortars where it can be shown that the mortar has been manufactured by the processes specified within this document.

Where necessary where the raking out has removed the original material beyond the specified depths, or where the original material has perished or weathered away, the joints shall be filled to the specified depth to ensure that the pointing mortar is kept to as even a depth as possible, that the joints are fully filled and that there is a firm backing to enable the pointing mortar to be fully rammed home, eliminating all air spaces.

Re-pointing
The Contractor shall note that all operations shall be suspended during time when freezing conditions apply or can be expected. To this end, no work shall be undertaken below a temperature of 4 degrees centigrade on a rising thermometer or below 6 degrees centigrade on a falling thermometer. In addition, the effect of wind conditions may also require the suspension of operations.

Re-pointing shall be carried out from the top, the joints having being first wetted, and proceed in one continuous operation, all mortar being carefully rammed well home into the joints to ensure no voids remain. The finishing of the pointing shall be as directed by the Architect, and the contractor shall provide for carrying out sample panels of pointing under the Architect's direction. In general, the joints will be filled and struck off flush with face of the surrounding stone; when the mortar has dries and the initial set commenced, the joints shall be dry brushed to remove the surface laitence and expose the sand particles and shall be subject to alteration depending on the results of the sample panels. All joints between windows and stonework shall be carefully raked out, packed with mortar if necessary and pointed with translucent or colour matched Polysulphide or Silicon Mastic to BS 5215 or 5889 applied in strict accordance with the manufacturer's instructions.

Wherever necessary, the dimensions of the joint shall be reduced by indenting small stone 'pinnings' or 'gallets' to reduce the dimension of the joint. Such pinnings or gallets shall be fully hammered home and firmly fixed in the joint at the time of placing the mortar and shall not become dislodged or move during or after the curing of the mortar.

Joints shall be taped to prevent the mortar staining the surfaces of the masonry, and it is imperative that the tape is able to withstand the pointing operations. Samples shall be approved by the Architect before the work is put in hands.

On no account shall individual stones be pointed in isolation. If necessary, pointing shall be delayed within a 1 m. radius of isolated repairs in order to achieve an acceptable visual appearance. All such instances shall be brought to the Architect's attention and his instructions carefully followed.

Where it is necessary to repair isolated small areas of defective pointing, the procedure specified above shall be followed. In such cases, the colour, texture etc. of the mortar shall be carefully controlled to match the original retained pointing as closely as possible.

Sample Panels of each type of work shall be completed for the Architect's approval before the work is commenced. The approved panels shall be retained for quality control purposes until the works are complete or until completed work is approved by the Architect for this purpose. Rejected sample panels shall be immediately removed.

Upon completion, the repair shall be treated with an approved pore lining water repellent approved by the Architect.

Provision shall be made for test repairs to be carried out for the Architects inspection before work is put in hand.

2.5. Brickwork

2.5.1. Repair Works to Existing Brick

The Contractor shall ensure that all brickwork and repair is carried out by competent and suitably experienced crafts persons.

Brick shall be of prime quality and match the existing brick on Site.

Code of Practice – Brick
The Contractor will be required to comply with the relevant sections of the latest editions of the following: (Note – Standards listed below, whilst not all explicitly referencing brick still contain sections relevant to the work to be carried out) -

- BS 5628 (Parts 1-3) Code of practice for the use of masonry;
- BS 8221-2:2000 Code of practice for cleaning and surface repair of buildings. Surface repair of natural stones, brick and terracotta.
- BS 8221-1:2012 Code of practice for cleaning and surface repair of buildings. Cleaning of natural stone, brick, terracotta and concrete (incorporating corrigendum No. 1).
- BS 5628-1:2005 Code of practice for use of masonry. Structural use of unreinforced masonry (incorporating Corrigendum No.1) (No longer current but cited in Building
- Regulations)
- BS 7913:1998 Guide to the principles of the conservation of historic buildings.
- IS EN 459-2:2010 Building lime - Test methods.
- IS EN 459-1:2010 Building limes - definitions, specifications and conformity criteria.

- IS EN 12440:2008 Natural stone - Denomination criteria.
- IS EN 12326-1:2004 Slate and stone products for discontinuous roofing and cladding - Product specification.
- IS EN 771 - Specification for masonry units.
- BS 5385-2:1991 Wall and floor tiling. Code of practice for the design and installation of external ceramic wall tiling and mosaics (including terracotta and faience).

BRICKWORK

Standards

The works shall be carried out in all respects to comply with British Standards 1014, 1217, 5589, 5390 and 6270. Scaffolding shall comply with B.S. 5973 and 5974. Variations may be permitted from these standards with the prior written permission of the Architect.

MATERIALS

Brick

The new brick, etc., where required, shall match the existing, when cleaned as specified later, as regards type, colour, texture, porosity, crushing strength, appearance etc. Samples of such brick shall be delivered to the Architect's office for his selection. All brick shall be free of all vents, cracks, fissures, soft beds, firing defects etc. or other defects which may affect durability. All arrises shall be true and straight and no damage will be permitted. The Contractor shall note that it may be necessary to have the brick specially manufactured by an approved manufacturer in order to ensure that the brick properly matched the original in all respects.

The Contractor shall note that different matching bricks may be required for the repairs. In addition, specials, particularly voussoir bricks will be required for the window heads and these specials will be required to match the brick elsewhere on the elevation. He will be expected to have made all necessary allowances for the amounts of each distinct type of brick required for the works and no extra will be allowed for his failure to do so.

The Contractor's attention is specifically drawn to the possible different sizes of the existing bricks which will have to be replicated in the repair brickwork. On no account will larger (or smaller) joint dimensions be permitted to allow the use of standard bricks or to reduce the number of differing sizes required for the works.

With regard to the specials, the Contractor will be permitted to arrange for the various sizes and specials necessary to be specially manufactured or to be worked (cut and / or rubbed) from larger sized bricks. In either case, all such bricks shall match the adjacent 'common' brick in all respects as noted earlier and the manufacturing or working process shall in no way interfere with or be damaging to the durability, stability, weathering characteristics or visual characteristics of the brick.

Salvaged Brick

The Contractor shall note that while all the brickwork included in the works has been specified to be new brick, the use of sound salvaged brick will be permitted with the Architect's prior approval. Salvaged brick shall match the original in all respects as specified in the earlier

clauses and shall have all old mortar, splashes etc. removed without damage to the fire skin, arrises etc. Salvaged brick may be sourced from a suitable supplier or may be suitable brick arising from the works and will be subject to the Architect's approval. Such approval, once given, shall not relieve the Contractor from his responsibility to ensure that the brick complies with the requirements of this specification. Should any brickwork built from such approved salvaged brick subsequently exhibit any damage or inherent or latent defects that would have led to its rejection at the time of approval if such characteristics had been apparent at that time, it shall be removed and replaced at no additional cost. The Architect's decisions shall be final and binding in all these matters.

The Contractor shall note that it would be the Architect's intention to use as much as possible of the original brick, salvaged from the works and meeting the above specification, in the works. However, it is not possible to give any indication as to the quantities that might be available for re-use. Therefore, any reductions in the amount of new brick necessary for the works arising from the re-use of original salvaged brick shall be treated as a credit on the contract.

Brick for Repair
All brick for repair shall be from bricks specifically selected for that purpose by the Architect and shall match the original in all respects, including size, colour, texture, porosity, finish etc. This brick may be either re-cycled salvaged brick or new brick with the Architect's prior approval. New brick shall be sourced from a specialist manufacturer approved by the Architect as specified earlier. The Contractor shall make provision for the erection of 3 trial panels as directed by the Architect, each panel measuring a minimum of 1 m. x 1 m. All repairs shall be so worked and finished that they are not visible when viewed from a distance of 4 meters. The Contractor's attention is drawn to the construction of flat and arched lintols, where purpose-made shaped voussoir bricks will be required.

Cement
Cement shall be white or grey Portland cement, to comply with BS EN197.

Repair Mortars
Repair Mortars shall be specialised materials supplied by a specialist supplier approved by the Architect. They shall be specially prepared to match the parent material in all respects as regards colour, texture, durability, porosity, density, compressive strength etc. Approved suppliers would include repair mortars supplied by Messrs Keim, Messrs. Jahn, Messrs. Remmers and Messrs. SBD. Samples of the colour matched material shall be approved by the Architect before any work is put in hands. Preference shall be given to mortars that can be left proud and worked back once the initial set has been completed to avoid the 'case hardening' effect of the worked surface and any residual cracking in the competed repair.

Water
Water for the works shall be clean, potable and free from any impurities, deleterious matter or harmful chemicals.

Lime
Lime shall conform to BS EN459 for the purpose required and shall be hydrated or lime putty

Sand
Sand shall comply with BS EN13139. Where sands are to be used in lime mortars or gauged lime mortars, great care shall be taken to ensure that no water retaining properties are contained within sands which would interfere with the carbonation of the lime. The Contractor

shall note the coarse and fine sands used in the varying pointing types extant on the building and will be required to obtain sands that will match these gradings.

Mortar Mix
The mortar mix shall be in accordance with Tables 4 and 5 of B.S. 6270 part 1, or as specified elsewhere in this document.

Fixings
All fixings, dowels, cramps, restraints etc. shall be of non-corrodible, non-ferrous metal or stainless steel grade 316 as selected by the Architect to the appropriate B.S.

Cleaning Chemicals
Chemicals for cleaning brickwork shall be approved by the Architect. These chemicals will be from the Neolith, Intrachem, Remmers and or Prosoco ranges of chemicals. Trials must be completed in advance of the cleaning programme to determine the appropriate times for application of chemicals. The Contractor should keep in mind that these materials contain injurious chemicals and the manufacturer's safety precautions must be prominently displayed, and adhered to at all times. The chemicals must be applied in accordance with the manufacturer's recommendations. The recommended Safety First Aid Kit should be maintained on site and readily available during operations.

CLEANING BRICKWORK.

Standards
These works shall comply with the requirements of BS 8221/2:2000 and BS 5390

Cleaning generally
Only fully experienced and trained personnel shall be permitted to carry out cleaning works, and full protection for the operatives, scaffold, woodwork, glass, ironwork, different adjoining masonry material types etc., shall be provided. In addition, full protection for persons and property in the vicinity of cleaning operations shall be provided. All safety recommendations shall be strictly adhered to.

Extent of the Works
All the existing brickwork shall be cleaned as specified below in such a manner as the surface of the masonry is not damaged in any way and that no harmful residues are left on the surface or within the pores of the masonry.

METHODOLOGY

General
Note : These processes shall be the subject of a number of trials. The Contractor will be deemed to have included for the costs of such trials at the time of tender and the Architect reserves the right to vary or amend this specification, including reversing the order to chemical treatment followed, where necessary, by mild abrasive cleaning, to take account of the results of the trials. The costs of these trials and amendments, variations and, if necessary, reversal of the cleaning order, etc. will be deemed to be included in the price submitted. In addition, the Contractor should particularly note that it may be necessary to clean the building on a number of occasions as blemishes may only appear as the fabric dries- a process that may

require the return of the specialist cleaning sub-contractor to site on a number of occasions - and he will be deemed to have included for all such repeat cleaning to ensure a clean even appearance is achieved to the Architect's satisfaction

Abrasive Method

The brick shall be cleaned by the 'NeoClean 300 System' or equal and approved low pressure mild abrasive cleaning system, in strict accordance with the manufacturers' instructions and safety recommendations. The abrasive be used shall be calcium carbonate of the appropriate grade with the water metered to the abrasive at the base of the blast pot. Only the minimum of water to control dust shall be used and on no account shall the brickwork be permitted to become saturated. On no account shall the pressure of the abrasive at the nozzle be permitted to exceed 25 p.s.i. and shall be, wherever possible less to obviate the possibility of damage. As far as practical, the finer grades of abrasive shall be used, but the Contractors attention is drawn to the fact that heavy encrustations of dirt etc. may have to be removed using the coarser grades to reduce the necessary contact time and prevent damage to adjoining fragile brickwork. The Contractor's attention is drawn to the fact that excessive use of 'J-Blast Finesse', fine or medium grade shot and the like, can be harmful to the brick surface and should not be used without the Architect's prior approval, following suitable tests. Before the work commences, the Contractor shall undertake sample panels as directed by the Architect to determine the grade of abrasive, the contact time and the optimum pressure for the operations.

The low pressure cleaning operations shall be undertaken by holding the nozzle approximately 1 meter from the surface of the brick at an angle of 45 degrees to the plane of the surface of the brick, unless the 'Joss' type nozzle, which delivers the abrasive mixture moving in a spiral motion, is being used in which case the nozzle shall be at right angles to the plane of the surface of the brick. The nozzle shall be moved over the surface in gentle, even strokes both vertically and horizontally to achieve an even clean appearance to the brick without causing any damage to fragile areas, particularly fine, weathered arrises. In areas where there is any doubt, cleaning operations shall be suspended before any damage occurs and the residual dirt allowed to remained until such time as the Architect has inspected the work and given instructions as to the procedure to be followed to complete the cleaning work. On no account shall gun shading of the cleaned areas be permitted to occur or the surface of any brick removed by these operations.

The Contractor shall complete the initial cleaning of each area in a single pass operation and subsequently return to clean isolated areas that have particularly heavy or stubborn accumulations until a clean even visual appearance to the Architect's satisfaction is achieved. The Contractor may, if he so wishes, commence operations by removing the above mentioned heavy or stubborn accumulations at the outset before the general cleaning, but in either case, each section must be completed in a single operation and there can be no instances of a section being left incomplete.

The Contractor shall, before the work commences, agree with the Architect the division of the facade into sections suitable for cleaning. As far as possible, these section boundaries shall occur at natural breaks in the facade, changes of plane, string courses, cornices etc.

Spent abrasive shall never be allowed to accumulate on the scaffold or on the face of the building and must be bagged and removed at appropriate times during the day's work. The Contractor should note that the calcium carbonate abrasive tends to form a slurry and stick to the surface of the work. This must be cleaned away immediately as the effectiveness of the cleaning cannot be determined while such deposits contaminate the surface.

At all times, a pressure gauge incorporating a hypodermic type needle shall be on site to enable the pressure to be checked.

Great care will be required to ensure that no salts within the masonry are liberated by the cleaning which may permit staining due to the deposit of the salt on the surface of the masonry. Iron ores are particularly damaging in this respect. Great care must be taken when cleaning the brickwork to ensure that no damage is caused to brick. It is essential that the cleaning with abrasives is halted before damage to the surface occurs. In all such cases, the Architect shall be consulted where the Contractor is concerned that damage may occur for his decision, either to continue, reduce the pressure or to clean using a wet chemical system as specified below.

When the work has been cleaned to the Architect's satisfaction, the Contractor shall apply an approved chemical to kill all residual spores, roots and other such residues, applied in strict accordance with the Manufacture's recommendations. Approved chemicals would include the appropriate algaecides and biocide as manufactured by Messrs Intrachem, Neolith, Prosoco, Remmers and SBD. It is imperative that the manufacturer's recommendation and data sheets as regards storage, use, application, removal, disposal and safety are strictly adhered to and available on site at all times.

Chemical Method

In situations where the above methodology is unable to remove deposits, surface discoloration or shadowing without damage to the surface or fire skin of the brick, these shall be removed by the use or liquid chemicals or poultice. They shall be cleaned with Intrachem, Neolith, Prosoco or Remmers Chemicals as previously specified or poultices as specified below, in strict accordance with the manufacturers' instructions or data sheets and safety recommendations.

All adjoining different masonry materials, polished surfaces, glass, metalwork etc. shall be carefully protected before commencement.

On no account should any chemical, or rinse water from areas cleaned with chemical, be permitted to come in contact with dry masonry or with areas to be cleaned by a different cleaning system or materials. Areas at particular risk are those underneath the current site of operations. It is imperative that all such areas are either fully protected before operations commence and fully rinsed down upon completion.

Sample panels are to be completed before the cleaning commences in areas selected by the Architect, to enable contact times to be established. In all cases, tests to ensure the surface is chemically neutral shall be undertaken 3 days after completion of the cleaning using litmus or other approved method.

Metallic staining shall be removed by poultice or other methods recommended in B.S. 6270 or B.R.E. Digest 280 and approved by the Architect.

Graffiti or other paint disfigurement shall be completely removed. This may be achieved by the use of Neolith HDL, Intrachem SC100 or other approved similar chemical as specified above, but where this is unsuccessful, or where a 'shadow' of the stain remains, these shall be removed by 'Peelaway', Remmers (Interchem) or Tensid 'AGS Graffiti Removers' or similar and approved paint removal poultice, used in strict accordance with the manufacturer's recommendations. In certain circumstances, the use of the mild abrasive blast as specified above may be permitted with the Architect's prior approval.

As with all operations involving water on the surface of the building, operations shall be suspended during time when freezing conditions apply or can be expected. To this end, no work shall be undertaken below a temperature of 4^0C. on a rising thermometer or below 6^0C. on a falling thermometer. In addition, the effect of wind conditions may also require the suspension of operations.

Where the cleaning operations are undertaken above the roof level or at junctions with roof finishes etc. great care must be taken to ensure that these operations do not cause damage to adjoining finishes etc.

REPAIRING BRICKWORK

WORKMANSHIP

Removal of damaged brick

All damaged brickwork etc. shall be carefully removed, either in part or in total as indicated on the drawings or directed by the Architect or the Engineer. Temporary support shall be provided as required. Care shall be taken to ensure that no damage occurs to any adjoining brick. Where large amounts of any course are to be removed, great care shall be taken to ensure that the support for the wall above is maintained, this may demand the work to be undertaken in a series of short lengths or other methods approved by the Architect. This will be deemed to be included for the areas of brickwork to be removed to correct the structural deviations of the front wall of the five houses. As far as possible and wherever relevant the removals shall comply with shall comply with the requirements of B.S. 6187, Code of Practice for Demolitions.

All brick shall be cut out carefully and in full. As far as possible, all headers shall be removed and replaced in total in order to retain the bond of the surface to the heart of the wall.

Mortars

Sand for mortars shall conform to BS 1200 and shall be non-staining. Portland Cement and Lime shall be as previously specified. Sand for use in the preparation of Course Stuff shall be as specified in that section. All mortars for bedding and pointing shall be slightly weaker and slightly more porous than the masonry being bedded or pointed. In particular, the Contractor shall ensure that the sands do not contain any material that would tend to retain water or slow the natural drying of the mortar, thus interfering with the proper carbonation of the lime.

The Contractor shall refer to the relevant Technical Guidance Documents published by Historic Scotland for guidance on the proper preparation and use of lime and ensure that the methodology implemented on site complies with their recommendations.

Mortar mixes shall be defined by volume and unless otherwise indicated shall be of the following proportions:-

> Mortars for bedding, jointing, pointing and re-pointing porous brickwork be one part cement, 2 parts lime putty and 9 parts crushed limestone/sandstone, prepared from Course Stuff or Fine Stuff as specified below.

Mortars for brick shall normally be cement-lime mortar composed one part cement, one part lime putty and 6 parts sand, prepared from Coarse Stuff or Fine Stuff as specified below.

The Contractor shall note that he will be required to match the pointing mortar to an area sound original pointing selected by the Architect as regards colour, texture, surface finish, grading of grains and, where appropriate pebbles etc. etc.

Preparation of Course Stuff and Fine Stuff

Sand for re-pointing and re-bedding shall generally conform to B.S. 882 and 1199/1200 and the Technical Guidance Documents published by Historic Scotland. The particles shall be sharp and angular and samples delivered to the Architect for approval before work is put in hands. The Contractor shall note the requirement to match the original pointing mortar type and finish extant on the buildings. To this end, the Architect will indicate an area on the building which will be the standard for the mortar and finish which the Contractor will be required to replicate.

For Coarse Stuff it shall be graded as the table below:

Sieve Size	% Particles passing
5.00mm	95%
2.36mm	80%
1.18mm	60%
0.60mm	35%
0.30mm	22%
0.15mm	7%

The Contractor shall note that the joint dimension between masonry units may require variations in the grading of the particle size, particularly where in the grading indicated in the table above would result in too coarse a mix. Fine Stuff will be required to be prepared for these situations. Proposals for the adjustments to the grading shall be submitted to the Architect for his approval and samples will be required to be prepared. The Contractor shall note that slight variations may be required in the cement/lime/sands ratio and the Contractor shall refer to publications by Historic Scotland, particularly Technical Guidance Document No. 1, for details of the correct method of assessment. The Contractor should note that the preparation of a number of mixes with differing grading of sands may be necessary to allow for the optimum mix for each joint type and size. He will be expected to have made the necessary allowances for such mixes at the time of tender, including the preparation of test mixes and no extra will be allowed by his failure so to do.

Hydrated lime shall comply with I.S.8. Lime for lime putty shall conform to BS EN 459 high calcium C90 lime and shall be run into lime putty and matured for at least one month before required for use and obtained from an approved source.

Lime Putty:

If the lime putty is delivered in 25kg tubs, it shall be allowed to stand undisturbed for 48 hours before use to allow the fines to settle. Any limewater on top of the tubs when opened shall be carefully decanted and stored for possible use.

Coarse Stuff and Fine Stuff:

Coarse Stuff and Fine Stuff shall be prepared by thoroughly mixing the lime putty and sand. The mixing operation is critical and compression will be required - a roller pan mixer is advisable as the normal rotary drum mixer does not provide the necessary compression. The proportions shall be 1 parts of lime putty to 6 parts sand, by volume which may be adjusted to suit the individual sand with the Architect's approval. There should be adequate water in the lime putty for mixing provided sufficient compression and / or beating and chopping is provided during mixing. If additional water is required, the decanted limewater shall be added in small quantities under strict control. The actual proportions of lime / cement to sands may vary depending on the particular characteristics of the sands. This shall be determined by test and on-site trials.

The mixed Coarse Stuff and Fine Stuff shall be set aside to mature, stored in air-tight containers or a heap covered with hessian or straw etc., kept moist at all times and the air excluded, for a minimum period of 3 weeks.

Knocking up:
When required for use, the coarse stuff or fine stuff shall be taken from storage and re-mixed until such time as the workable material has returned. This may be achieved successfully in a rotary drum mixer or by hand. Any material that has dried or shows any signs of carbonation shall be discarded before the knocking up commences. It should be noted that hand preparation will require a minimum of 15 - 20 minutes for proper mixing and to ensure the proper workability of the mix is achieved without the addition of any water.

Gauging:
When knocking-up is complete, 1 part of white cement shall be added to the mixture and thoroughly blended. In general, it should not be necessary to add additional water to achieve a workable mixture, but if such addition proves necessary, the stored limewater shall be used in small quantities using the minimum to achieve a workable mix. The Contractor shall note that if the mix is too wet when used, this will contribute to crazing and shrinkage cracks. All work that exhibits any such defects, be they the result of too much water, improper preparation, application, aftercare or from other cause, will be required to be removed and replaced at no cost to the Employer.

Coarse Stuff or Fine Stuff should only be gauged with white cement in quantities that can be used within 30 minutes. Any gauged mix not placed within this time shall be discarded. On no account shall the mixture be knock-up and used after this time.

Where the mortar is required to be black in colour, Lamp Black, or other approved natural colorant, shall be used in sufficient quantities to give the required colour.

Hydraulic Lime.
Should the Contractor desire to use hydraulic lime to replace the non-hydraulic lime or cement in part or in whole, he will be required to submit at method statement to the Architect for his approval. This statement shall be modified as necessary to obtain approval before the works commence and it is likely that sample panels will be required. Only hydraulic lime from an approved source will be permitted and the Contractor will be required to submit certificates confirming that no cement has been used or added to the powder. Hydraulic lime shall be delivered in bags with the manufacture's name, the contents and use-by date clearly marked on the outside. It shall be stored under similar conditions as for cement. All mixes incorporating hydraulic

lime shall be placed within 30 minutes of water being added to the mixture, any mixes not used by that time shall be disposed of and never 'knocked up' and used in the work. Approved suppliers would include Messrs Narrow Water Lime Services, St. Astier and Telling Lime Products.

It is essential that the sands, water content, colorant etc. are carefully monitored to ensure that air is able to permeate the mixture to achieve carbonation of the mortar. It is also imperative that the effects of the chosen colorant does not have any adverse effect on the mortar. To this end, trial mixes shall be prepared at the start of the contract for the Architect's approval as to colour, particle size, carbonation, finish, visual appearance etc. well before the mortar is required for use.

Inserting new brick

Where the repair work requires the insertion of new or salvaged brick as previously specified, the area shall be carefully cleaned and all loose or deleterious material removed. The brick shall be laid on a full bed of mortar, and all joints fully filled, including the back and sides of the brick. It is imperative that the top bed is filled with mortar, well rammed home, so that the loadings within the wall are correctly transferred to the masonry below. If deemed necessary by the Architect, the work shall be carefully grouted by hand to ensure all cavities around the repair are fully filled using a method and material approved by the Architect. On no account shall any mortar, grout or other substances be allowed to come in contact with adjoining masonry. All mortar or grout splashes shall be immediately washed off and on no account allowed to dry or stain the masonry. All faces of joints shall be raked out for pointing.

The Contractor shall provide for all necessary non-ferrous metal fixings, cramps, dowels, armatures etc. that may be required or as directed by the Architect. In addition, the Contractor should include for the various relevant structural works as indicated on the Drawings or as directed by the Engineer including the stitching of cracks and insertion of structural connections at party walls, cross walls, floors etc. etc.

Arches

The Contractor's attention is drawn to the construction of flat and arched lintels, where purpose made shaped voussoir bricks will be required. These shall be constructed to match the originals, and on no account will tapered mortar joints be permitted.

Removal of corroded ferrous metal armatures, fixings etc.

All corroded ferrous metal armatures, fixings etc. shall be removed and replaced by non-ferrous metal as previously specified. If, for structural reasons, it is not possible to remove all of such metal, then it shall be cut back as far as possible, grit blasted to remove all visible rust, primed with red lead or a zinc-rich primer and painted with two coats of bituminous paint.

Replacement of missing features

Where a missing feature is to be replaced, it shall be copied from an existing detail on the building as selected by the Architect. In all respects, the provisions of the last clauses shall apply wherever relevant.

Jointing

All bricks shall be set on a full bed of mortar and tapped home. All beds and joints shall be the same width as the existing. Form all joggles with air escape holes as required, mortises, sinkings or ties, cheeks, perforations and grooves for flashing. All arrises shall be left clean.

"Mortar" Repairs

All "mortar" repairs shall be carried out with mortars approved by the Architect as specified, used in strict accordance with the manufacturer's recommendations.

Repair Mortar selection.

The mortars for brick repairs shall be as specified earlier. The contractor shall note that a series of sample panels of each colour will be required to be executed and fully cured to confirm the colour, texture, tool marking and all other aspects of the repair. The Contractor will be required to execute sufficient number of panels to enable the Architect to designate selected panels as the standard against which all executed work shall be judged when complete. Any panels rejected by the Architect shall be immediately removed. The panels designated as 'Standard' shall remain intact on the building until such time as completed work can be designated to replace them, at which time they shall be immediately removed.

Shade Board.

When the colours of the mortar have been approved, the Contractor shall prepare a shade board which will contain cured samples of each approved shade. This board shall be kept on site at all times and shall be used to judge the colour of each brick and the correct colour of the repair mortar to be used.

Storage of Mortars.

The mortars shall be stored in their original bags with the manufacturers' original label clearly legible, including batch numbers and colour codes. The bags shall be stored by batch as specified elsewhere for cement.

Batch and Colour Codes.

The Contractor shall note that there may be slight colour variations between batches. He will not be permitted to mix mortars of the same colour from differing batches and will be required to check each and every batch as regards colour etc. He should note that, if the colours vary from batch to batch, he will be required to prepare a new shade board to encompass the cured samples of the particular batch.

In addition, the Contractor will be required to record the Batch and Colour Codes of the mortar used for each and every individual repair completed on the building.

Water Content.

The Contractor shall note that the water content of the mixes may have a significant effect on the final colour of the repair. Where the manufacturer recommends a range of values for water content, the Contractor will be required to record the water content of the approved sample and ensure that this is consistent in all mixes prepared from this batch.

Armatures, fixings etc.

The Contractor will be required to provide and fix all necessary armatures, fixings etc. as previously specified to ensure the proper bonding of the repair to the parent brick. In addition, he will be required to provide all such armatures etc. required to control the shrinkage and movement of the mortar during drying and curing. In all cases, these armatures, fixings etc. shall comply with the mortar manufacturers' recommendations and shall be approved by the Architect before the work is put in hands.

As a general rule, in-situ repairs will require a 'cage' of wires or threaded bars to be fixed to the brick before the mortar is applied, while castings will require sufficient reinforcement to ensure the casting can be moved without damage, dry and cure without shrinking or cracking and that the necessary dowels, cramps etc. for fixing to the prepared brick are cast into the casting rather than being fixed when the cast is removed from the mould. Details shall be agreed with the Architect before the work commences and shall be in accordance with the manufacturer's recommendations.

Surface preparation.
The damaged surface of the brick shall be removed as specified previously. The surface of the sound strata of the brick exposed by this operation shall be tooled to achieve an adequate key for the repair mortar. All armatures and the like shall be fixed to the brick by means of non-ferrous screws, dowels etc. using plastic plugs or resin anchors. The wire 'cage' shall be firmly attached to the fixings to the Architect's satisfaction and in compliance with the manufacturer's recommendations.

Repair methodology.
The repair mortar shall be prepared and applied in strict accordance with the manufacturer's recommendations, particular care being applied to requirements in relation to layer thickness and the provision of non-ferrous metal armatures etc. The surface of the repair shall be worked to match the existing in colour, texture and finish, any tool markings etc. being re-created, and no deviation from the original line will be permitted. Mechanical fixings, of Non-ferrous metal as specified for fixings, shall be provided as required or as recommended by the mortar manufacturer. On no account shall the boundaries of the repair be allowed to 'feather or to contaminate retained surfaces.

As far as possible, the surface of the repair shall be worked proud of the surface and the initial set be allowed to complete before being worked back to the required line. This must ensure that the case hardened surface containing a higher proportion of fines and binder is removed and that surface crazing of the repair will be avoided. Any repairs that exhibit any cracking, crazing, delamination, bond failure or other defect shall be immediately removed and a new repair completed to the Architect's satisfaction.

Upon completion, the repair shall be treated with an approved pore lining water repellent approved by the Architect. Approved repellents would include Siloxane or Silane repellents as manufactured by Messrs Remmers, SBD, and Wacker.

Provision shall be made for test repairs to be carried out for the Architects inspection before work is put in hands.

RE-POINTING BRICKWORK

Raking-Out

The raking-out shall be carried out using chisels or other appropriate instruments. Mechanical systems, hand saws or hand discs for raking out shall not be used excepts with the prior approval of the Architect and the Contractor, if he desires to use such methods, will be required to demonstrate the effectiveness of the methodology to the Architect. If such demonstrations fail to satisfy the Architect, the Contractor may demonstrate further

developments if he so wishes in order to obtain the Architect's approval. However, the Architect retains the right to instruct that the raking out must be undertaken by manual means at no additional cost to the Employer notwithstanding the results of all or any of such tests.

Areas indicated on site and on the drawings by the Architect to be re-pointed shall be carefully raked out to a depth equal to twice the width of the joint with a minimum depth of 15 mm. Great care shall be taken to ensure that the brick or any arrises are not damaged. Upon completion of the raking out all loose matter shall be carefully removed.

Pointing Generally

All the existing brickwork shall be fully re-pointed. The mortar mix shall be as specified above and must always be slightly weaker and slightly more porous than the masonry and bedding mortar being pointed. Re-pointing shall be carried out from the top, the joints having being first wetted, and proceed in one continuous operation, all mortar being carefully rammed well home into the joints to ensure no voids remain. The finishing of the pointing shall be as directed by the Architect and would include a lightly brushed finish.

All areas of pointing shall be fully protected from sun, wind, rain, extremes of temperature etc. to ensure that the mortar dries and cures and carbonates properly. In particular, the Contractor shall guard against any of the protection forming microclimates, wind tunnels etc. which would adversely affect the finished joint - refer to the relevant Technical Guidance Documents published by Historic Scotland.

The amount of water used to dampen the joints shall be carefully controlled to prevent the joints being saturated and only those amounts necessary to adjust the 'suck' due to the porosity of the substrate shall be used. On no account shall water be allowed to lodge in the joints and on no occasion shall any pointing be undertaken while water is lodging. Should any instances of the pointing mortar being damaged by lodging water become apparent, these shall be removed and replaced by the Contractor at his own expense to the Architect's satisfaction.

All joints between windows and brickwork shall be carefully raked out, packed with a compressible bitumen impregnated foam, and pointed up in mortar. Alternatively, joints may be packed with mortar as required and pointed with translucent or colour matched two pack Polysulphide or Silicon Mastic to B.S. 5215 or 5889 applied in strict accordance with the manufacturers' instructions.

If deemed necessary by the Architect, all joints shall be taped to prevent the mortar staining the surfaces of the masonry. It is imperative that the tape should not damage the face of the masonry and is able to withstand the pointing operations. Samples shall be approved by the Architect before the work is put in hands.

On no account shall individual bricks be pointed in isolation. If necessary, pointing shall be delayed within a 1 m. radius of isolated repairs in order to achieve an acceptable visual appearance. All such instances shall be brought to the Architect's attention and his instructions carefully followed.

Sample Panels

The Contractor shall provide for carrying out sample panels of the pointing under the Architect's direction. When the Architect is satisfied that there is a sample panel for each type of pointing finish required, he will nominate these panels as the standard by which the executed work on the building is to be judged. All rejected panels shall be immediately

removed from site or raked out to ensure that no confusion shall exist. The standard panels shall remain undisturbed until such time as the Architect nominates a panel of the completed work to be the standard, at which time the original shall be removed. All pointing work which fails to match the standard shall be raked out and re-pointed to match the standard at no expense to the Employer and the Architect's decision shall be final and binding in all such matters.

Existing Mortar Repairs
Existing Mortar repairs will be removed by the works. All marks, residues etc. of this mortar left on adjoining brick shall be carefully removed without damage to the sub-strata.

Crack Injection
Where indicated on the Drawings or on site by the Architect or Engineer, cracks shall be injected by a specialist company approved by the Architect. In situations where it is necessary to create a structural bond, the injection shall consist of epoxy, polyester or other approved resin. Where a structural bond is not required, the material shall be a non-shrink latex formulation to prevent the ingress of water.

In all situations, care shall be taken in the location and installation of nipples, reservoirs etc. to ensure that no disfigurement of the surface results.

The crack shall be sealed to prevent the spillage of the injected material and to ensure complete filling of the crack. All splashes, runs etc. shall be immediately removed to prevent disfigurement. It may be necessary to use a variety of low viscosity and thixotropic material to ensure complete crack filling and, where appropriate, the proper structural bond is created. The injection shall be undertaken by means of hand pumping and wherever necessary, the resins shall be heated to assist flow characteristics. At all times during these operations, continual monitoring shall be provided to ensure the resin does not emerge where not expected. The nipples, reservoirs shall be so placed to form a checking system of the penetration as resin exudes from adjoining nipples, but care must be taken that this does not 'short-circuit' the coverage.

Upon completion, the nipples, reservoirs, injectors, etc. shall be carefully removed, the areas cleaned and the surface of the crack pointed in a colour matched mortar so that it is not visible when viewed from a distance of 3 meters from the repair. Particular care shall be taken where the nipple fixative and crack sealant sets to a hard bond to ensure their removal does not disfigure the surrounding brick.

2.6. External Render

PREPARATION

Hacking off
All existing render for repair shall be carefully hacked off, taking care to avoid disturbance to adjoining sound render. The Contractor should note that this operation may be the source of immense potential damage and he will be required to take the utmost care particularly at existing joints, arrises. It will be the Contractor's responsibility to repair any damage caused, to the Architect's satisfaction, at his own expense. In particular, great care shall be taken in situations where decorative features are to be retained in-situ and ensure that no damage occurs to these features.

Hacking off may be undertaken by hand or using mechanical equipment, providing the forgoing is strictly observed. The Contractor shall note that the level of vibration during this operation will be critical and must be controlled. The Contractor shall prepare a method statement covering his proposed procedure for hacking off and indicating how he will comply with the above requirements for the Architect's approval before any work is put in hand. On no account shall any damage be permitted to any features and the Contractor may be required to use manual techniques or small controllable "dentistry" type power tools when hacking of render in these areas. All debris, hacked off render etc., shall be removed from site at regular intervals and not permitted to accumulate on site.

MATERIALS

The materials for rendering shall be prepared from Coarse Stuff and Fine Stuff, stored, used and protected as specified under Stonework. The mixes for the various coats shall be as specified in that section, but may be modified by the results of the laboratory analysis of the original samples. Allowances shall be made for the particular differences from that already specified as indicated in the remainder of this section.

WORKMANSHIP

General
Prior to commencement, the contractor shall ensure that all required openings, chases or other apertures have been cut, all fixtures, fixing pads and plugs have been fixed, all making good has been completed, and the lime mortar in stone repairs has fully carbonated.

Protection
The contractor shall ensure that surfaces are adequately sheltered from weather to ensure that they are reasonably dry before starting work.
All existing work and approaches, with boards, dust sheets, etc. All droppings on to finished work to be cleaned off immediately.

Cleanliness
The contractor shall ensure that all plant and tools are kept clean and free from previous mixes.

Scrubbing
All traces of mould, oil, paint, grease, dirt and other incompatible material shall be removed by scrubbing with water containing detergent.

Solid Backgrounds
Before coating, adjust porosity to give uniform suction.

General
Surface Preparation BS 5262 Code of Practice for External Renderings and BS 8000 Code of Practice Workmanship on Building Sites Part 10 should be followed.

The quantity of material required for a given area should be of the one batch or a number of batches thoroughly mixed together.

When applying in hot weather, it is advisable to ensure that work coincides with the shaded areas of the building.

Dubbing Out
All dubbing out, filling and repairing must confirm to BS 5262 Code of Practice for External renderings.

Substrates - Poor Existing
Poor existing substrates should be removed back to a sound and stable substrate. Loose or friable brick, block or stonework, should be replaced.

Preparation
All surfaces must be clean, suitably dry, sound and free from anything that may interfere with the adhesion of the materials to be applied.

Arrises & Feature Stops
Form all angles and feature stops with clean straight timber battens to achieve a true straight line. In certain locations and only under special circumstances, the Architect may permit the use of proprietary beads and stops as specified. In these cases, the manufacturers' instructions as regards use, fixing and application of material shall be strictly followed.

Masking
Masking should be used to give protection to adjacent work and to give clean straight edges. It should be removed immediately after finishing.

Splashes
Remove splashes of material from glass or other surfaces immediately to prevent marking the surface.

Aftercare, Curing and Protection
Care must be taken to protect applied work from rapid drying conditions i.e. exposure to direct sunlight or drying winds. In these conditions it should be kept evenly damp for up to 30 days, depending on ambient conditions and the rate of set, by lightly spraying periodically with clean water. In addition the surface shall be protected from the action of frost.

Polythene, hessian or other approved sheeting shall be used during curing and should be arranged to hang clear of the face of the wall in such a way that it does not form a tunnel through which the wind could increase the evaporation of water from the rendering. The polythene or hessian sheeting must not have intermittent contact with the render as this may cause a patchy appearance.

In areas exposed to direct sunlight, the possibility of a "greenhouse" effect must be avoided, either by shading the polythene or by substituting woven cloth materials.

RENDER METHODOLOGY

The render shall be executed in 3 coats using a basic proportion of 1 part lime putty to 3 parts sand. Coarse Stuff or Fine Stuff shall be prepared as specified under Stonework and Brickwork.

Ambient Conditions
It is essential that ambient climatic conditions are observed during the preparation and use of the mixture and the batch size adjusted accordingly. It is imperative that the mixture is not allowed to become dry or be subject to freezing conditions. In addition, the precaution of

suspending operations until the temperature reaches 6^0C on a rising thermometer or drops to 8^0C on a falling thermometer shall be strictly observed.

Hair
Goat hair or other approved animal hair may be added to the base coat if approved by the Architect. This should be body hair that is clean, free from impurities such as grease, dirt, skin etc., and carefully teased into the mixture to achieve the even dispersion of the hair throughout the mixture.

Dubbing Out
In order to keep the layer thickness as even as possible, major depressions in the wall surface shall be dubbed out using the gauged mortar and small pieces of stone or brick to reduce the possibility of shrinkage as previously specified. In all cases, the previous clauses relating to adjusting the suction and aftercare etc., shall be strictly observed.

Scudding
Where necessary, the surfaces shall be scudded by throwing the gauged mortar onto the surface to obtain an even key. The surface shall be left rough and the clauses relating to aftercare strictly observed until the scudding is set. The clauses relating to adjustment of suction shall be strictly observed.

Base Coat
When a stable keyed base has been achieved, the base coat shall be applied in gauged mortar as specified, with the suction adjusted as previously specified. The mortar shall be applied by trowel, 12 - 15mm thick in diagonal strokes applying a slight pressure to create an effective bond. The coat shall be kept to as even a thickness as possible with only minor fluctuations permitted.

The surface should be scratched immediately in a diagonally crossed pattern to provide a key for the succeeding coat. Great care must be taken to ensure that the scratching is slightly undercut, not too deep and executed in such a manner as not to disturb the bond.

Correct aftercare is essential and the mortar must be dampened from time to time and protected from extremes of temperature etc., as previously specified.

Levelling Coat
When the base coat has dried sufficiently the levelling coat shall be laid on in gauged mortar as specified, with the suction adjusted as previously specified. The mortar shall be applied by trowel, 10 - 12mm thick in diagonal strokes applying a slight pressure to create an effective bond. These strokes shall be in the opposite direction to the base coat. The surface shall be brought to an even level surface using levelling screeds in the normal manner, the screeds being removed and filled with mortar before the initial set has taken place.

Top Coat
When the base coat has sufficiently cured, the top coat shall be applied 8-10mm thick by trowel as specified for the base coat, ensuring that the strokes are in the opposite direction to the levelling coat. Particular care shall be taken to ensure all arrises are straight and true and a fair finish is achieved. The proportions of lime to sands will be adjusted for this coat from the base coats as may be the sands grading.

Particular care must be taken to ensure that the surface is not "polished" to avoid any cracking or crazing when the final set is achieved. The surface shall be finished to a flat, smooth,

regular, surface by the use of a fine wooden float. On no account should any marks of the float or drag marks from the aggregate be visible in the finished work. No colour or textural variations will be permitted.

The provisions of the 'Aftercare' clause shall be strictly observed during curing, a period which shall extend to 28 days after completion of the coat.

'Ashlar' Finish
Where the finish is required to exhibit lining simulate stonework, the surface shall be carefully marked with an appropriate round edged tool to replicate ashlar stonework. The joints shall be 3mm wide and shall not penetrate the surface deeper than 4mm maximum. On no account shall the marking be allowed to drag the aggregate or otherwise damage the surface of the render. To this end, the Contractor will be responsible for determining the appropriate time when the render has sufficiently set to enable the marking to be undertaken. In general, the markings should be placed at 300 to 350 mm vertically with a proportion of 1:1.5 to 1.75 for the perpends. All horizontals should be straight and level and all perpends should be vertical, break joint on succeeding courses and line up with those on every second course above and below.

Samples of the finish and markings shall be undertaken and approved by the architect before the work is put in hands. The approved samples shall remain on site as a standard until such time as the Architect nominates a section of the completed work to act a standard.

The Contractor's attention is drawn to the recessed jointing pattern of the basement wall at the front elevation of No. 15. He will be required to replicate this recessed jointing pattern in the new render. In all respects, the requirements stated above will apply to this work.

Reveals, Jambs, etc.
Where reveals, jambs etc., are encountered, these shall be finished to match the original. It is imperative that the finishing to these is completed in advance of the top coat in order to achieve a fair finish. All arrises etc., shall be true and straight.

Junction with String Courses, Parapets, Plinths etc.
The render shall be finished to the full thickness or to match the original detail as directed by the Architect and lined to replicate a 3mm ashlar stonework joint as specified.

Sample panels
The Contractor shall be required to execute sufficient sample panels to demonstrate the quality and type of workmanship and finish is to the Architect's satisfaction. Each sample panel shall measure at least 1 meter x 1 meter. The approved panel shall be retained undisturbed as a quality and finish control panel until such time as the Architect indicates a completed area of render is approved to serve this purpose.

2.7. Works to Floors

OUTLINE SCHEDULE OF WORKS

1. Floorboards to be carefully lifted in areas where required: see architects' drawings/ Services drawings.

2. Floorboards to be numbered and recorded, both photographically and on drawings, prior to lifting (see below).

3. Refit all floorboards in their original location after all works to underfloor areas have been carried out.

SPECIFICATION

Floors
Floors are to be protected prior to carrying out any overhead work.

Recording of Floorboards
Where floorboards are being opened up, all existing floorboards are to be carefully recorded and numbered both photographically and on a drawing of the Area. A detailed plan is to be prepared to indicate numbering of each board, its location and direction of the board.

Boards are to be clearly tagged underneath in a consistent manner for reinstatement in the same exact position. It is not always necessary to remove thresholds and skirting's when floorboards are being lifted and in some cases it is preferable to retain edge boards to keep skirting/thresholds intact.

Removal of Floorboards
Before lifting of boards, carefully remove the skirting boards and thresholds.

Floorboards are to be carefully removed for re-use without undue force in order to reduce damage to the board and also vibrations that may cause damage to the ceiling below. As the removal of board's proceeds, temporary plywood sheeting is to be screw fixed to the joists. At no time shall an individual joist to be loaded by foot traffic or otherwise.

Floorboards shall be carefully stored in the Areas from which they were removed. All efforts shall be made to protect existing floors from damage, dirt, moisture and thermal shock.

Pugging in Floor & Ceiling Voids
Where historic pugging is encountered within floor voids the Contractor shall ensure that where this is required to be carefully removed by hand and by soft nozzle vacuum cleaner, great care to be taken to avoid damage or loosening of the plaster key to lath of the ceiling below.

In specific cases this may require a plasterwork specialist.

Structural Timbers
Other than by specific prior agreement with the Authority, notching or drilling of floor joists is not permitted.

Reinstatement
All floorboards are to be reinstated in exact position as removed from according to recording method above. Reinstated skirting boards and thresholds are also to be replaced in exact position as removed.

Floorboards Strategy where Ceilings are to be Secured/ Tied
- Retain all original wide boards,

- Ceiling conservator to be consulted on strategy for lifting floorboards to minimise risk to ceilings/ structural integrity,
- Lift every third board or as otherwise advised by ceiling conservator
- Lift max 30% of floor boarding at a time/ lay ply & screw fix/ then remove remainder/
- Project Engineer to be consulted.
- Lift previously disturbed boards first, minimise damage, skilled carpenter to undertake the work.
- Boards are typically nailed throughout in traditional fashion/ butt jointed. Avoid cutting original boards. Use a bolster or chisel with a board blade with timber block.
- Prioritise relaying on basis of principal rooms first. Boards to be numbered in chalk, stacked flat on the floor and re-laid in their original position.
- Where extensive services are to be contained in the floor zone, boards may be screw fixed for future access.
- Follow through other to secondary rooms wall to wall
- Where floorboards are missing or are agreed to be replaced match existing floorboards in all respects.
- Where carpet floor finish is proposed lay underlay (6mm ply) over all re-laid floorboards.
- Hearth arrangements to be retained as existing unless otherwise specified/ agreed and Fire Strategy Consultant to check fire-proofing.

Where boards are to be covered in overlay
- 6mm ply over joists/ to be confirmed by Principal Architects
- Smallest gauge nails or screws at smallest centres possible to secure same and avoid excessive fixings.

2.8. Windows

2.8.1. Windows & Frames

Repair Level 1. – Painter's Repair

Remove window frame and sashes from opening complete.
Remove and renew all damaged or defective modern glass as required.
Strip all paint.
Check and remove and renew all loose or defective putty.
Check opening action and adjust as necessary, including tightening all loose sashes to reduce gaps, draughts etc., and balance sashes to ensure satisfactory movement.
Replace window in ope. Provide new staff beads, parting beads and fixings to match original mouldings.
Check all fixings of frame to ope and repair or replace as necessary.
Provide mastic joint between window frames and stone or render reveals externally.
Prepare by sanding and filling as necessary, prime and paint with two coats undercoat and one coat finishing coat selected 'silk' finish microporous paint selected by the Architect. All weathered timber to be sanded to a fresh face to ensure proper adhesion of the paint.
Remove all existing ironmongery, make good as necessary and provide new ironmongery to match original as selected by the Architect

Repair Level 2. – Reinforcing and repairs to joints

Carry out all the foregoing tasks listed for repair level 1, and in addition carry out the following:

Check all joints in frames and sashes and reinforce or repair as necessary. Reinforcement to consist of timber wedging, dowelling, brass or stainless steel screws, as directed by the Architect.

Repair Level 3. – Major repairs to joints

Carry out all the foregoing tasks listed for repair level 1 and 2, and in addition carry out the following:

Check all joints in frames and sashes and reinforce or re-make as necessary. Reinforcement to consist of recessed stainless steel plates as directed by the Architect. Where reinforcement is not feasible, the joint shall be re-made in timber to match original, with scarfe or splice joints as directed by the Architect (including any necessary mortice or tenons, dowels etc., to replicate original jointing), and reinforced as necessary by one of the aforementioned methods. Allow for the careful removal and replacement of 10% of original timbers.

Repair Level 4. – Minor replacement timbers.

Carry out all the foregoing tasks listed for repair level 1, 2 and 3, and in addition carry out the following:

Repair or renew all missing, defective, damaged or incorrect glazing bars to match originals.

Check all joints in sashes and box frames. Allow for the careful removal and replacement of a further 10% of original timbers– scarfe or splice joints as directed by the Architect (including any necessary mortice or tenons, dowels etc., to replicate original jointing).

Repair Level 5. – Major replacement timbers.

Carry out all the foregoing tasks listed for repair level 1, 2, 3 and 4, and in addition carry out the following:

Check all original frame and sash timbers and repair as necessary. Where timber cannot be repaired by the aforementioned method, the entire component – head frame, pulley rail, cill, top rail, side rail, bottom rail, and meeting rails, glazing bars etc., - shall be re-made in timber to match original, with scarfe or splice joints as directed by the Architect (including any necessary mortice or tenons, dowels etc., to replicate original jointing). Allow for the careful removal and replacement of 50 % of original timbers.

Repair Level 6. – Complete renewal.

Carry out all the foregoing tasks listed for repair level 1,2,3,4 and 5, for components to be retained.

Discard components, which, in the opinion of the Architect are beyond repair, and renew to correct historic pattern.

Assemble new/retained components and check opening action (both vertical sliding and hinged casement) and adjust as necessary, including tightening all loose sashes to reduce gaps and draughts.

Fit window in ope and provide mastic joint between window frames and stone or render reveals externally.
Prepare by sanding and filling as necessary, prime and paint with two coats undercoat and one coat finishing coat selected 'silk' finish microporous paint selected by the Architect. All weathered timber to be sanded to a fresh face to ensure proper adhesion of the paint.
Provide new ironmongery to match original as selected by the Architect.

2.9. Fanlight Repair

Allow for cleaning and repainting fanlight in place by approved Stained-Glass specialist.

2.10. Repair to the entrance door and doorcase

Repair Level 1. – Minor Repair

Strip all paint.
Check all fixings of frame to ope and repair or replace as necessary.
Prepare by sanding and filling as necessary, prime and paint with two coats undercoat and one coat finishing coat selected 'silk' finish microporous paint selected by the Architect.

Repair Level 2. – Intermediate Repair

Carry out all the foregoing tasks listed for repair level 1, and in addition carry out the following:

Check all joints in frames architraves, panels, etc., and reinforce, repair or align as necessary.
Repair lengths of damaged architrave to match existing.

Repair Level 3. – Panel Repairs.

Carry out all the foregoing tasks listed for repair level 1 and 2, and in addition carry out the following:

Repair sections of panels to match originals.

Repair Level 4. – Minor Replacement Timbers.

Carry out all the foregoing tasks listed for repair level 1, 2 and 3, and in addition carry out the following:

Renew sections of missing, or damaged architraves to match originals.

Renew sections of missing, or damaged panelling to match originals.

Repair Level 5. – Major Replacement Timbers.

Carry out all the foregoing tasks listed for repair level 1, 2, 3 and 4, and in addition carry out the following:.

Renew complete sections or surround where missing or beyond repair.

Repair Level 6. – Complete Renewal.

Carry out all the foregoing tasks listed for repair level 1, 2, 3, 4 and 5, for components to be retained.

Completely replacement of surround, panelling and shutters.

2.11. Ancillary Joinery

General Joinery

Timber for joinery to be decorated with opaque coatings (paint) be as follows:

a) Hardwood shall be Class 2 to BS 1186, specially selected as suitable for usage intended as described in Appendix B and C. Hardwoods described as 'resinous' shall not be used.

b) Moisture content shall not exceed the recommendations set out in Section 3 and Table 3. On no account shall the moisture content for external joinery exceed 17%.

c) No exposed piths, arris knots, shakes, compression wood, sapwood, brittle heart, plugs, inserts or other natural defects or repairs will be permitted on any face of the hardwood. All timber shall be free from all decay and insect attack.

e) The grain shall be clean and straight with clearly defined arrises, with the grain slope not exceeding 1:8. Exposed faces shall show the same grain characteristics throughout and shall be free from knots, stains, discoloration and checks.

Samples

The Contractor shall provide samples of the types of hardwood he proposes to use for the Architect's approval. All hardwoods used in the works shall be of an equal or greater standard to the approved sample.

Timber for Grounds etc.

Timbers to be permanently concealed and used for grounds etc. shall be free from decay and all defects that would affect its long term stability and durability or the accuracy of the completed works. It shall be treated with an approved preservative.

Hardwood for Lippings, Beads etc.

Hardwoods for lippings, beads etc. shall be virtually straight grained with good matching qualities and be of the same species as the Hardwood for the joinery.

Timber Sizes

Sizes shall be finished sizes and no deviation from these sizes will be allowed without the Architect's prior approval. In general, they should comply with the requirements of BS 5450.

Seasoning and Moisture Content

All timber shall be seasoned to the specified moisture content before the works commence. The Contractor shall prepare kiln drying schedules to ensure that the required time for drying,

seasoning, sections size and ultimate usage are taken into account and kilning defects are avoided.

Plywood
Generally shall comply with BS 1455. Use as follows:

Grade 1 veneer	where clear finish required
Grade 2 veneer	where oil painting required
Grade 3 veneer	for concealed surfaces
Bonding type M.R.	for interior use
Bonding type W.B.P	for exterior use
Bonding type I.N.T.	not to be used
Marine plywood to BS 1088	for exterior use.

Medium Density Fibreboard
Medium density fibreboard shall be 'Medite' from Medite Ltd. Clonmel or other equal and approved, shall be the waterproof quality (Medite 313 - Moisture Resistance M.D.F.) with given centre core to the thickness shown on drawings.

Fixings
Fixings and adhesives shall be as specified in CARPENTRY.

Nail Lengths
Nail lengths to be not more than total thickness of sections to be joined less 3mm but otherwise not less than 2 times thickness of board/strip at point of fixing.

Screw lengths
Screw lengths to be not more than total thickness of sections to be joined less 3mm but otherwise not less than twice thickness of board/strip at point of fixing.

Mastic.
Mastic shall be non-setting butyl mastic to the approval of the Architect.

Glue
Glue shall be best quality synthetic resin glue and shall be approved by the Architect.

Adhesives
Adhesives for exterior use shall be synthetic resin type complying with BS 1304: Part 1, type "W.B.P." Adhesives for interior use shall be synthetic resin type complying with BS 1304: Part1, type "M.R." Unless otherwise stated, the following grades of glue bonding shall be used:

a) INT for internal work.

b) MR for internal work in humid areas.

c) WBP for external work.

d) Mastic shall be non-setting non-staining two pack polysulphide or silicon mastic to BS 5215 or 5889 to the approval of the Architect.

WORKMANSHIP

Standard
Frame accurately and execute in a sound workmanlike manner in accordance with best practice and complying with BS 1385: Part 2, but to true lengths and levels and avoid the use filling pieces.

Profiles and Mouldings
Existing mouldings and profiles, both for new works and repair works, shall be accurately replicated and the Contractor's attention is drawn to the subtle variation that exists throughout the six houses and that will be required to be replicated. The Contractor will be required to submit full sized drawings of each and every moulding and profile type to the Architect and shall be responsible for the accuracy of all such mouldings and profiles. Full sized samples of the original fabric (where these are available) and the Contractors proposed replicas shall be submitted to the Architect to demonstrate compliance with this requirement. Profiles of sections shall not be modified from those shown on drawings without prior approval.

Surface Treatment
Sand and produce a smooth surface to joinery requiring a clear finish. Use approved filler to overcome the coarse grain, to uneven suction conditions or where growth rings are coarse. Coat all knots and stop nail and other holes to match adjacent wood. Joinery detailed to be oil painted is to give a surface such that if it is properly painted in gloss paint no imperfections will be apparent.

Finish
Plane, thoroughly clean, sandpaper and leave unstained for finishing as required.

Arrises
Arrises shall be as shown on drawings.

Punching
All nail heads shall be punched below timber surfaces which will be visible when completed.

Countersinking
All screw heads shall be countersunk not less than 2mm.

Pelleting
All screw heads shall be sunk 6mm below timber surfaces that are to be clear finished. Grain matched pellets not less than 6mm thick and cut from matching timber shall be glued in place and finished off flush with face.

Proprietary components
All proprietary components shall be fixed in accordance with manufacturer's recommendation.

FIXING FRAMES: PREPARATION AND POSITIONING

Priming and Sealing
All frames shall be primed or sealed as specified before fixing.

Loading
Frames must not carry any structural loads unless designed to do so.

Opening Lights

All opening sections shall be kept closed and secured during all operations until fixed, retaining any clamping devices in position.

Horns
All horns shall be removed before fixing.

Placing
All frames shall be plumb, level and square.

Damp Proof Courses
D.p.c.'s shall not be displaced and should be positioned correctly in relation to frames.

Building-In
All frames shall be supported and braced as necessary to prevent distortion during erection of adjacent structure.

Prepared Openings
All joints shall be packed to maintain specified widths, including at positions where fixings tighten frame against structure.

Packing
The unobstructed depth of joint recommended by manufacturer of sealants shall be strictly observed.

Distortion
Extreme care should be taken to avoid distortion of frames when driving edges or other packing, or when tightening fixings. Adequate clearance shall be maintained for opening parts. If necessary, packing and fixings should be adjusted to eliminate binding. On no account should frames be cut, plane or sand to remedy distortion.

Fixing Positions
Fixings shall be at approximately 150 mm. from bottom edge and not more than 600mm centres unless shown otherwise.

Architraves
Architraves shall be fitted in un-jointed lengths with mitred angles between joints unless otherwise specified, and fixed securely to prevent pulling away, deflection etc., during use.

2.12. Internal Plasterwork

2.12.1. General

Specification

Must be carried out by suitable experienced crafts people, working under the supervision of the Conservation Architect.

Plaster Removal
Care is to be taken where removing existing modern plaster internally to historic masonry not to damage substrate.

The Contractor shall ensure that removal of defective or damaged lime plaster to masonry is to be carried out in such a way that the absolute minimum necessary amount is removed.

Materials

Cement
Cement for plastering work to be as previously specified.

Sand
Sand for rendering beds and backings shall conform to B.S. 1699.
Sand for finishing shall be fine plastering grade sand.

Lime
Lime shall be hydrated lime and shall comply with I.S. 8. Lime for lime putty shall conform to B.S.890 (Clause A) and shall be run into lime putty and matured for at least three weeks before required for use.

Water
Water shall be clean, fresh and free from organic matter. River water shall not be used.

Beads
Stop beads shall be galvanised mild steel by Expamet Ltd. or equal approved.

Timber formers
Timber formers to arrises and the like shall be 25mm diameter hardwood.

Expanded Metal Lathing
Expanded Metal Lathing for internal use shall be galvanised mild steel 'Riblath' or equal approved.

Scrim
Scrim shall be 100mm wide jute to Architect's approval.

Bonding agents shall be of a type recommended by the manufacturer of the plaster, or other approved.

Workmanship

General

All materials shall be delivered to the site in their original packages bearing the trade name of the material concerned and shall be stored off the ground, under cover and away from all source of damp.

Store lime and gypsum plaster separately by different types, off the ground, in a dry, well ventilated space.

Use cement in rotation within three months of delivery.

Lime putty shall be matured for at least one month before use.

Internal plastering shall be carried out strictly in accordance with BS 5492:1990

Workmanship
Do not begin work until:

(1) All required openings, chases or other apertures have been cut,
(2) All pipes, fixtures, fixing pads and plugs have been fixed,
(3) All making good has been completed.

Protection
Protect all existing work and approaches, with boards, dust sheets, etc. All droppings on to finished work to be cleaned off immediately. Protect all concrete surfaces from contamination by gypsum plaster.

Cleanliness
Ensure that all plant and tools are kept clean and free from previous mixes.

Scrubbing
Remove all traces of mould oil, paint, grease, dirt and other materials incompatible with plasterwork by scrubbing with water containing detergent.

Scudding
Throw onto surfaces scudding of cement-sharp sand (1:3) and leave rough. Keep wet with fine water-spray until set and allow to harden before applying undercoat.

Protection
Protect surfaces to be coated from weather, to ensure that they are reasonably dry before starting work.

Solid Backgrounds
Before coating, adjust porosity to give uniform suction.

Gauge Boxes
Measure plaster constituents by volume, using gauge boxes made to sizes to suit volumes required. Overfill gauge boxes and strike off excess material with a straight edge.

Contamination
Avoid contamination of one type of plaster by another.

Mix

Mortar thoroughly so that individual constituents are incorporated evenly, and to a consistency suitable for the particular plastering work.

Wash Out
Mixer four times daily if in continuous use, and after each batch if mixer is used intermittently, or if a different constituent is used.

Discharge
Mixes onto a bunker or onto barrows.

Do Not Use
Discard mixes after initial set has taken place. Re-tempering or reconstitution of mixes will not be permitted.

Admixtures
Do not use admixtures without prior approval.

Beads and Stops
Fix plumb, square and true to line and level. Protect cut edges with black tar based paint.
Fix beads to solid backgrounds with plaster dabs each side at 600 centres or less.
Fix beads to timber supports with 38mm clout nails each side at 600mm or less.
Fix rounded arris and panel beads by cross nailing.

Junctions
At junctions in the same plane between differing wall backgrounds fix 1 length metal stop beading to each side with plaster dabs.

Projections
Hack off projections.

Chases
Cover all service chases with expanded metal lath, fixed both sides with plaster dabs at 600mm centres maximum. Cover all conduit not chased in with scrim bedded in finish coat mix, pressed flat and trowelled in.

Brushing
Remove efflorescence, laitance, dirt and other loose material by thoroughly brushing.

Dubbing Out
If necessary to correct inaccuracies, dub out in thickness of not more than 10mm in the same mix as first coat. Allow to dry out before next coat is applied. Cross scratch surface of each coat immediately after set.

2.12.2. Lime Plaster

Plaster Mixes
Sand for render shall conform to BS 1200 and shall be non-staining. Lime shall be as previously specified. Sand for use in the preparation of Course Stuff shall be as specified in that section. In particular, the Contractor shall ensure that the sands do not contain any material that would tend to retain water or slow the natural drying of the render thus interfering with the proper carbonation of the lime.

The Contractor shall refer to the relevant Technical Guidance Documents published by Historic Scotland for guidance on the proper preparation and use of lime and ensure that the methodology implemented on site complies with their recommendations.

Mixes for scudding, scratch coats, base coats, etc., shall be defined by volume and unless otherwise indicated shall be one part lime putty and 3 parts sand, prepared from Coarse Stuff or Fine Stuff as specified below. The mix for finishing coats shall be one part lime putty and 3 parts sand prepared from fine plastering sand, as approved by the Architect.

The Contractor shall note that he will be required to match the render to an area sound original render selected by the Architect as regards colour, texture, surface finish, grading of grains etc.

Preparation of Course Stuff and Fine Stuff

Sand for plasters shall generally conform to B.S. 882 and 1199/1200 and the Technical Guidance Documents published by Historic Scotland. The particles shall be sharp and angular and samples delivered to the Architect for approval before work is put in hands. The Contractor shall note the requirement to match the original plaster type and finish extant on the buildings. To this end, the Architect will indicate an area on the building which will be the standard for the finish which the Contractor will be required to replicate.

For Coarse Stuff it shall be graded as the table below:

Sieve Size	% Particles passing
5.00mm	95%
2.36mm	80%
1.18mm	60%
0.60mm	35%
0.30mm	22%
0.15mm	7%

Hydrated lime shall comply with I.S.8. Lime for lime putty shall conform to B.S.890 (Clause A) and shall be run into lime putty and matured for at least one month before required for use and obtained from an approved source.

Lime Putty:

If the lime putty is delivered in 25kg tubs, it shall be allowed to stand undisturbed for 48 hours before use to allow the fines to settle. Any limewater on top of the tubs when opened shall be carefully decanted and stored for possible use.

Coarse Stuff and Fine Stuff:

Coarse Stuff and Fine Stuff shall be prepared by thoroughly mixing the lime putty and sand. The mixing operation is critical and compression will be required - a roller pan mixer is advisable as the normal rotary drum mixer does not provide the necessary compression. The proportions shall be 1 parts of lime putty to 6 parts sand, by volume which may be adjusted to suit the individual sand with the Architect's approval. There should be adequate water in the lime putty for mixing provided sufficient compression and / or beating and chopping is provided during mixing. If additional water is required, the decanted limewater shall be added in small quantities under strict control. The actual proportions of lime / cement to sands may vary depending on the particular

characteristics of the sands. This shall be determined by test and on-site trials.

The mixed Coarse Stuff and Fine Stuff shall be set aside to mature, stored in air-tight containers or a heap covered with hessian or straw etc., kept moist at all times and the air excluded, for a minimum period of 3 weeks.

Knocking up:
When required for use, the coarse stuff or fine stuff shall be taken from storage and re-mixed until such time as the workable material has returned. This may be achieved successfully in a rotary drum mixer or by hand. Any material that has dried or shows any signs of carbonation shall be discarded before the knocking up commences. It should be noted that hand preparation will require a minimum of 15 - 20 minutes for proper mixing and to ensure the proper workability of the mix is achieved without the addition of any water.

In general, it should not be necessary to add additional water to achieve a workable mixture, but if such addition proves necessary, the stored limewater shall be used in small quantities using the minimum to achieve a workable mix. The Contractor shall note that if the mix is too wet when used, this will contribute to crazing and shrinkage cracks. All work that exhibits any such defects, be they the result of too much water, improper preparation, application, aftercare or from other cause, will be required to be removed and replaced at no cost to the Employer.

Coarse Stuff or Fine Stuff should only be gauged with white cement in quantities that can be used within 30 minutes. Any gauged mix not placed within this time shall be discarded. On no account shall the mixture be knock-up and used after this time.
Where the mortar is required to be black in colour, Lamp Black, or other approved natural colorant, shall be used in sufficient quantities to give the required colour.

Hydraulic Lime
Should the Contractor desire to use hydraulic lime to replace the non-hydraulic lime or cement in part or in whole, he will be required to submit at method statement to the Architect for his approval. This statement shall be modified as necessary to obtain approval before the works commence and it is likely that sample panels will be required. Only hydraulic lime from an approved source will be permitted and the Contractor will be required to submit certificates confirming that no cement has been used or added to the powder. Hydraulic lime shall be delivered in bags with the manufacture's name, the contents and use by date clearly marked on the outside. It shall be stored under similar conditions as for cement. All mixes incorporating hydraulic lime shall be placed within 30 minutes of water being added to the mixture, any mixes not used by that time shall be disposed of and never 'knocked up' and used in the work.

Ambient Conditions
It is essential that ambient climatic conditions are observed during the preparation and use of the mixture and the batch size adjusted accordingly. It is imperative that the mixture is not allowed to become dry or be subject to freezing conditions. In addition, the precaution of suspending operations until the temperature reaches 6^0C on a rising thermometer or drops to 8^0C on a falling thermometer shall be strictly observed.

Hair
Goat hair or other approved animal hair may be added to the base coat if approved by the Architect. This should be body hair that is clean, free from impurities such as grease, dirt, skin

etc., and carefully teased into the mixture to achieve the even dispersion of the hair throughout the mixture.

Dubbing Out
In order to keep the layer thickness as even as possible, major depressions in the wall surface shall be dubbed out in several layers to reduce the possibility of shrinkage as previously specified. In all cases, the previous clauses relating to adjusting the suction and aftercare etc., shall be strictly observed.

Scudding
Where necessary, the surfaces shall be scudded by throwing the gauged mortar onto the surface to obtain an even key. The surface shall be left rough and the clauses relating to aftercare strictly observed until the scudding is set. The clauses relating to adjustment of suction shall be strictly observed.

Base Coat
When a stable keyed base has been achieved, the base coat shall be applied in gauged mortar as specified, with the suction adjusted as previously specified. The mortar shall be applied by trowel, 10 - 12mm thick in diagonal strokes applying a slight pressure to create an effective bond. The coat shall be kept to as even a thickness as possible with only minor fluctuations permitted.

The surface should be scratched immediately in a diagonally crossed pattern to provide a key for the succeeding coat. Great care must be taken to ensure that the scratching is slightly undercut, not too deep and executed in such a manner as not to disturb the bond.

Correct aftercare is essential and the mortar must be dampened from time to time and protected from extremes of temperature etc., as previously specified.

Levelling Coat
When the base coat has dried sufficiently the levelling coat shall be laid on in gauged mortar as specified, with the suction adjusted as previously specified. The mortar shall be applied by trowel, 8 - 10mm thick in diagonal strokes applying a slight pressure to create an effective bond. These strokes shall be in the opposite direction to the base coat. The surface shall be brought to an even level surface using levelling screeds in the normal manner, the screeds being removed and filled with mortar before the initial set has taken place.

Top Coat
When the base coat has sufficiently cured, the top coat shall be applied 4 - 6mm thick by trowel as specified for the base coat, ensuring that the strokes are in the opposite direction to the levelling coat. Particular care shall be taken to ensure all arrises are straight and true and a fair finish is achieved. The proportions of lime to sands will be adjusted for this coat from the base coats as may be the sands grading.

Particular care must be taken to ensure that the surface is "polished" in a manner to avoid any cracking or crazing when the final set is achieved. The surface shall be finished to a fine smooth, regular, surface by the use of a steel float. On no account should any marks of the float or drag marks from the aggregate be visible in the finished work. No textural variations will be permitted.

The provisions of the 'Aftercare' clause shall be strictly observed during curing, a period which shall extend to 28 days after completion of the coat.

Reveals, Jambs, etc.
All arrises etc., shall be true and straight.

Sample Panels
The Contractor shall be required to execute sufficient sample panels to demonstrate the quality and type of workmanship for the Architect's approval. Each sample panel shall measure at least 1 meter x 1 meter. The approved panel shall be retained undisturbed as a quality and finish control panel until such time as the Architect indicates a completed area of render is approved to serve this purpose.

2.13. Painting

PAINTING

2.13.1. General

Standards

The works shall comply with the requirements of BS 6150, BS 5593 and BRE Digest 261 as relevant.

White Spirit to be to I.S. 17.

Knotting shall be made with pure shellac and industrial methylated spirits conforming to I.S. 17.

The priming paint for woodwork to be oil painted, shall comply with I.S. 18.

The primer for ironwork shall be red lead priming conforming to I.S.18.

The primer for galvanized metalwork shall an etching type primer or Calcium plumbate primer to B.S. 3698 Type A.

Red oxide linseed oil priming paint shall be to B.S. 2524.

Emulsion Paint shall not be of lesser standard than that required by I.S. 179

Oil Finishing Paint shall not be of lesser standard than that required by I.S. 32

Breathable paints shall have an Sd (permeability) value of around 0.02m to 0.5m.

Materials

Paint removers, cleaning agents, rust inhibitors, glue size, knotting, stopping, fillers and other preparation materials for painting work shall be types recommended by the manufacturer of the coating to be used.

Stopping for woodwork to receive opaque finish, plywood, and fibreboard, shall be as approved and tinted to match colour of undercoat.

Stopping for woodwork to receive clear finish, shall be tinted to match surrounding Woodwork.

Woodwork to be oil painted, shall be an approved oil resin primer containing aluminium of the same manufacturer as the undercoating.

Primer and thinner for polyurethane lacquer shall be as recommended by the Manufacturer of the lacquer being used.

Coating materials are to be delivered in sealed containers, clearly labelled as follows:

1. Type of material.
2. Brand name.
3. Intended use.
4. Manufacturer's batch numbers.

Batch deliveries of coating materials dated for use in order of delivery.

Paints other than water based and bituminous, delivered in containers of not more than 5 Litres capacity.

Store materials in a clean, dry area protected from extreme temperatures.

Priming coats, undercoats and finishing coats for any one surface must be obtained from the same manufacturer.

All materials shall be used in strict conformity with the manufacturer's recommendations, paying particular attention to initial preparation of the base.

Preparation

Prepare surface for decorative coating in accordance with the manufacturer's recommendations.

Strippers.
Use paint strippers, cleaning agents, etching solutions, mould inhibitors, rust inhibitors, size, stopping, knotting and fillers in accordance with their manufacturer's recommendations.

Defects.
Ensure that all holes, cracks, defective joints and other defects in surfaces to be prepared and coated have been made good.

Pre-Primed Surfaces.
Ensure that surfaces have been properly prepared and that primer is of suitable type firmly adhering and in good condition.

Drying Out.
Before decorating allow surfaces to dry thoroughly.

Brush Down.
Brush down all surfaces, immediately before decorating, to remove dust, dirt and loose material.

Sample Areas.
Before applying coatings, prepare representative areas of each type of surface, to Architect's approval.

Existing Surfaces.
Existing woodwork shall have all existing coatings removed to expose the original timbers. Any timbers showing defects shall be repaired to the Architect's satisfaction; any loose or defective putty shall be removed and replaced. New and existing timber surfaces shall be sanded to form a smooth, stable base. Knot, stop, prepare, prime and paint all surfaces with two coats undercoat and one coat full gloss oil paint to colours selected by the Architect.

Painting Work To Be Done

Preparation.
Prepare as specified generally. Prime, stop, fill, prime again and paint two undercoats and one finishing coat.

All existing joinery shall be stripped to the bare wood, sanded smooth and painted as specified for new wood.

Newly plastered internal walls, finished in lime, shall not be painted until the lime has cured sufficiently, and shall be painted with breathable paint

Newly gypsum skimmed plasterboard shall be primed and painted as specified.

Coating materials generally
Check that all materials to be used are recommended by their manufacturers for the particular substrate and conditions of exposure, and that they are compatible with each other. Inform the Architect of any discrepancy and obtain instructions before proceeding with application of coating.

Generally.

Control Sample(s)
Complete representative sample areas of each type of coating, including preparation of surfaces. Obtain approval of appearance before proceeding.

Previous Treatments
Where surfaces have been treated with preservatives or fire retardants, check with treatment manufacturer that coating materials are compatible with the treatment.

Cleanliness
Keep all brushes, tools and equipment in a clean condition. Keep all surfaces clean and free from dust during coating and drying. Provide suitable receptacle for liquids, slop washings etc.

Preparation Of Materials

Generally
Prepare coating materials as recommended by their manufacturers.

Strain

Through fine gauze any coating materials showing bittiness in application.

Do Not Intermix different coating materials.

Stir coating materials to attain an even consistency before use unless otherwise recommended by manufacturers.

Protection

Damage
Adequately protect freshly applied surface coatings from damage.

Adjacent Surfaces
Adequately protect surfaces adjacent to those being covered.

Generally
Apply coatings in accordance with their manufacturers' recommendations, to clean, dry surface in dry atmospheric conditions and after any previous coats have hardened.

Unsuitable Conditions
Do not apply coatings to surfaces affected by moisture or frost, when ambient temperature is below 4 degrees C or when heat is likely to cause blistering or wrinkling.

Priming Generally
Apply priming coats by brush unless other methods are approved by the Architect. Work primer into surface, joints, angles and end grain. Ensure that priming coats are of adequate thickness and suit surface porosity. Ensure that any primed surfaces which have deteriorated on site or in transit are touched up or re-primed.

Priming Joinery
Prime all surfaces before joinery leaves the joinery shop.

Priming Metal
Prime metal surfaces on same day as they have been cleaned.

Undercoats
Apply an even film over all exposed surfaces, avoiding uneven thickness at edges and angles.

Use different tints for successive coats.

Finishing Coats
Apply an even film over all exposed surfaces avoiding brush marks, sags, runs and other defects.

Rub Down all priming and undercoats to a smooth surface with abrasive paper and remove all dust before applying the next coat.

Cut In neatly and cleanly. Do not splash or mark adjacent surfaces.

Brush Painting
Apply all paints by brush unless otherwise specified. Lay off all areas evenly, and ensure that finished surfaces are free from brush marks.

2.14. Services Installation Philosophy

SERVICES INSTALLATION PHILOSPHY

In general, the electrical works should attempt to reuse existing cable and duct positions, improving or adding to these where necessary. The addition of new trunking, ducting and cabling for the electrical will therefore be decreased and any new chasing/opening-up/notching etc. will be significantly reduced.

In general, mechanical services will follow the lines of existing joists and, in all cases, will avoid the removal of any decorative fabric.

A brief list of 'dos' and 'don'ts', in relation to the M&E interventions is given below. It is not exhaustive but has been useful in guiding the design.

Do's
Make redundant, unsightly wiring, through use of wireless systems.
Removal of unsightly redundant wiring, surface trunking etc.
Existing services routes which are seen to be particularly intrusive within the historic structure should be revised and routed away to less critical locations.
Careful patching, making good and redecoration of any chases/holes in plasterwork and joinery that have been made previously.
Repairs of any notching in structures that has caused weakening.
Confine works, where possible, to single vertical and horizontal locations, away from areas of decoration.

Don'ts
Where possible, avoid any chasing into walls. If required, note on drawings now.
Where possible, avoid any opening up of ceilings or other historic fabric. If required, note on drawings now.
Drop down boxings to contain new ducts are not acceptable and are likely to be unsightly and have an impact on architectural features. If absolutely necessary, these should be noted on drawings now.

APPENDIX VIII : CV'S & PRACTICE PROFILE

CURRICULUM VITAE - JAMES SLATTERY

DAVID SLATTERY – Architects – Historic Buildings Consultants

8, Vergemount, Clonskeagh, Dublin 6, Ireland. Tel:+353(1) 2697344 Fax: +353 (1) 2604098

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CURRICULUM VITAE - JAMES SLATTERY

Name:	James Slattery, B Arch MRIAI DiplABRCons.
Position:	Principal
Profession:	Conservation Architect, Historic Buildings Consultant.

Professional Affiliations:

* BArch Degree in Architecture, UCD-1995-2001.
* Member of the Royal Institute of the Architects of Ireland.
* Diploma in Applied Building Repair and Conservation from Trinity College, Dublin, 2007-2008.

Brief Summary of Experience:

2001-2006 BCDH/BDA Architects

2004-2006 U2 Tower-Competition Winning Scheme & Design up to Tender Stage for DDDA.

2005-2006 Lead designer on the 2nd placed design for the Irish World Performing Arts Village at UL and on shortlisted scheme for Anthony Fokker Park, Schiphol, Holland.

2001-2005 Residential Development to Protected Structure (Regional Significance) at 30-32 S.J.R.Q., Dublin 2 up to Planning Stage

2006- David Slattery Conservation Architects Ltd.

2006-2012 Conservation Architect for Restoration of the National Maritime Museum Protected Structure (National Significance), Haigh Terrace Dun Laoghaire within the former Mariner' Church including roofworks, restoration of stonework, stained glass repairs and protection, interior restorations and new interventions to improve functionality. Lead sketch, planning, tender, construction phases.

2007-2009 Protected Structure (Regional Significance) at No. 13 Stephen's Green, Dublin 2-Conservation Architect for Restoration of external fabric (decorative stucco, sash windows and slate roof) and interior alterations. Lead sketch, planning, tender, construction phases.

2007-2008 Redevelopment of the Humewood Castle Protected Structure (National Significance), Co. Wicklow- Conservation Consulatant to successful

planning for redevelopment of the gothic revival estate which was recently completed.

2008-2012 Kent Station (Protected Structure of National Significance) Redevelopment Masterplan, Horgan's Quay, Cork - Conservation Consultant up to planning stage.

2008- Dartry House (Protected Structure of National/Regional Significance), Rathmines-Restoration - Conservation Consultant though planning, tender and on site stage of a number of phases of work to main house and to Dartry road.

2008-2009 65 Fitzwilliam Sq, Dublin 2 (Protected Structure of National/Regional Significance) – Conservation Consultant to planning stage for conversion of former house in offices back to a single family dwelling.

2008-2010 Ardeevin, Otranto Place, Sandycove (Protected Structure Regional Significance) - Conservation Architect for Extension and Restoration of detached Victorian House by the sea. Sketch, Planning, Tender and Construction stages.

2009-2014 Redevelopment of Ballroom and Stables at K-Club, Straffan House (Protected Structure of Regional Significance)-Conservation Consultant

2008-2012 Works to Railway Stations at Newbridge, Kildare, Sallins, Ballinasloe, Tullamore and Drogheda- (all Regionally Significant Protected Structures) Conservation Consultant.

2008-2012 Dart Underground-Conservation-Consultant for Design, EIS Preparation etc. to successful Railway Order.

2008-2012 Luas Line BXD-Conservation Consultant for Design, EIS Preparation etc. to successful Railway Order for works affecting numerous Nationally and Regionally significant Protected Structures and National Monuments within ACA and CAs in Dublin City.

2009-2012 Redevelopment of interior to Powerscourt Townhouse (Protected Structure of National/Regional Significance) and Restoration Works to Front Setting, Sth William St, Dublin 2 - Conservation Consultant and Architect.

2009-2012 Redevelopment of Doyles/Times Hostel, Fleet Street, Dublin 2 (including Regionally Significanr Protected Structures) - Conservation Consultant.

2010-2014 NUI Galway – Reroofing Quadrangle Building – Protected Structure and Refurbishments to Aula Maxima – Conservation Architect for planning, tender and construction.

2010-	Redevelopment of RTE Campus, Dublin 4 (including assessments of Protected Structures of Montrose and Mt Errol and the STW campus itself) - Conservation Consultant.to Planning and Tender for Restoration Works to Montrose House redevelopment.
2010-2015	Redevelopment of Irish Distiller's Site, Smithfield - Conservation Consultant.
2010-2012	Redevelopment and Restoration of CWU Headquarters, NCR, Dublin 3-Conservation Consultant for planning, tender and construction phases of works to former early Georgian house (Protected Structure of Regional Significance).
2010-2012	Restoration of Seatown Road Parochial House Swords - Conservation Consultant for planning, tender and construction phases of works (Protected Structure of Regional Significance).
2010-2012	Restoration to Interiors of St. Francis Xavier's Church (Protected Structure of National/Regional Significance), Gardiner Street, Dublin 1-Conservation Consultant
2011-2013	Redevelopment of Former Ford Factory Site (Protected Structure of National Significance), Marina Park, Cork-Conservation Consultant. Sketch and planning stage.
2011-2013	Restoration Works to Macroom, Carrig, & Kildare Bridges-Conservation Consultant. Planning and Tender Stages.
2011-	Restoration of Leinster House External Fabric (Protected Structure of National Significance) - Conservation Architect to Tender Stage.
2011-2012	Restoration of Fire Damaged Church, Ballinroad, Waterford (Protected Structure Regional) – Conservation Consultant. Tender and Construction stages.
2011-2015	Restoration of Olympia Roof and Interiors, Dublin 2 (Protected Structure Regional) – Conservation Consultant. Tender and construction stages.
2011-2012	Redevelopment of former Dutch Billy at No. 50 Mary Street, Dublin 3 (Regionally Significant Protected Structure) - Conservation Architect. Planning and Tender stages.
2011-2013	Restoration of Stonework and Copper Lamps and Standards to Sarsfield Bridge, Limerick (Regionally Significant Protected Structure)- Conservation Consultant. Planning, tender and construction stages.

2012-	Belvedere House – Belvedere College – Conservation Architect planning tender and construction stage.
2012-	Restoration and protection of Apse Roofs to Pugin Chapel, Slate Roofs to Apple Store and Redevelopment of Stoyte House and Kitchen Courtyard all at St. Patrick's College Maynooth including a number of Nationally Significant Protected Structures. Conservation Architect for planning, tender and construction stages.
2012-2013	Restoration & Redevelopment of Marley Grange, Rathfarnham (Regionally Significant Protected Structure) - Conservation Consultant for planning and tender stages.
2012-2016	Redevelopment of former Georgian Houses at Nos. 18-20 Merrion Street, Dublin 2 (Protected Structures of Regional Significance) - Conservation-Architect for planning, tender and construction stages.
2012-	Restoration of Glendruid House, Cabinteely (Protected Structure of Regional Significance) - Conservation Architect for planning, tender and construction stages. Conservation consultant for redevelopment of estate.
2012-	Restoration and Redevelopment of Ashbourne Church and Parish House (two Regionally Significant Protected Structures), Ashbourne, Co Meath-Conservation Consultant for planning consents, tender and construction stages of restoration and extension works.
2013	Redevelopment of Site of Former Celbridge Workhouse, Co. Kildare (Regionally Significant Protected Structure) - Conservation Consultant for planning stage.
2013-	Restoration of the Church of Our Lady and St. David, Co. Kildare (Regionally Significant Protected Structure) -Conservation Architect for planning, tender and construction stages of restoration.
2013-2014	Tyrconnell Bridge Reconstruction, Donegal, Co. Donegal (Regionally Significant Protected Structure) - Conservation Consultant to planning and tender stages.
2013-	Redevelopment of Former Late-Georgian Terraced Houses at Camden Street Upper to Camden Street Hotel, Dublin 8 (Protected Structures of Regional Significance) - Conservation Consultant to Planning stage.
2013	Garryduff Bridge in BNM Land - Conservation Consultant in Relation to Proposed Inclusion on RPS.

2013-2016	Restoration of No. 70 Blessington Street, Dublin-Conservation Consultant for planning, tender and construction stages of work to restore a mixed surgery and apartment use to the former Georgian House.
2013-	Redevelopment of Regionally Significant (not on RPS) Ormond Hotel and adjoining Protected Structures, Ormond Quay, Dublin 1 - Conservation Consultant planning stage.
2013-2016	Redevelopment of Fleet Street Hotel, Westmoreland Street, Dublin 2 above former Bewleys premises (Protected Structure Regional) - Conservation Consultant for planning, tender and construction stages.
2013-2014	Redevelopment of Molesworth Street to South Frederick Street Block, Dublin 2-Conservation Consultant planning stage.
2014-2015	Redevelopment of Chatham House, Chatham Street, Dublin 2-Conservation Consultant planning stage.
2014-	Boland's Mills Redevelopment – Conservation Architect for planning, tender and construction stages.
2014-	Spire Restoration at Pro-Cathedral of Saints Peter and Paul, O'Connell Street, Ennis, Co. Clare (Protected Structure Regional) - Conservation Architect tender stage.
2014-2015	Former Dowager House (Now BOI) Restoration, Westport, Co. Mayo (Protected Structure Regional) -Conservation Consultant planning stage.
2014-2016	Works to Trinity Hotel, Dublin 2 Site of Former Tara St Fire Station (including Regionally Significant Protected Structures) - Conservation Consultant planning stage.
2015-	Trinity College Business School including Restoration and Adaptation of former houses on Pearse Street - Conservation Architect for Planning, Tender and Construction stages.
2015-	Restoration of Gate of Justice, Dublin Castle, Dublin 2 (National/Regional Significance Protected Structure) - Conservation Architect for Tender and construction stages.
2015-	Extension and Restoration of Regionally Significant Arts and Crafts Protected Structure at "Seaside", Burrow Road-Conservation Architect for Planning, Tender and Construction stages.

2015- Restoration and Redevelopment of Irish Stock Exchange and Armoury Building, Anglesea Street/College Green (National/Regional Significance) - Conservation Consultant for planning, tender and construction stages.

2016- Restoration of single family dwelling to former Georgian house at No. 5 Mount Street Crescent, Dublin 2 (Regionally Significant Protected Structure) - Conservation Consultant for planning stage.

2016- Restoration and redevelopment of former Clerys Site, Dublin 1 – Nationally Significant Protected Structure - Conservation Consultant for planning and tender stage.

2016- Restoration and redevelopment of No. 2 Grand Parade, Dublin 6 (former Carrolls building) National/Regional Significant Protected Structure - Conservation Consultant for planning and tender stage.

2016- Restoration and redevelopment of site of former Hampton Carmelite Convent and Pugin Chapel, Drumcondra, Dublin 3 (Regionally Significant Protected Structure). Conservation consultant planning and tender stage.

2016- Works to original Fitzgerald airport terminal for DAA (Regional Protected Structure) – Conservation Consultant planning stage.

2016- Restoration and redevelopment of former 19th Century Hotel at Crofton Hall, Crofton Road, Dun Laoghaire (Regional Protected Structure) – Conservation Consultant planning stage.

2016- Restoration and reinstatement of residential use to no. 61 Merrion Square, Dublin 2 (Regionally Significant Protected Structure) – Conservation Consultant planning and tender stage.

2016- Restoration and redevelopment of former Central Bank Site Dame/College Street including one National/Regional Significant Protected Structure (No. 9 College Street) - Conservation Consultant for planning stage.

2017- Redevelopment at Howth Castle Masterplanning – Conservation Consultant.

2017- Restoration and Extension to No.16 St. Stephen's Green – Nationally Significant Protected Structure - Conservation Consultant for planning stage.

2017- Restoration and Extension to former Ardmore House within the UCD Estate – Nationally Significant Protected Structure - Conservation Consultant for planning stage.

PRACTICE DESCRIPTION.

DAVID SLATTERY – Architects – Historic Buildings Consultants

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DESCRIPTION OF PRACTICE

The practice was established in 1990 office location No. 8 Vergemount, Clonskeagh, Dublin 6. The works and projects undertaken are solely of a conservation nature.

In addition to completing major projects for clients, the practice provides specialist consultancy services to other architectural practices. The repair and conservation of historic stonework, brickwork and metalwork; the preparation and use of historic materials such as lime and the conservation and repair of decorative plasterwork, joinery and statuary are areas where the practice has a particular expertise and substantial experience. In addition, the practice has completed a substantial number of assessments of historic buildings and has provided consultancy services for the historic fabric aspects of a number of larger mixed developments.

The practice has seven permanent members of staff and carries Professional Indemnity Insurance.

The practice has worked jointly and in a consultancy role on complex new design and conservation projects on many occasions. It has a proven ability to work as part of a design team.

The practice was part of the Design Team and advising on conservation issues regarding the proposed Terminal 2 at Dublin Airport and conservation architects to the Railway Procurement Agency on Metro North and LUAS Line BXD and to C.I.E./Iarnrod Eireann on the DART Underground Project. The practice was commissioned to act as Conservation Advisors to the E.S.B. on their proposal to redevelop their premises at Lower Fitzwilliam Street. The practice provided advice on the restoration and redevelopment of the former Central Bank Site Dame/College Street now under construction. The practice was also engaged as Conservation Consultants on conservation and repair works carried out on St. Muredach's Cathedral, Ballina, Leinster House, Belvedere College and on the Irish Stock Exchange at Foster Place/College Green.

The Practice is providing ongoing conservation advice on the Bolands Mills Project in the Docklands and on the restoration and redevelopment of No. 2 Grand Parade, Dublin 6 (former Carrolls building) on the Grand Canal as well as the works to the Tropical Fruit Warehouse on Sir John Rogerson's Quay.