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**Thetford, Cemetery Chapel, London Road**  
**Repairs to the South Side**  
**SPECIFICATION**

10 February 2017

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This Specification refers to work to

**Rebuild gable parapets, repoint walls. Repair the cement flashings to the roof.**  
**Replace rainwater goods and rebuild the south eastern buttress.**

To be read with the:

**Contract Particulars**

**Work Schedule**

**Drawing 590/2101 Site Plan, Protection and Scaffolding**

**Drawing 590/2102 Layout, Roof Plan and South Elevation**

**Drawing 590/2103 Details, Buttress Repairs**

**Drawing 590/2104 Details, South Transepts Parapets Repairs**

**Drawing 590/2105 Details, Rainwater Goods**

Which together with the Form of Contract form the Contract Documents

*This is the Specification described in the Agreement between the Thetford Town Council (Employer)*

*and ..... (Contractor), dated .....*

*Signed ..... (Employer), dated .....*

*Signed ..... (Contractor), dated .....*

## Specification

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# 1 Tender and pricing

## 1.1 Site Visit & Working Area

- .1 Visit the site before tendering and ascertain all local conditions and restrictions likely to affect the execution of the works. No claims arising from failure to do so will be considered. Check the position and capacity of the water and power outlets.
- .2 Confine all workmen, including those of subcontractors, to the site of the works. Prevent trespass on adjoining owner's property.

## 1.2 Specification

- .1 The specification including these Preliminaries will form part of the Contract Documents. No alteration or qualification of any kind is to be made to its text without the written authority of the architect.

### **Errors**

- .2 Notify the architect if any pages are missing or duplicated, or if any text or figures are indistinct. No claim for loss resulting from your failure to comply with this clause will be considered. Any inconsistency in or between Contract Documents must be referred to the architect, and will be corrected in accordance with Clause 4.1. of the Agreement.
- .3 Specification and drawings are to be read and priced together.
- .4 When required to inform, instruct, and agree, confirm, obtain approval, or obtain instructions, do so **in writing**.

## 1.3 Documents *Will usually include:*

- .1 Contract Particulars
- .2 Specification: Section 1 - Preliminaries; Section 2 - Standard Specifications
- .3 Work Schedule with Form of Tender
- .4 Drawings, listed in the contents pages of the 'Work Schedule'

## 1.4 Pricing

- .1 Each item in the schedule of work is to be priced separately. Please enter prices in black ink to facilitate photocopying. Facilities for pricing the documents are provided as follows:-

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- .2 The total of the preliminaries cost is entered as an item in the Work Schedule, this is then carried forward to the Tender Summary.
- .3 In the Schedule of Work, there is a column for pricing each item, with a total for each section of work to be carried forward to the Tender Summary at the end of the schedule.
- .4 The employer does not undertake to accept the lowest or any tender, and reserves the right to accept part only of a tender.
- .5 The employer will not be responsible for expenses incurred by the tenderer in preparing his tender.
- .6 The tenderer may withdraw his tender at any time before its acceptance.
- .7 The Profit shall be included in the work items and not in the Preliminaries section. If any tender is weighted heavily in the Preliminaries section, the Employer will ask for this to be re-priced or for the tender to be withdrawn.

#### **1.5 Condition of Tender**

- .1 Note the following requirements on the Form of Tender:
  - .1 CITB registration number.
  - .2 Submission of a Programme of Work and Cash Flow Forecast before the tender can be formally accepted.

#### **1.6 Schedule of Rates**

- .1 Where you are required to submit a schedule of rates, it must be submitted on the form provided with the Tender Documents. The Schedule will be used, where possible, to arrive at a fair assessment of any variations, in accordance with Clause 3.6 of the Agreement.
- .2 Daywork: All work that cannot be properly measured and valued on the basis of the Schedule of Rates (where applicable) or current measured rates for the district will be assessed in accordance with "The Definition of Prime Cost Daywork carried out under a Building Contract" as published by the Royal Institute of Chartered Surveyors and the National Federation of Building Trades Employers. Your labour attendance and percentage additions must be entered on the attached "Schedule of Daywork Rates," and included with your Tender.

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- .3      Dayworks vouchers: Vouchers giving details of the time spent daily upon dayworks, the trades and tradesmen's names, and the materials, plant and transport are to be delivered to the Architect for verification not later than the end of the week following that in which the work has been executed.
  
- .4      Unpriced items: Where a tenderer does not insert a price against any clause in the Preliminaries and Preambles it will be understood that he has made allowance elsewhere in his pricing for the provisions of such clauses.

### **1.7      Labour and Plant**

- .1      Labour on-costs: Provide for the following costs:
  - .1          Matters within the jurisdiction of the recognised Wage Fixing Bodies.
  - .2          National Insurance Contributions.
  - .3          Any levy or contribution or disbursement payable by the Contractor in respect of his work people.
  
- .2      Plant costs: Provide all plant, tools and vehicles for the execution of the Works.
  
- .3      Overtime: If you decide when tendering that overtime working is necessary, then you must include for it in your tender.
  
- .4      Making good: Include, where appropriate, for making good any disturbed work to match adjoining unaffected areas.

### **1.8      Specialist Contractors and Suppliers**

#### **Selection**

- .1      Where certain works are to be carried out by Specialist Contractors, their selection will be dealt with as described in section 5 of these Preliminaries.

#### **Payment**

- .2      Valuation of and payment for work carried out by approved subcontractors will be based on part 4 of the contract conditions.

#### **Domestic sub-contractors**

- .3      Specialist subcontractors may be employed, they shall be 'Domestic' for the purposes of the contract.

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## 2 Job particulars

### 2.1 The Building and Site

- .1        The Cemetery is located in the south west side of Thetford on Norwich Road.
- .2        Access to the Cemetery Chapel is restricted by a boundary wall on the north side with a metal gate. This must not be disrupted during the course of the works.
- .3        The building is not listed.

### 2.2 Temporary Services

#### .1        Water:

~~A        There is no mains water available on site. Provide clean fresh water for the works and make temporary arrangements for storing and distributing it about the site.~~

**B        Mains water is available on the site. The area around the stand pipe, tap or sink shall be maintained in a clean and tidy manner for the client to use as he needs during the period of the contract.**

#### .2        Electricity:

~~A        There is no mains supply to the site. Make whatever arrangements are necessary to provide power for tools, lighting etc.~~

**B        You will be allowed to use the existing supply. You must ensure that you use does not overload its capacity which may be limited**

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### **3    Statutory and General Obligations**

#### **3.1    Requisition or complaint**

- .1        Inform the Architect immediately of any requisition, complaint or communication affecting the Works from any Local Statutory or other Authority. Await the Architect's written instructions before proceeding further with the part of the Works affected. You will be liable for any loss or extra cost resulting from your neglecting to notify the Architect in accordance with this clause.

#### **3.2    Police Regulations**

- .1        Ascertain and comply with the Police regulations affecting the execution of the Works.

#### **3.3    Safety, Health and Welfare & CDM Regulations**

- .1        Comply with enactment's, regulations and working rules relating to safety, health and welfare of workpeople.
  
- .2        Before work commences a Health and Safety Plan shall be prepared based on the Pre-Construction Information Pack prepared by the CDM Co-ordinator, and updated during the works as required. During the works, information shall be collated for incorporation into the Project H & S File to be submitted to the CDM Co-ordinator and Employer within 3 months of Practical Completion. Allow for any costs involved with the administration of the CDM regulations.

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### **4 Commodities and Workmanship Generally**

#### **4.1 Commodities**

- .1 Handle, store and fix each commodity in accordance with manufacturer's recommendations. Inform the Architect if these conflict with any other specified requirement.
- .2 Where approval of samples is specified submit samples. Do not confirm orders for commodities until approval has been obtained. Retain approved samples on site for comparison with commodities used in the Works.
- .3 Commodities in short supply should be ordered well in advance and, when applicable, the opening of roofs and removal of gutters etc. should be delayed until the required materials arrive on site.
- .4 All Surplus supplies and salvaged materials should remain on site, complete and neatly stacked until a check has been made. In the case of scrap metals the Architect will wish to examine weigh bridge tickets showing the weights of metals removed from site.

#### **4.2 Accuracy**

- .1 Check all dimensions both on drawings and on site, particularly the relationship between components and the work in place.

#### **4.3 Workmanship**

- .1 A high standard of work is required, with a good blend of old and new work, and where applicable the Architect will specify the use of good quality old materials, especially where matching-in is required.
- .2 In doubt or dispute the latest relevant British Standards, Codes of Practice, Regional Working Rates, Factory Acts and manufacturer's written guarantees will be applied as final.
- .3 Time and materials used for repeated work should not be chargeable. Where the Contractor is not certain of the Architect's requirements a trial section should be carried out first for approval. Make due allowance in tender for any trial areas that would appear to be necessary.
- .4 The Contractor shall design and provide all necessary shoring, needling, strutting and other temporary supports for the protection and stability of the works and adjoining fabric.

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### 4.4    **Supervision**

- .1    **The Main Contractor shall employ a responsible foreman to oversee the project.**
- .2    Traditional materials and craft skills are to be employed throughout the works, and experienced craftsmen shall select appropriate materials and supervise all building operations.
- .3    Architect's visits will be made at agreed regular intervals. Prolonged major works will receive unscheduled calls in addition to regular visits.

### 4.5    **Fire**

- .1    Take particular care to avoid damage by fire. The use of blow lamps and welding apparatus will only be allowed when a hot work permit has been issued. Hot work precautions are to be agreed with the Architect before commencing work.
- .2    **Smoking is strictly forbidden on the Works**

### 4.6    **Temporary Works**

- .1    Provide as necessary all temporary roads, tracks, crossings and hard standing required for your own use.
- .2    Provide as necessary temporary sheds, offices, mess rooms, sanitary accommodation and other temporary buildings required for your own use.
- .3    Provide temporary fencing, hoardings, fans, planked foot ways, guard rails, gantries and the like as may be necessary for protecting the public and others, for the proper execution of the works and for meeting the requirements of any Local or other Authority.
- .4    Provide as necessary general scaffolding for the execution of the Works and in accordance with the site setup section in the Standard Specification.
- .5    Obtain Architect's approval for any temporary name board displaying names of Contractor and subcontractors. Allow to include space for a Heritage Lottery Fund sign.
- .6    Provide temporary disposal of rainwater from the Works.

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### **4.7    Progress**

- .1        Costs arising from delays due to bad weather or Sub-Contractor's delays especially for standing scaffolding, and shortage of materials and labour, should not be charged without specific agreement of the Architect.
- .2        Obtain the approval of the Architect for all proposed measures for building in cold and inclement weather.

### **4.8    Discoveries**

- .1        Hidden faults such as wet or dry rot, wood borer attacks alive or dead, cracks in large masonry, dampness etc., uncovered by building work should be brought to the notice of the Architect before new work is added.

### **4.9    Completion**

- .1        Unless otherwise instructed, the Contractor is not expected to restore the polished surfaces of floors and fittings, but he should remove all debris inside and out which can be swept up, and remove all paint spots, cement and plaster droppings etc.
- .2        Windows are to be washed down with clean water only and wiped down, and left clear with no marks. Lime and cement mortar must not be left on glass for any period of time and must be cleared off immediately as it can permanently etch the glass surface
- .3        Clear away all plant, materials and debris after agreeing any credit.
- .4        Rake over paths and bare earth areas that are flattened during building work. Fill in ruts caused by building traffic, and make good the surface.
- .5        Washing water containing paint, cement, lime or plaster residues must not be tipped down rainwater gullies. Any gullies found to be choked as a result of the building works are to be cleaned out on completion and swilled with clean water.

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### 5 Specialist Contractors and Suppliers

*The JCT MW Agreement makes no provision for nomination or naming of subcontractors or suppliers. Therefore, where specialist contractors and suppliers are to provide services and/or goods within these works, they will have been selected on one or more bases described below. The basis for selection is made clear in the items of the attached schedule of work relating to such subcontractors and suppliers.*

#### 5.1 Domestic Subcontractors or Suppliers

On this basis, only specialist work and/or materials are described in the schedule of work, and you are required to obtain tenders from a firm or firms of your choosing and make due allowance in your own tender for such specialist work or supplies. Should your own tender be accepted, and subject to the architects' consent under clause 3.2 of the agreement, you would then appoint the successful tenderer as your 'domestic' subcontractor.

#### 5.2 Approved Firm

On this basis the schedule of work describes the work and/or materials, together with the naming of two or more 'approved firms from whom you are required to obtain tenders (subject to your own approval of such firms), and make due allowance in your own tender for such subcontractors' work. Should your own tender be accepted, you would then appoint the successful tenderer as your own 'domestic' subcontractor or supplier.

#### 5.3 Separate Contractor

On this basis, the specialist work will be the subject of a separate contract direct with the Employer. The nature of such work is described in the schedule of work and it will be such that it can easily be coordinated with your own programme of work, and the attendance required from you will only be general, for example:

- .1 Use of contractor's standing scaffolding.
- .2 Use of mess room, sanitary accommodation and welfare facilities.
- .3 Space for storage of plant and materials.
- .4 Light and water.
- .5 Clearing away rubbish.

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### **5.4    Expenditure of Provisional Sums (clause 3.7)**

On this basis, a Provisional Sum is included in the Schedule of Work for work and/or goods which cannot be described accurately at the time of tender.

### **5.5    Pricing**

Do not price against any of the items in this section (5).

- .1        In case of items 5.1 and 5.2 your prices against the relevant items in the Schedule of Work will be deemed to include all your own on-costs (profit, overheads, discount, attendance, etc.) as well as the cost of the specialist work and/or supplies.
- .2        In case of item 5.3, the attendance required will be described in the Schedule of Work.
- .3        In the case of item 5.4, provision is made in the Schedule of Rates in the Form of Tender for you to enter, at the time of submitting your tender. Your price is to cover profit and attendance based on the provisional sum.
- .4        Your profit and attendance will be adjusted pro rata, based on the certified value of the subcontract work.

## Section 2 - Standard Specifications

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### 1 Site Setup

#### 1.1 Cemetery Services

- .1 Midweek services: Every effort will be made by the client to rearrange midweek services in order to avoid interference with the proper progress of the works. Where this is unavoidable, as in the case of funerals, a note must be made of the non-productive time, should it prove impractical to transfer men to other work on the church or elsewhere.
- .2 Weekends: Unless otherwise instructed at the time of tendering the contractor is to assume that the Church is to be left at weekends in a fair condition for the conduct of services. Detailed arrangements must be made with the client before commencing work to the areas required to be kept in use.

#### 1.2 Protection for Church Repairs

- .1 The fabric and its contents are extremely valuable and the churchyard is consecrated ground, no soil may be removed from the churchyard. This should be impressed on all workmen. The church is a special building in use and the churchyard is a burial ground and must be respected as such during the works; the architect may insist that an untidy site be cleared to his/her satisfaction before work continues at any stage during the works and rowdy or unseemly behaviour is not allowed.
- .2 Protection should be given where any damage may occur, and included in all tenders. Your attention is drawn to the following more common situations:
  - .1 Seating areas and walkways affected by the works to be covered by deals and fireproof polythene sheeting and railed off with clear warning signs.
  - .2 Open roofs with stout covers well battened, supported underneath and regularly checked in all weathers.
  - .3 Open window tracery with Stirling Board templates shaped and clamped in place.
  - .4 Glazing, with Stirling Board templates, cut to shape and clamped in place.
  - .5 Wall monuments with light deal framing and hardboard sheeting. This is particularly important in redecoration work.
  - .6 The organ enclosed on all sides with two layers of fireproof 1000 gauge polythene sheeting and taped joints. Where the organ shape is large or irregular a light deal

## Section 2 - Standard Specifications

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framework will be needed to support the sheeting. This is particularly important in redecoration and roof work and repairs to plaster work when no dust may be allowed to enter the organ mechanism. The organ should still be playable for services.

- .7    Light fittings to be removed and stored, or protected or tied back and reset on completion.
- .8    Floor tiles and stone paving covered with canvas dust sheets.
- .9    Monument brasses need additional covering. This is particularly important in roof treatment, redecoration and internal alterations.
- .10    Floors in the vicinity of grouting work to be covered with 2 inches of sawdust.
- .11    Lead roof surfaces with stout deals, especially under scaffold poles, ladders and masonry work in progress. Steel shod shoes and boots must not be allowed on lead roofs.
- .12    Tiled roofs as for lead roofs, and with straw packing.
- .13    Exposed arises, reveals, jambs, tombs, gravestones etc. to be protected with deals with bubble-wrap.
- .14    Sheet lead must not be stored in the church or on site.
- .15    Sand and shingle to be stored on a raised platform to protect it and the churchyard surface.
- .16    Bags of lime, cement etc. to be stored under waterproof covers on a raised platform.
- .17    No materials to be stored in the church without permission.
- .18    Mortar, concrete and paint to be prepared and mixed on protective boards or sheeting. On no account should floor or path surfaces be used.

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- .19 Arches, bulges, beams, excavations etc. in the vicinity of work where collapse could occur to be shored and strutted firmly.
- .20 Protection from frost and rain to be provided for both new work and existing fabric especially where water mains and heating pipes are exposed, and during work to roofs and gutters.
- .21 Removable items. The employer will arrange for the removal to safe storage of any carpets, hangings, ornaments, vestments, books etc. from working areas where damage is likely to occur.
- .22 Existing damage. Before any work starts, the architect with the contractor will examine the existing structure and fittings and any damage noted will be agreed in writing. Otherwise the contractor may be held responsible for any such damage, and requires to it good at his own expense.

### 1.3 Archaeology

- .1 Where excavation are specified, the contractor shall telephone (01362 860528) Norfolk Landscape Archaeology two weeks before starting and inform them of the start of the work so that they can inspect excavations and record any 'finds'. A confirmatory call when the work has started is also required. Archaeologists will require access to record any finds. If any foundations or other features are discovered during the works, work to this area shall stop until the archaeologist and the architect have inspected and given further instructions
- .2 Any bones discovered shall be carefully put aside and handed to the employer for reburial on completion of the excavations.
- .3 Where archaeologists are to be employed for excavation and recording, this will be noted in the relevant sections of the Schedule of Work.

### 1.4 Scaffolding

- .1 All scaffolding work should comply with the regulations given in British Standard BS 5973:1993 or a later edition. Inspection tags must be maintained during the works. In addition the following special considerations are needed for this project:
- .2 All lifts shall be kept clear of debris and regularly swept down for safety, ease of working and to ensure the building is not marked by splash-back. The ground level area shall also be kept clear of debris. The architect may insist that an untidy site and scaffolding be cleared to his/her satisfaction before work continues.

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- .3 All ladders shall be fixed and be 10° - 20° from vertical. When scaffolding a tower and buttress repairs are specified, full working width around the buttress must be provided.
- .4 3M high hoarding at ground level is to be provided around the base of all scaffolding which is not within a secure compound. The scaffold is to be made safe and Unclimbable when the site is not occupied.
- .5 The scaffold must not rest or rely on the existing building for support. No scaffold shall rest on any roof below, it shall be designed to span lower roofs to avoid damage.
- .6 If the scaffold shall be sheeted in; the sheeting is to be "Monarflex Airflow". Debris netting must be fitted to scaffolding above roofs and above areas to where the public have access.
- .7 When full temporary roofs are specified, these shall be waterproof, give at least 2M clear working headroom below, and extend beyond the side wall sheeting so that rainwater is discharged clear of the works.
- .8 Gargoyle spouts and rainwater downpipes shall be extended with temporary pipes to discharge clear of the scaffolding and the works when full temporary roofs are not used. Any rainwater from temporary discharges must be allowed to run away and not pond or flood the site or churchyard.
- .9 Earthing will be required for safety with electric tools and for lightning protection.
- .10 In the Schedule of Work, the clause for pricing scaffolding will sub-divided into:
  - .1 Erection
  - .2 Dismantling
  - .3 Period of Hire allowed (same as contract period - see Article 7 of the Preliminaries)
  - .4 Rate per week for additional hire

## Section 2 - Standard Specifications

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## 2 Roofs

### 2.1 Slate Roofing

#### .1 Slate roofing - Ridge and Eaves

See Appendix A

#### .2 Slate roof abutments

See Appendix B

### 2.2 Leadwork to Roofs and Gutters

- .1 All work should comply with the guidance given in the Lead Development Association's Publication Lead sheet in Building, and the advice given in the periodic issues of Leadwork, also published by the Lead Development Association. If work is to deviate from the advice given in the above then the matter should be discussed with the architect and written approval given.
- .2 It shall be assumed that lead used for church roof repairs is to be 'sand cast' lead. There is no relevant BS Code for sand cast lead. It should be obtained from a reputable lead working firm, and should be free from defects and excessive pitting. The thickness of sand cast lead is available normally in accordance with Code 6,7 and 8 of milled lead, and will be referred to as such in the specification.
- .3 Milled Lead may be allowed in certain sheltered or hidden locations but only when specified as such on the drawings or in the schedule of work, see paragraph 1.2.1 above. All milled lead shall be to BS 1178, free from defects, such as inclusion and lamination. The tolerance on thickness should be not more than  $\pm 5\%$  and the chemical composition should be not less than 99% lead. Milled lead is available in various grades, from Code 3 to Code 8 and the code for every application will be clearly stated in the Schedule of Work.
- .4 Copper Clips. Copper clips should be cut from copper sheet, not less than 0.6 mm thickness conforming to BS 2870. Copper clips are to be soldered (tinned) where they are exposed.
- .5 Nails. These are to be copper clout nails with jagged shanks conforming to BS 1202, Part 2, Table 2 and not less than 25 mm long or 10 SWG shank diameter.

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- .6        Screws. These should be of brass or stainless steel conforming to BS 1210, Table 3 and not less than 25 mm long or 10 SWG shank diameter.
  
- .7        Solder. Where this is used for soldered fixing dots it should be grade D or grade J conforming to BS 219. The use of solder should be kept to a minimum and not used for forming seams in boxed gutters or parapet gutters, and used normally only in connection with soldered fixing dots.
  
- .8        Sub strata. Timber boarding to be wrought, well seasoned and preservative treated. Nail heads to be well punched below the surface, screws to be counter sunk and any sharp corners of external angles to be rounded off.

### 2.3        Protection

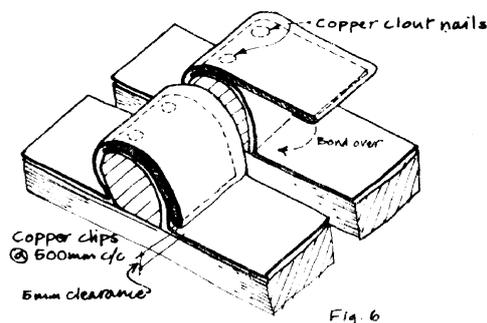
- .9        Metal to metal contact between lead and aluminium should be avoided to avoid premature corrosion of the aluminium.
  
- .10       Lead should be protected from exposure to organic acids, for instance that from new cedar shingles, lichen growth and also tannic acid from new oak. Where lichen growth is likely on tile or slate roofs a sacrificial strip of code 4 lead should be provided. Where lead is laid in conjunction with new cedar shingles this should be protected with a thick coat of bitumastic paint during the first few years until the cedar shingles have weathered.
  
- .11       Free lime present in Portland cement can initiate a slow corrosive attack on lead and where lead sheet is built into brickwork or concrete as a damp proof course this should be protected with a thick coat of bitumen paint.
  
- .12       The term 'creep' should not be applied to the slipping of lead down a pitched roof where this is a result of fixings having failed to give adequate long term support.

### 2.4        Lead roofing up to 60% pitch

- .13       Thickness of lead and joint spacing. Unless otherwise stated the roofing shall be carried out in cast lead of equivalent weight to Code 7 milled lead. The exact width of the bays of the lead roofing may vary for design purposes, but the bay widths will normally fall in the range of 600 to a maximum of 2,400 mm.
  
- .14       Fixings. The head fixing shall be of two rows of copper clout nails at the head of the panel, 75 mm apart and staggered, the top row being 25 mm from the top edge of the sheet with 25 mm between rows.

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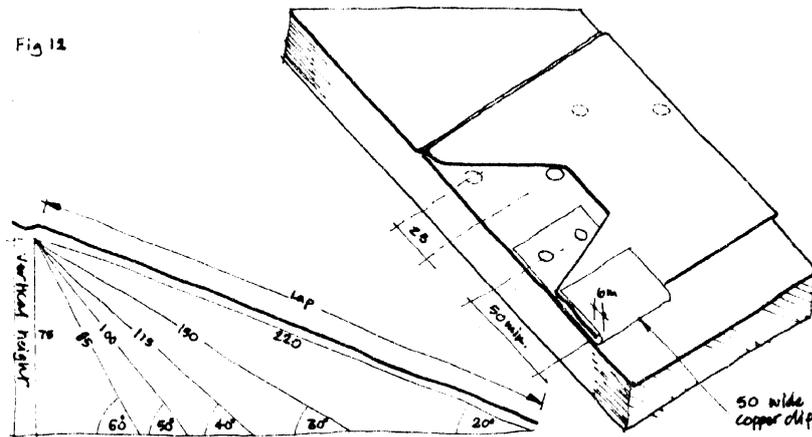
- .15 Side fixings are provided by 50 mm wide copper clips incorporated in the joints and fixed to the wood sub strata with No. 3 copper clout nails or 2 brass or stainless steel countersunk screws to each clip. These should be at maximum of 600 mm spacing with the lead sheet and copper clip lightly pinched together.
- .16 Retaining clips to secure free edges against wind lift should be 50 mm wide and cut from either sheet lead or copper sheet. Copper clips are preferable in situations of severe exposure and these shall be preferably hot dipped coated with a high lead content solder when visible. Any such retaining clips at bottom of panels shall be fixed to allow some freedom for thermal movement.
- .17 Intermediate fixings will generally be unnecessary with roofs below 30% pitch. With roofs of a greater pitch than 30% and vertical panels some additional support may be required for an intermediate fixing. These can take a number of forms but our preference is for screw fixing with a lead burn dot or screw fixings with a small lead cap, lead burned, to cover them.
- .18 Joints. Unless otherwise specified in the Schedule of Work the joints running with the fall of the roof coverings should be wood cored rolls. It is important that the wood roll is properly shaped, of approximately 45 mm x 45 mm with a 25 mm wide base. In the section shown in the drawing below, the undercloak should be turned well over the roll and nailed with copper clout nails at 150 mm spacing to the upper third only of the panel length starting at the head. The overcloak shall be dressed fully over the roll and form a 40 mm splash lap, making sure it is not forced in tightly along the inside of the roll. This type of wood cored roll is most suitable for roofs up to 30° pitch but for roofs greater than this pitch the roll should be formed to allow for splash lap and with the free edge secured with copper clips as shown in figure 6.



- .19 With a 45 mm wood roll, add 85 mm to the width of the bay for the undercloak, 175 mm for the overcloak if there is a splash lap and 135 mm if the splash lap is omitted.
- .20 The joint across the fall can be formed by either a lap joint or a drip.

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- .21 Lap Joints - the cover of the lap joint should be equivalent of a vertical height of 75 mm. The effect of this on the length of the lap is shown on the enclosed Fig. 12. The head of the underlap should be fixed as described for head fixings. The edge of the overlap to be secured with copper clips to prevent wind lift depending on exposure either one or two clips per panel are required. These should be staggered from one bay to the next.

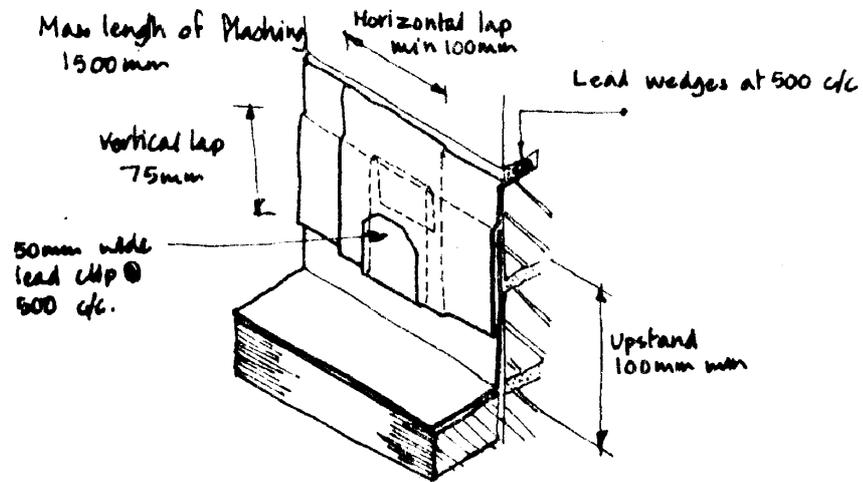


- .22 Drips : Steps should not be less than 75 mm in depth. The end of the undercloak shall be rebated into the sub strata, with a minimum of 25 mm lap and copper nailed at 50 mm intervals. The overcloak should have 40 mm splash lap.

**2.5 Details of valleys, gutters, etc.**

- .23 Flashings, pitched roof to abutment. Use Code 5 lead for stepped and cover flashings with horizontal turn in to a raked out joint of minimum depth 25 mm and fixed with lead wedges at each step or at spaces of 500 mm in straight runs. Single length of cover flashing to be a maximum of 1200 mm in length and lapped a minimum of 100 mm. Details of fixing shown below in Fig. 18.

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- .24 Apron flashings to be 225 mm minimum for slate and lead roofs up to 20° pitch. Lead or lead coated copper clips provided at lap to secure the free edges. Head laps to be minimum 100 mm unless otherwise specified.
- .25 Soakers, these should be of Code 3 milled lead to a minimum width of 175 mm to allow for 75 mm upstand and 100 mm minimum at head flashings. Should abutment wall not be suitably coursed for fixing a stepped cover flashing a groove should be formed of minimum 35 mm in depth. The flashing to be turned in 25 mm and fixed with lead wedges at 500 mm centres and edge welted up. Normally a drip of either 2 courses of plain tiles will be formed over the flashing, or where the wall is rendered, a stainless steel bell drip will be fixed above the flashing and the render formed to a drip. The lead flashing will be sealed with a 2 part polysulphide mastic, or lime putty / fine sand mortar as detailed in the schedule of work or on the drawings.
- .26 Lead Valleys. After new valley boards have been provided a lining fillet to be fixed to each side of the gutter trim to given 125 mm trim between raking edges of the roof covering and overhang of 25 mm to 50 mm and a fillet to the naked edge. Bituminous sarking felt beneath the roofing should not be carried over sole of gutter as underlay to gutter lining. Use Code 5 milled lead unless otherwise specified, at lengths not to exceed 1200 mm with laps of 150 mm min.

**2.6 Lead repairs**

- .27 When lead repairs are specified these are in order to preserve old graffiti and ancient lead sheets and their layout.

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- .28      Drawings showing the existing lead sheet layout must be numbered to identify each sheet, and each sheet must be numbered correspondingly before it is removed.
- .29      Unless otherwise agreed, lead sheets to be repaired are to remain on the roof or scaffolding at roof level for repair (the scaffolding should be designed to accommodate this).
- .30      Repairs are to be made by cutting out cracked or damaged sections (shown on drawings and/or marked up on site by the architect) and butt joining similar age and thickness lead into the sheet and welding both faces of the sheet (top & bottom).
- .31      New lead may only be introduced only with the agreement of the architect or where specified on the drawings, and it must match the thickness of the lead it replaces and be recast, Sand Cast, old lead.
- .1      **Lead Roofing General Information**
- See Appendix G

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### 3 Walls

#### 3.1 Pointing and Rebuilding Flintwork and Brickwork

- .1 Slaked natural lime putty to BS 890, 96% pure calcium Hydroxide made from slaked quicklime, not dry hydrate and matured for a minimum of three months.
- .2 Sharp sand evenly graded from 0.06 mm to 5 mm to BS 882:1992 (Specification for Aggregates from Natural Sources) from 1 source for the project. The colour of the sand will affect the final appearance and appropriate sand must be selected to match adjacent areas for repair work.
- .3 Thoroughly mix lime putty with sand 1:3 (normally), and store in airtight bins to prevent drying (carbonation). Before gauging with other constituents ram, beat and chop the mix. Cement mixers do not achieve a good mix for lime mortars.
- .4 Other aggregates may be required in the mix. These are noted in the schedule of work if required. These may be crushed and sieved old mortar, crushed brick, chalk, limestone and shell.
- .5 Clean water free from acid and vegetable matter.
- .6 Sample panels. At the start of the job prepare 3 sample panels of 0.5 sq. m each for approval and this approved sample shall be maintained for the duration of the works as a control. On approval mix the mortar to ensure consistency throughout the work, hydraulic agents shall be omitted until required.
- .7 Lime concrete for slabs and filling large voids needs to be firmly placed and consolidated, but not overworked. In some instances, within walls and in exposed positions, a hydraulic lime mortar may be used (either feebly, moderately or eminently hydraulic), but only with the prior written instruction of the architect. For the purposes of pricing and unless instructed otherwise hydraulic lime is to be Singleton Birch Natural Hydraulic Lime, NHL2 available from the manufacturer telephone 01223 583701 or Hendry and Sons of Foulsham 01362 683249.
- .8 For filling large voids and setting in damp conditions a hydrated hydraulic lime and sand mix shall be used. Unless otherwise specified this shall be 'blue Lias' lime. To improve workability up to 10% lime putty may be mixed in with the hydrated lime.
- .9 Cut out joints in masonry/flintwork with toothed masonry chisels or bent spikes. Avoid hacking hammers and cold chisels. Drilling may be helpful in removing cement pointing and

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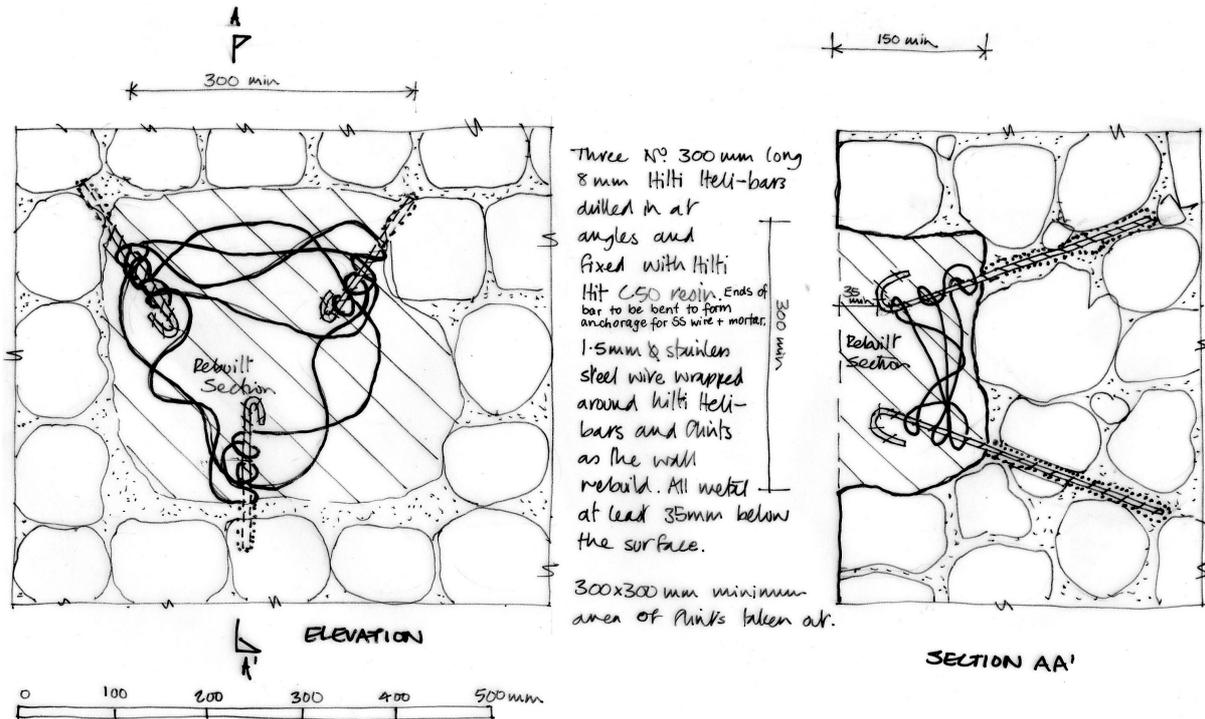
in long regular runs a small angle grinder used with extreme caution may be used but only with the prior agreement of the architect for specific areas. Never cut into masonry or open up joints. Joints to be cleaned out at least 18 mm or the width of the joint whichever is the greater in masonry, 25 mm in brickwork, and 38 mm in flintwork, but deeper if the background is frail or loose. Clean out the joint, adjust suction with water only. Press mortar into cavity firmly using a tool narrower than the joint, taking care not to spread the mortar onto the face of the wall. Remove splashes with a damp cloth or sponge, avoiding over wetting. Strike off flush with the wall surface, and leave to turn green. When sufficiently hard to be brushed with a stiff bristle brush without smearing, press the mortar back into the joint then the surface should be brushed back to 1-2 mm below the wall surface to leave a course surface with the aggregate exposed.

- .10 When removing plants and vegetation as part of the work, all roots shall be dug out of the wall. if necessary the core rebuilt with new sound brick, flint or stone as appropriate to the wall to maintain its' integrity.
- .11 Gallets are to be collected for reuse. Normally many will have been lost before the re-pointing has become essential. Allowance shall be made for supply of new gallets to incorporate into the wall. The density and finish will normally be to match the best existing work on a similar, sheltered part of the building.
- .12 In dry weather the mortar will need protecting from premature drying which will cause shrinkage and cracking. In frosty conditions protection is also needed to prevent water in the mix freezing, expanding and shaling the mortar. Plasticisers and anti freeze agents are forbidden.
- .13 When stainless steel helibars are described in the schedule of work or shown on drawings they are to be built in to the wall, across cracks and turned down into large blocks. Where the bars are used to fix quoins, lintels, arch heads and other stone features, the stone is to be drilled and the helibar inserted a minimum of 100 mm (or to 25 mm of the far stone face) into the stone and glued in using a proprietary stone glue, either polyester or epoxy based (Hilti c-50 or similar). They are to be a minimum of 50 mm below the finished wall face.

### 3.2 Patch Reinforcement Repair of Flintwork

- .1 Where a wall is to be repaired using these patches, holes may only be opened in a sequence agreed with the architect / engineer, prior to the start of the work.  
This is to avoid the possibility of the wall-face collapsing during the work.

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3.3 Stone Masonry

Stone

- .1 New stone shall be Ancaster or Clipsham, sample to be approved by the architect before any orders are placed. (Refer to Chapter 3 for the selection of new stone). It shall be free of any defects, such as shakes, vents or clay beds, which might detract from the performance of the stone.
- .2 All new stones will be laid on the natural bed, with the exception of sills, copings, cornices, stone ridges and string courses, which will be edge-bedded. Returns on these features to be natural-bedded in carefully selected stone. Voussoirs to be bedded at right angles to the thrust.
- .3 When delivered to site, the stone is to be stored carefully under cover, protected from accidental damage and not in contact with soil or other contaminants.

Templets

- .1 All mouldings to be replaced are to be set-out carefully, to be as close a copy as possible of the original profiles, and templets produced in zinc. The size and jointing of replacement stones must match the original, unless otherwise agreed with the architect.
- .2 All drawings and templets are to be retained for record purposes.

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### Chopping out and dismantling

- .1 Stone due for replacement is to be cut out without damaging adjacent stones. Disc cutters must not be used for this purpose (except in individually approved special circumstances). The stone must be cut out to full depth, and old mortar cleaned from the adjacent beds and joints, all ironwork must be completely removed.
- .2 Stones which are to be dismantled for reuse are to be numbered on the top bed before taking down, and must be taken down carefully so as to minimise damage. Joints are to be dawn out by hand first, if necessary to break the hold of hard pointing on the arrises. A disc cutter must not be used.
- .3 Any old cramps or dowels in stone which is to be reused are to be cut out by drilling out the old fixing material, or by cutting with a chisel if suitable.

### Dressing of stone

- .1 All replacement stone is to be finished to match as closely as possible the original finish. Machined stones to be left with an allowance for hand finishing and not tooled over the smooth surface.
- .2 Any sawn surfaces must be rubbed free of saw marks/to be finished by hand chiselling/to sample (as appropriate).
- .3 All new stone is to be free of snips, spalling or other defects, which detract from the appearance of the stone, and worked to the highest standards within the requirement to match the original.
- .4 A sample stone, worked to an agreed moulding and to the satisfaction of the architect, shall be provided before work commences.

### Fixing

- .1 All stones must be solidly bedded and jointed as far as possible. If grouting of any joints is essential, this must be carried out in the same mortar as used for bedding. The use of OPC grout is forbidden.
- .2 The stones must be thoroughly wetted before fixing.
- .3 No part of any stone shall project beyond another stone by more than 0.5 mm at most. All mouldings and ashlar to be pared-in after fixing, if this is necessary, but major paring-in is

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prohibited in favour of working a new stone or stones; the designed profiles must be maintained.

- .4     Fixing may not be carried out unless the temperature, actual or anticipated, is at least 3° C above freezing point.

### Pointing

- .1     Old mortar is to be raked out with a sharp steel implement, which will not damage the arrises. Cutting out with chisels will not normally be necessary. If chisels are necessary, to cut out hard cement pointing, they should be fine quirks, narrower than the width of the joints. The use of a disc cutter is forbidden.
- .2     The joint is to be taken back to sound mortar, or a minimum of twice the width of the joint.
- .3     Before repointing, all dust and debris is to be removed by washing with a light water spray or other suitable means, and the joints well dampened, but not wet, right to the back.
- .4     New pointing is to be pressed fully into the joint, leaving no voids and the joint filled flush. Mortar must be kept off the face of the stone.
- .5     When the mortar has taken an initial set, but no more, brush lightly along the joint with a stiff brush to remove the hard surface and reveal the aggregate. This operation must not smear the face of the stone, nor leave brush marks.
- .6     At completion, the pointing is to be flush with the faces and with the arrises visible, without leaving ledges to collect water.
- .7     Any stains left on the face of limestone are to be removed using a clean sponge and sufficient clean water without introducing any more water to the mortar.
- .8     New pointing is to be protected from rainwater and from over-rapid drying until the surface set is complete. Mortar that has cracked will not be acceptable.
- .9     Pointing may not be carried out unless the temperature, actual or anticipated, is at least 3° above freezing point.

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### 3.4 Gravity Grouting and Crack Repairs

- .1 This specification is a detailed instruction for the grouting of extensive cracks in flint walls. It may be modified by a prior discussion with the architect to suit the particular circumstances and the scale of the work on a particular site.
- .2 The following the equipment should be used:
  - Pail sized grout pan with bottom trumpet funnel outlet.
  - 4.5M of 25 mm diameter polythene hose pipe with clipped connection at the top to fit the grout pail and fitted with 225 mm length of 18m dia. pipe at the bottom.
  - A long handled tapered wooden plug to control the grout flow through the outlet from above.
  - A rubber force cup to clear blockages in the pipe during grouting.
- .3 The mixture should be a **non cement** lime based grout from the Saint Paul's Heritage Products Range. The constituents of the mixes include, in varying quantities, pulverised fuel ash, hydraulic lime and Bentonite and clay in a pre mixed powder, these are available from Hendry and Sons Ltd. telephone 01362 683249. Mixing instructions are supplied by the manufacturer, but in general as little water as possible, consistent with good flow, should be used. If too much water is added the mix cracks and fails.
- .4 If the wall is weak it may need shoring and supporting, especially around the inlet and outlet points. The pouring of the grout wall can force a weak outer skin of wall to bulge and even burst.
- .5 All surface cracks must be pointed as described elsewhere.
- .6 Built into the crack, and connected to any voids, lengths of 32 mm dia. PVC pipe at intervals of 600 mm horizontally and 900 mm vertically. Typical pipe lengths will be about 225 mm.
- .7 Fixed trestle or scaffold supports are needed to hold the grout pail 3 - 3.5M above the inlet point.
- .8 In principle; grout is poured into a lower hole under gravity and allowed to fill any crack or voids until it appears at the next highest inlet/outlet pipe. The hose is disconnected and the inlet hole plugged while the mix sets, this takes 24 hours. Work proceeds slowly up the wall. At the start of each section of work, the void is flushed with clean water to wash out loose material and to reduce suction on the grout mix, this also reveals any leaks! Great care and planning is needed to contain all the water and grout mix. Any cracks which appear during the grouting must be filled and stopped immediately. All surface runs of grout must be

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removed before they set. On completion the inlet pipes are removed and the wall rebuilt/repointed.

### 3.5 Repair and Replacement of Lime Plaster

- .1 Good lime plastering is a skilled art and the architect shall expect a competent experienced foreman to oversee all lime plastering works and to check the suitability and quality of materials before they are fixed or applied. This includes the selection sorting, preparation and fixing of laths, checking the plaster mixes for consistency and the quality, quantity and distribution of hair. Controlled drying to prevent shrinkage and to ensure even carbonation is essential for successful lime plastering, as is the timing of the application of subsequent coats. For these reasons it is essential that the experienced plaster foreman supervises the work and is available to monitor the drying and carbonation processes. The architect shall stop the work and insist that the work is completely taken down and redone if these general supervisory principles are not strictly adhered to.
- .2 All materials shall be selected and approved by the plasterer as suitable for the work in consultation with the architect. Slaked lime putty and selected graded sands are to be used. Hydraulic lime may only be gauged with the mix with the approval of the architect. Sand should be selected by the plasterer. Clean goats hair, chopped in 30 - 40 mm lengths is added to give strength to the mix. This at the rate of 5.3 Kg beaten into each cubic metre. Shorter, 20 mm long hair is used in the floating coat. The hair must be fine and evenly distributed throughout the batch. Mixing in cement mixers can cause the hair to ball if it is not sufficiently wet, for this reason hand beating of the hair into the mix is preferred.
- .3 Lime and hair plaster should be applied to a rough and porous background. The wall must be free from friable or loose material. The suction of the wall or laths must be adjusted to prevent premature drying. It is preferable to use just water for the control of suction but in certain situations, with the architect's approval, size or dilute PVA solutions may be applied.
- .4 Laths, if used, shall be split oak or chestnut (sawn softwood laths will not be allowed unless this is for matching in small areas of similar existing work) and these shall be well soaked before fixing. The plasterer shall be responsible for the supply and setting out and fixing of the laths. Lath thickness shall be appropriate for the joist spacing i.e. 3/16" up to 14", 5/16" for 14" - 16" and 7/16" for 16" - 18" joist spacing. 30 mm stainless steel ring shank nails shall be used for fixing the laths. Lime plaster shall not be applied to expanded metal laths.
- .5 As much sound old plaster as possible is to be left on the wall.

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- .6      The pricking up coat should not exceed 9 mm thickness. If more thickness is need then dubbing out will be needed. This should be scratched with a wooden rake. The general mix is 1 volume lime putty to 3 volumes of sand and this shall be applied in successive coats of up to 9 mm thick to ensure carbonation can take place, successive coats may only be applied after the previous one has gone green.
- .7      The floating coat should not exceed 6 mm in thickness. This may only be applied when the pricking coat has gone green. This will be finished with a devil float to give a fine key. The general mix is 1 volume lime putty to 3 volumes of sand.
- .8      The setting coat should be about 3 mm thick. This is a different mix to the previous 2 coats, no hair and a more even, softer sand is normally used. It is important to replicate the surrounding work when completing a repair. A successful repair to a historic building can only be detected by a trained eye. Where a particularly fine finish is specified a little Plaster-of-Paris can be gauged in with the mix. For a self finished smooth final coat, gauge 1 volume of lime putty with 50% fine sand (50 grit) and 25% Plaster-of-Paris. When matching existing plaster, the setting coat may be omitted if there was none originally.
- .9      Wood floats are to be used for all work. It is essential not to overwork lime plaster as this can draw the water out. The final coat shall be finished with a damp sponge.

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**4 Rainwater Disposal**

**4.1 Gully**

See Appendix C

**4.2 Gutters, downpipes and fixings**

See Appendix D

**4.3 Warns outlet chutes**

See Appendix E

**4.4 Downpipe fixings**

See Appendix F

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### 5 Decorations

#### 5.1 Limewashing

- .1        Limewash shall be made from pure slaked lime putty, sieved and matured for a minimum of three months. The putty is watered down to the consistency of milk. Pigments, if used, shall be natural earth colours as these are more stable than synthetic dyes. Sample panels shall be made at the start of a contract to agree the application procedure and the final colour. The final colour can only be gauged when the limewash is dry, heat may be needed to speed the drying in cold or damp conditions.
  
- .2        Brush off and remove all loose material. Distemper and synthetic paint must be removed. If a non porous background is discovered contact the architect for instructions.
  
- .3        If there are signs of wall paintings the wall shall be left until inspected by a conservator. Contact the architect for instructions.
  
- .4        The wall may have to be wetted before limewashing to allow the lime to carbonate rather than simply to dry quickly as this will dust off.
  
- .5        3 coats are needed to cover bare plaster. The first coat is barely visible when first applied as it soaks into the surface, the second coat should not disappear as quickly and should be visible as it dries. The final coat builds up the surface and dries to an even colour. Depending on the dampness of the walls and the drying conditions it can take several weeks for the final coat to dry.
  
- .6        Limewash is very alkali and can etch many substances, including glass and metal, any spills or splashes must therefore be cleaned up immediately as the etching continues while the lime is in contact with the material. Floors, windows, monuments and furniture must be protected from splashes. Any splashes should be wiped up with dry material and brushed off. Wet washing can cause the lime to spread and affect the material it is on. Brushing when dry can be effective at removing excess.
  
- .7        Limewash can cause drying of the skin and may cause burns. It is essential to protect the eyes. All operatives must wear goggles, gloves and protective clothing. Saline eyewashes must be available on site.

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**5.2 Preparation and Painting of Exterior Metalwork**

Finish to be semi-gloss black:

See Appendix D

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**7    Appendix**

- A.....Slate roofing ridge and eaves
- B.....Slate roofing verge and abutments
- C .....Gully
- D .....Gutters, downpipes and fixings
- E.....Warns outlet chutes
- F .....Downpipe fixings
- G .....Lead Roofs and Gutters: General Notes

**End of Specification**