

Appendix VI – Specification

Specification for Masonry Cleaning, Repointing and Stonework Repairs

John Rylands Library, The University of Manchester
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Revision 1

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1.0 PRELIMINARIES/GENERAL CONDITIONS

- 1.1 The contractor shall provide proper management and co-ordination of the works including close supervision of the contractor's own employees and sub-contractors.
- 1.2 The contractor shall provide the following, which shall be deemed to include all incidental items required by the contractor:
- a) Plant, tools, vehicles and temporary equipment of every description.
 - b) Hoarding, barriers, covers and everything necessary for safety and protection of the works against damage, weather etc. Maintain and adjust protections as required throughout works.
 - c) Temporary welfare facilities and adequate means of water disposal - for the duration of the works. (Note: The interior of the building is not to be used for mess facilities or storage.)
 - d) Adequate PPE for site operatives and visitors.
 - e) Water, power and means of distribution – contractor to make own arrangements.
 - f) Adequate telephone facilities. A mobile telephone will be acceptable if there is reception.
- 1.3 The contractor shall ascertain and allow for all costs in relation to complying with the requirements of the local authority, in particular regarding traffic control equipment, notices and safety barriers.
- 1.4 The contractor shall inform the Contract Administrator of the intended siting of all temporary works, facilities and services. All such works are to be subject to approval.
- 1.5 The contractor shall maintain, alter, adapt and move temporary works and services as necessary. Clear away when no longer required and make good.
- 1.6 The contractor shall ascertain the position of any existing services in the area of the site before starting work and shall take all necessary precautions to protect, isolate or maintain these during the progress of the works.
- 1.7 For the duration of the works, the contractor will ensure that:
- a) The risk of fire is kept to a minimum. Naked flames are not allowed. Flammable materials are not stored on site. There is to be no smoking within the site. There is to be no accumulation of flammable debris.
 - b) Noise, dust, smoke and disturbance are to be kept to a minimum. All areas affected by the works shall be kept clean and tidy so that there is no risk to public safety.
 - c) Sufficient enclosure and protections are included throughout to ensure that no damage occurs in relation to:
 - i) The creation of dust
 - ii) Chemicals and / or water splashing around
 - iii) Chemicals and / or water running from the structure or scaffold

2.0

SCAFFOLDING AND ACCESS

GENERAL

Scope of work	Provide scaffolding and temporary access to complete all work described in Specification and Drawings. This includes the provision of temporary access over light-wells and areas of lead flat roofing.
Standards	The Contractor will be responsible for ensuring that the scaffold design, construction and maintenance of the scaffolding is in compliance with BS EN 12810/12811 or NASC guidance TG20:08 and that the scaffold is erected, altered and dismantled in accordance with the Work at Height Regulations 2005 by suitably competent persons.

MATERIALS

Tubing	All scaffold tubing is to be galvanised and in 'as new' condition.
Caps	Plastic end caps.
Fittings	Fittings are to be properly oiled and in good clean condition.
Boarding	• Scaffold boards are to be straight and sound. • The boards are not to contain any residues which would harm the building i.e. cement.
Hoardings	• Scaffolding to be protected by metal sheet or UPVC panels to a minimum height of 5m. • Hoardings to be suitable to receive anti-graffiti vinyl graphics. Images to be provided by University. • Hoarding to be in good clean condition without damaged or bent edges.
Debris Netting	Green debris netting. No torn or damaged netting is to be used.
Ladders	Timber or metal pole ladders in sound condition.

WORKMANSHIP

Health and Safety	• The contractor is to ensure that all legal obligations currently in force are complied with. • A competent person is to inspect all material to be used for any scaffold prior to erection and inspects the completed scaffolding within 7 days of erection and prior to use. • Further inspection shall be carried out within 7 days of any alteration to the scaffolding and prior to use.
Survey	The contractor is responsible for making a thorough inspection of the site to determine all factors which may affect erection of the scaffold including: a) Location of services b) Access routes

c) Delicate elements of the building where special care will be needed to avoid damage.

Method Statement	The contractor shall provide a method statement, identifying: a) The nature and location of the proposed scaffolding or temporary access b) All materials to be used. c) Method to be followed during erection and dismantling of scaffold. d) Chain of command and responsibility of site personnel. e) Stability of the scaffolding during erection and dismantling. f) Security of the scaffold and building during erection and dismantling. g) Emergency procedures to be followed in case of accident or injury. h) 24 hour emergency telephone contact numbers.
Design and Erection	• The contractor will present his design to the Contract Administrator for approval. Amendments will be required where the design is inadequate in terms of location, safety and serviceability. • Scaffolding to be designed and erected so that: a) The scaffolding complies with the recommendations of BS EN 12811. b) The scaffolding is designed and erected to minimise intervention with the fabric of the building. c) Loads are adequately transmitted. All surfaces used for support must be capable of safely transmitting loads placed upon them and must be protected against damage. d) No loads are placed on any part of the building structure without the written consent of the Contract Administrator. e) Lateral support is provided from points which are capable of providing the necessary support and which will not be damaged. f) Tying through window openings and to other structural features is not permitted without the written consent of the Contract Administrator. g) Loads of necessary materials are adequately supported. h) Loads are adequately spread at ground level to avoid damage to drains and other underground services, concrete or stone paving. i) Access is maintained to services (e.g. valves, inspection chambers, rodding eyes etc). j) Lift positions are selected to provide platforms at the optimum level for undertaking all works inclusive of any work being carried out by sub-contractors. k) The contractor is to be entirely responsible for the safety and stability of the scaffold and protection provided for the public both during and after erection. l) The security of the scaffolding and building are maintained during erection and dismantling of the scaffold.
Boarding and Guarding	• Working and access platforms are to be fully boarded in such a manner as to provide a safe and secure platform. • No boards shall be cantilevered. • Defective boards are to be removed from site.
Protections	• The contractor is to provide secure pedestrian routes as necessary.

- The fabric of the building is to be protected against damage by the scaffolding during use, scaffold construction, dismantling or transport of materials. The contractor is to ensure:
 - a) No part of the scaffold is placed in such a way that it abrades the building.
 - b) Plastic caps are placed on both ends of all tubes.
 - c) Where tubes are required to bear against the building they are to be provided with 500x500 timber packings and a resilient material against the building. Allow for rigid insulation board a minimum of 50mm thick.
 - d) Scaffolding does not bear on the roofs without the written consent of the Contract Administrator.
 - e) Paving, ornate masonry etc. is adequately protected.
 - f) Any damage caused is made good at the contractor's own expense.
 - g) The scaffold is to be adequately earthed against the possibility of a lightning strike.
 - h) All scaffold to be protected with green debris netting and fire retardant sheeting.

Hoarding

Hoarding/fencing to be:

- a) Rigid panels with adequate supporting structure (fixed in such a way that no assistance is given to anyone attempting to climb the hoarding).
- b) Minimum height of 5.0 metres rigid metal sheet or UPVC panels to base of scaffold if left overnight to prevent unauthorized access.
- c) Panels suitable to receive anti-graffiti vinyl graphics. Images provided by the Employer.
- d) Clean and in as new condition. Contractor to include for regular cleaning of hoarding.
- e) With lockable access.
- f) All fixings or raised edges to be finished smooth.

Access

- Ladder access is to be provided to all scaffold lifts.
- The ladder to the first two lifts must be removed at the end of each working day and locked away.

Striking

The contractor is to ensure that the scaffold is struck in part or in whole only after receiving written authorisation from the Contract Administrator (such approval to be requested by the contractor one week in advance).

Security

A security alarm system must be installed on the scaffolding. Requirements as follows:

- a) Battery Operated Outdoor PIR Intrusion Detector
- b) Able to dial out when activated to multiple contacts

3.0 Masonry Cleaning

GENERAL/PREPARATION

Scope of Work	Cleaning moss and algae from stonework by superheated water system.
Site Inspection	• Allow for attendance at 1no. site inspection at least 3 working days before starting each section of work to confirm extent of cleaning. • Parties involved: Conservation Architect, Contract Administrator, Contractor's site foreman, masonry cleaning sub-contractor • Instructions issued during inspection: To be confirmed by Conservation Architect.
Vegetation	• Carefully remove plants, root systems and associated soil/ debris from joints, voids and facework prior to undertaking cleaning works. • Where roots growths cannot be removed completely without disturbing masonry seek instructions from Conservation Architect before proceeding.
Protections	• Protect surfaces not designated for cleaning: lightning conductors, roof coverings, leadwork, rainwater goods, glass, window frames, doors, external lighting and cables, signs, paving. • Prevent damage, including marking and staining. • Openings: Prevent ingress of water, cleaning agents and detritus. • Vents and grilles: Seek instructions before sealing up. • Temporary mechanical fastenings: - In masonry: Locate in joints. - In other surfaces: Seek instructions. • Additional protection: - Cast iron railings: Submit proposals to Conservation Architect. - Lead roofs: Submit proposals to Conservation Architect.
Control and disposal of wash water and detritus	• Safely dispose of wash water. Obtain approvals from relevant Authority. • Control removal of wash water. Collect and divert to prevent ingress and damage to building fabric and adjacent areas. • Keep above and below ground drainage systems free from detritus and maintain normal operation.
Cold weather	• Do not use cleaning procedures using water when air temperature is at or below 5°C. • Protect damp surfaces from frost.
Cleaning generally	• Operatives to be appropriately trained and experienced in Doff cleaning and be registered on Stonehealth's 'Approved Contractor' list • Evidence of training: Submit copy of 'Rosette Approved Doff Contractor' card • Control of cleaning: Confine cleaning processes and materials to designated areas. • Prevent wind drift. • Detritus: Remove regularly. Dispose of safely.

- Monitoring: Frequently check results of cleaning compared to approved trial samples. If results established by trials are not achieved, seek instructions.
- Modifications to cleaning methods and materials: Seek instructions from Conservation Architect.

Record of cleaning works

- Record cleaning methods and procedures used for each type of surface and deposit in written report.
- Record to include all relevant attributes of cleaning methods used including:
 - Equipment and settings
 - Water pressure
 - Water temperature
 - Nozzle type
 - Nozzle distance
 - Dwell times
 - Number of applications
 - Ambient temperatures.
- Electronic copy to be submitted to Conservation Architect and Employer upon completion of cleaning works.

Sample panels

- Allow for undertaking 1 no. sample panel per elevation to be cleaned. Sample panel to be undertaken as follows:
 - Location/ Size: 1 square metre. Location to be agreed with Conservation Architect.
 - Surface: sandstone.
 - Type of soiling: Moss and algae
 - Cleaning methods: Superheated water system.
- Maintain written records for each trial area to enable replication of results elsewhere. Records to include all relevant attributes of cleaning methods used including:
 - Equipment and settings
 - Water pressure
 - Water temperature
 - Nozzle type
 - Nozzle distance
 - Dwell times
 - Number of applications
 - Ambient temperatures.
- Await Conservation Architect's approval of each sample panel and written record before proceeding with cleaning works to that elevation.

MATERIALS/EQUIPMENT

Cleaning agent Not permitted.

Surface biocides Not permitted.

Water Water for the works is to be clean and pure and free from salts.

- Superheated water
cleaning equipment
- Manufacturer: Stonehealth Ltd
 - Product reference: Doff system (<https://stonehealth.com/products/doff/>)

WORKMANSHIP

Application

- The purpose of cleaning is to remove existing moss and algae.
- Application of all treatments to be *strictly in accordance with manufacturer's written instructions* unless otherwise specified.

Superheated water cleaning

- Prevent damage to surfaces, including abrasion.
- Prevent ingress of excess water into surfaces.
- Equipment settings (including nozzle type and distance from surface) to be adjusted regularly to achieve optimum cleaning performance for each surface.

4.0 REPAIRS TO STONework

GENERAL/PREPARATION

Scope of Work	Localised indent repairs to damaged stones as indicated on drawings
Site Inspection	• Allow for attendance at 1no. site inspection at least 3 working days before starting each section of work to confirm extent of repointing works. • Parties involved: Conservation Architect, Contract Administrator, Contractor's site foreman, Masonry conservator/sub-contractor • Instructions issued during inspection: To be confirmed by Conservation Architect.
Records	• Records of masonry to be repaired: Before starting work, use measurements and photographs as appropriate • Identification of masonry units to be removed, replaced or repaired: Mark clearly, but not indelibly, on face of masonry units or parts of units to be cut out and replaced. Transcribe markings to drawings/ photographs.
Vegetation	• Carefully remove plants, root systems and associated soil/ debris from joints, voids and facework prior to undertaking cleaning works. • Where roots growths cannot be removed completely without disturbing masonry seek instructions from Conservation Architect before proceeding.
Protection of masonry units and masonry	• Prevent damage, particularly to arises, projecting features and delicate, friable surfaces. • Store on level bearers clear of the ground, separated with resilient spacers. • Protect from adverse weather and keep dry. • Prevent soiling, chipping and contamination • Prevent mortar/ grout splashes and other staining and marking on facework. • Protect using suitable non-staining slats, boards, tarpaulins, etc. • Remove protection on completion of the work.
Structural Stability	• Maintain stability of masonry • Report defects, including signs of movement, that are exposed or become apparent during the removal of masonry units.
Disturbance to retained masonry	• Disturb retained masonry in the vicinity of repair works as little as possible. • Do not cut or adjust existing retained masonry to accommodate new or reused units.

	• Retained loose masonry units and those vulnerable to movement during repair works by propping or wedging so as to be firmly and correctly positioned.
Adverse weather	• Do not use frozen materials. • Air temperature: Do not repoint: - In hydraulic lime:sand mortars when ambient air temperature is at or below 5°C and falling or unless it is at least 3°C and rising. - In nonhydraulic lime:sand mortars in cold weather, unless approval is given. • Maintain the temperature of the work above freezing until mortar has fully set. • Protect masonry by covering during precipitation (rain, snow and dew) and at all times when work is not proceeding. • Prevent masonry from drying out rapidly in hot conditions and drying winds. • Rake out and replace any new mortar damaged by frost.
Record of works	• Record work carried out to masonry clearly and accurately using written descriptions, sketches, drawings and photographs, as necessary to record bonding patterns, joint widths, special features, etc. • Undertake photographic survey before and after work with locations identified and annotated as required. • Submit electronic copies to the Conservation Architect and Employer on completion of the work.
Samples	• Prior to works control samples shall be provided for each different type of dressed stone specified. Final stone specification to be agreed with Conservation Architect following completion of samples. • Allow for providing 4no. control samples • Maintain written records for each sample including quarry and bed type • Await Conservation Architect's approval of chosen sample before proceeding
Recording Profiles	• Profiles: Take measurements from existing masonry units, as instructed, to allow accurate matching of replacements. • Recording in situ: If there are no suitable joints to allow use of inserts, seek instructions. • Drawings and templates: Prepare as necessary. Templates must be clearly and indelibly marked to identify use and location.

MATERIALS

Material samples	• Submit representative samples of the following prior to placing orders: - Dressed stone • Samples to be retained on site for reference unless otherwise instructed. • Protect samples from damage and contamination.
Stone	• Supplier: Submit samples for approval by Conservation Architect of the following: - Locharbriggs Sandstone, Locharbriggs Quarry, Dumfries, Scotland - Cove Red Sandstone, Cove Quarry, near Kirk Patrick Fleming, Scotland - Red St.Bees Sandstone, Bickhams Quarry, St.Bees, Cumbria, England - Stoneraise Red Sandstone, Craggnock Quarry, near Penrith, Cumbria, England • Particular specification is to be confirmed by Conservation Architect following receipt of samples. • Original is believed from historical records to be Barbary Plain Red Sandstone, however it is understood that this is no longer available • Quality: Free from vents, cracks, fissures, discolouration, or other defects that may adversely affect strength, durability or appearance. Thoroughly seasoned, dressed and worked in accordance with shop drawings prepared by the supplier. • Finish: dressed to match existing.
Stone Orientation	• Orientation of natural bed: - In plain walling: Horizontal. - In projecting stones and copings: Vertical and perpendicular to wall face. - In arches: Perpendicular to line of thrust.
Ashlar Blocks and Dressings	• Cutting and dressing stone: To true and regular surfaces, free from hollow or rough areas.
WORKMANSHIP	
Structural stability	• Maintain stability of masonry. Report defects, including signs of movement that are exposed or become apparent during the removal of cementitious pointing.
Workmanship	• Skill and experience of site operatives: Appropriate for types of work on which they are employed. • Documentary evidence: Submit on request.
Preparation for replacement masonry	• Defective material: Carefully remove to the extent agreed with Conservation Architect. Do not disturb, damage or mark adjacent retained masonry. • Existing metal fixings, frame members, etc: Report when exposed. • Redundant metal fixings: Remove.

- Recesses: Remove projections and loose material; leave joint surfaces in a suitable condition to receive replacement units. Protect from adverse weather if units are not to be placed immediately.

Replacement of stone indent repair

- Extent: Where indicated on drawings. Exact location and extent to be agreed on site with Conservation Architect
- Stone: Specified elsewhere
- Bedding depths: n/e 150 mm or as agreed following site inspection .
- Mortar: Specified elsewhere
- Fixings: Bonded dowels
- Joints: Specified elsewhere
- Other requirements: removal of existing stone to be by hand .

Installing stone inserts

- Pockets to receive inserts:
 - Cut out accurately. Undercut sides of pocket where necessary to provide space for bonding material.
 - Adjust depth so that insert stands proud of existing stone for finishing in situ.
 - Clean out thoroughly.
- Inserts: Cut to the smallest rectangular shape necessary to replace the defective area and provide a firm seating. Install accurately and securely.
- Exposed faces: Keep clear of bonding material.
- Existing joint widths: Maintain. Do not bridge joints.

Bonded dowel fixings

- Dowels: Austenitic stainless steel.
- Adhesive: Epoxy resin.
- Holes for dowels: Suitably sized and accurately aligned in masonry background and in rear of replacement/ insert stone; clean and dry.
- Other requirements: Do not use adhesive to bond stones at joints unless instructed.

5.0 REPOINTING

GENERAL/PREPARATION

Scope of Work	Localised repointing of stonework in lime mortar.
Site Inspection	• Allow for attendance at 1no. site inspection at least 3 working days before starting each section of work to confirm extent of repointing works. • Parties involved: Conservation Architect, Contract Administrator, Contractor's site foreman, Masonry conservator/sub-contractor • Instructions issued during inspection: To be confirmed by Conservation Architect.
Records	• Keep records of masonry repointed • Before starting work, use measurements and photographs as appropriate to joint widths, finishes, special features, etc.
Vegetation	• Carefully remove plants, root systems and associated soil/ debris from joints, voids and facework prior to undertaking cleaning works. • Where roots growths cannot be removed completely without disturbing masonry seek instructions from Conservation Architect before proceeding.
Protections	• Masonry: Prevent damage, particularly to arises, projecting features and delicate, friable surfaces. • Prevent mortar/ grout splashes and other staining and marking on facework. • Protect using suitable non-staining slats, boards, tarpaulins, etc. • Remove protection on completion of the work.
Adverse weather	• Do not use frozen materials. • Air temperature: Do not repoint: - In hydraulic lime:sand mortars when ambient air temperature is at or below 5°C and falling or unless it is at least 3°C and rising. - In nonhydraulic lime:sand mortars in cold weather, unless approval is given. • Maintain the temperature of the work above freezing until mortar has fully set. • Protect masonry by covering during precipitation (rain, snow and dew) and at all times when work is not proceeding. • Prevent masonry from drying out rapidly in hot conditions and drying winds. • Rake out and replace any new mortar damaged by frost.
Record of works	• Record work carried out to masonry clearly and accurately using written descriptions, sketches, drawings and photographs, as necessary. • Undertake photographic survey before and after work with locations identified and annotated as required. • Submit electronic copies to the Conservation Architect and Employer on completion of the work.
Samples	• Prior to undertaking trial panels, biscuit samples of mortar shall be provided for each different type of mix. - Mix: Outline specification as follows:

1:1:1:1/4:1/4

'Ionic' NHL 2:Moist pink silica sand:Waddington fell grit:Clinker based ash:PFA

- Particular specification to be agreed with Conservation Architect following completion of samples.

- Allow for providing 5no. biscuit samples per building.
- Samples of each mix should include variations of aggregates ratios and aggregate sizes.
- Maintain written records for each biscuit sample mix to enable replication of results elsewhere.
- Await Conservation Architect's approval of each sample and written record of mix before proceeding with trial panels.

Trial panels

- Complete a trial panel for each of the following types of work and arrange for inspection before proceeding with the remainder:
 - Repointing: for each different type of mix prepare a trial area; first stage approval – after preparation; second stage approval – after repointing.
- Allow for undertaking 1no. trial panel per elevation to be repointed. Sample panel to be undertaken as follows:
 - Location/ Size: 1 square metre. Location to be agreed with Conservation Architect.
 - Mix: Outline specification as follows:

1:1:1:1/4:1/4

'Ionic' NHL 2:Moist pink silica sand:Waddington fell grit:Clinker based ash:PFA

- Particular specification to be agreed with Conservation Architect following completion of samples.

- Finish: As described below

- Maintain written records for each trial area to enable replication of results elsewhere.
- Await Conservation Architect's approval of each trial panel and written record before proceeding with repointing works to that elevation.

MATERIALS

Material samples

- Submit representative samples of the following prior to placing orders:
 - Sands for re pointing.
- Samples to be retained on site for reference unless otherwise instructed.
- Protect samples from damage and contamination.

Water

Water for the works is to be clean and pure and free from salts.

WORKMANSHIP

Power tools

Usage for removal of mortar: Not permitted.

Structural stability

Maintain stability of masonry. Report defects, including signs of movement that are exposed or become apparent during the removal of cementitious pointing.

Workmanship

- Skill and experience of site operatives: Appropriate for types of work on which they are employed.
- Documentary evidence: Submit on request.

Preparation for repointing	• Working from top of wall downwards, remove existing mortar carefully to locations agreed on site prior to commencement, without damaging adjacent masonry or widening joints, to a minimum depth of 25mm unless otherwise agreed by Conservation Architect. • Raking to be by hand only using hacksaw blade or similar tool. No mechanical raking will be permitted. • Seek instructions when mortar beyond specified recess depth is loose or friable and/or if cavities are found. • Remove dust and debris from joints following raking out.
Pointing stonework generally	• Prepare joints by carefully brushing away loose mortar and dampen joints, as necessary, to control suction. • Mortar: As section 5.0 - Mix: Outline specification as follows: 1:1:1:1/4:1/4 'Ionic' NHL 2:Moist pink silica sand:Waddington fell grit:Clinker based ash:PFA - Particular specification to be agreed with Conservation Architect following completion of samples. - Binder type: Specified elsewhere. Exact binder to be agreed following inspection of onsite trials. - Sand source/ type: Specified elsewhere. Exact sand type to be confirmed following trials. • Protection and Curing: As section 5.0 • Finish: As described below
Pointing with tools/ irons	• Press mortar well into joints using pointing tools/ irons that fit into the joints, so that they are fully filled. • Keep face of masonry clear of mortar. Use suitable temporary adhesive tape on each side of joints where necessary. • Finish joints neatly.
Finish to joints	• The mortar is ready for finishing when it is still damp but has attained a semi-hard consistency; at this stage it can be marked with a thumbnail, but a thumb pressed into the surface leaves barely any impression. The time taken for mortar to reach this stage varies and the work programme must be adjusted to take account of this. • Form a sympathetic finish to match adjacent mortar. The work should be hit firmly using a stiff bristled churn brush to compact the mortar, remove laitance and expose the aggregate. • Await Conservation Architect's approval of joint finish on trial panel before proceeding with finishing joints.

6.0

MORTARS

Lime:sand mortar mixes	Specified elsewhere.
Sand for lime:sand masonry mortars	• Type: Sharp, well graded. - Quality, sampling and testing: To BS EN 13139. - Grading/ Source: Outline specification as per suggested replacement mortar mix in mortar analysis report. Particular specification to be agreed with Conservation Architect following completion of samples.
Admixtures for hydraulic lime:sand mortars	• Air entraining (plasticizing) admixtures: To BS EN 934-3 and compatible with other mortar constituents. • Prohibited admixtures: Calcium chloride, ethylene glycol and any admixture containing calcium chloride.
Storage of lime:sand mortar materials	• Sands and aggregates: Keep different types/ grades in separate stockpiles on hard, clean, free-draining bases. • Ready prepared nonhydraulic lime putty: Prevent drying out and protect from frost. • Nonhydraulic lime:sand mortar: Store on clean bases or in clean containers that allow free drainage. Prevent drying out or wetting and protect from frost. • Bagged hydrated hydraulic lime: Store off the ground in dry conditions.
Making lime:sand mortars generally	• Batching: By volume. Use clean and accurate gauge boxes or buckets. • Mix materials thoroughly to uniform consistency, free from lumps. • Contamination: Prevent intermixing with other materials, including cement.
Making hydraulic lime:sand mortars	• Mixing hydrated hydraulic lime:sand: Follow the lime manufacturer's recommendations for each stage of the mix. • Water quantity: Only sufficient to produce a workable mix. • Working time: Within limits recommended by the hydraulic lime manufacturer.
Protection & curing	• All lime work should be protected against wind, rain and strong sunlight to ensure rapid drying, shrinkage, cracking or damage to the mortar. Rapid loss of water from fresh mortars is the greatest hazard in warm weather. Sunlight and high temperatures encourage water evaporation and drying is accelerated due to wind. • Regular water misting: Contractor must ensure lime mortars are lightly sprayed to keep damp (not wet) for a minimum of 7 days following the application of the mortar. Provisions must be made for dampening down over weekend periods. • Protection: Adequate provisions for protection the mortars must be undertaken. Provide a single hessian or thin cotton sheet approx. 100mm from the surface of the masonry. Hessian sheeting should also be dampened down using a light water spray. An outer plastic sheet may also be required to prevent the hessian or cotton sheet drying out in windy, sunny or exposed locations. A 100mm air flow void should be maintained between the surface of the lime mortars and the sheeting. • Fixings and support: Contractor to allow for providing any temporary support to sheeting and weights to secure sheeting.

- The need for ongoing protection beyond the 7 days will depend upon the environmental conditions. Contractors undertaking the work should be experienced in the use and protection of lime mortars.