

Glyndwr University
School of Creative Arts

Cleaning and Refurbishment of Stonework
Of Portico and Regent Street Elevation

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C

Demolition/ Alteration/ Renovation

C20 Demolition

To be read with Preliminaries/General conditions

" Scope: Before starting deconstruction/ demolition work, examine available information, and carry out a survey of:

- the structure or structures to be deconstructed/ demolished, - the site on which the structure or structures stand, and - the surrounding area.
- " Report and method statements: Submit, describing:
 - Form, condition and details of the structure or structures, the site and the surrounding area.
 - Extent: Existing services duct / pit in the two chapels and motor room.
 - Type, location and condition of adjoining or surrounding premises that might be adversely affected by removal of the structure or structures or by noise, vibration and/ or dust generated during deconstruction/ demolition.
 - Identity and location of services above and below ground, including those required for the Contractor's use, and arrangements for their disconnection and removal.
 - Form and location of flammable, toxic or hazardous materials, including lead-based paint, and proposed methods for their removal and disposal.
 - Form and location of materials identified for reuse or recycling, and proposed methods for removal and temporary storage.
 - Proposed programme of work, including sequence and methods of deconstruction/demolition.
 - Details of specific pre-weakening required.
 - Arrangements for protection of students, staff and the general public, including exclusion of unauthorized persons.
 - Arrangements for control of site transport and traffic. - Special requirements: none.

10 EXTENT OF DECONSTRUCTION/ DEMOLITION

" General: Subject to retention requirements specified elsewhere, deconstruct/ demolish structures down to levels and areas shown on drawings.

20 FEATURES TO BE RETAINED

" General: Features such as sign over main entrance and Coat of Arms from gable of central section, flag pole to be carefully removed kept safe and to be refitted into original locations upon completion of cleaning and renovation of stonework. Any damage to features to be repaired and made good before refitting.

" Security / CCTV camera over portico to be kept in place and protected during the works.

25 LOCATION OF SERVICES

" Check that all services that conflict with proposed works have been removed before start of works

31 SERVICES DISCONNECTION ARRANGED BY EMPLOYER

" Responsibility: The Employer will arrange disconnection of services and removal of fittings and equipment owned by those authorities prior to deconstruction/ demolition.

" Timing: Do not start deconstruction/ demolition until disconnections are completed.

45 SERVICES TO BE RETAINED

" Damage to services: Give notice and notify relevant service authorities and/ or owner/ occupier regarding damage arising from deconstruction/ demolition.

50 WORKMANSHIP

" Standard: Deconstruct structures in accordance with BS 6187.

" Operatives: Appropriately skilled and experienced for the type of work. Holding, or in training to obtain, relevant CITB Certificates of Competence.

" Site staff responsible for supervision and control of work: Experienced in the assessment of risks involved and methods of deconstruction/ demolition to be used. 55 SITE HAZARDS

" Precautions: Prevent fire and/ or explosion caused by gas and/ or vapour from redundant tanks, pipes, etc.

" Dust: Reduce by periodically spraying with an appropriate wetting agent.

" Site operatives and general public: Protect from vibration, dangerous fumes and dust arising during the course of the Works.

60 ADJOINING PROPERTY

" Temporary support and protection: Provide. Maintain and alter, as necessary, as work proceeds. Do not leave unnecessary or unstable projections.

" Defects: Report immediately on discovery.

" Damage: Minimize. Repair promptly to ensure safety, stability, weather protection and security.

" Support to foundations: Do not disturb.

65 STRUCTURES TO BE RETAINED

" Extent: Brickwork and concrete walls around the service perimeter trench duct.

" Parts that are to be kept in place: Protect.

" Interface between retained structures and deconstruction/ demolition: Cut away and strip out with care to minimize making good.

76 ASBESTOS-CONTAINING MATERIALS – UNKNOWN OCCURENCES

" Discovery: Give notice immediately of suspected asbestos-containing materials when discovered during deconstruction/ demolition work. Avoid disturbing such materials. "

Removal: Submit statutory risk assessments and details of proposed methods for safe removal.

78 UNFORESEEN HAZARDS

" Discovery: Give notice immediately when hazards, such as unrecorded voids, tanks, chemicals, are discovered during deconstruction/ demolition. " Removal: Submit details of proposed methods for filling, removal, etc.

85 SITE CONDITION AT COMPLETION

" Debris: Clear away and leave the site tidy on completion.

" Special requirements: Contractor to extract the rubble generated by the deconstruction works via Regent Street. The route is to be constantly monitored and kept clean by the contractor.

90 CONTRACTOR'S PROPERTY

" Components and materials arising from the deconstruction/ demolition work: Property of the Contractor except where otherwise provided.

" Action: Remove from site as work proceeds where not to be reused or recycled for site use.

95 RECYCLED MATERIALS

" Materials arising from deconstruction/ demolition work: Can be recycled or reused elsewhere in the project, subject to compliance with the appropriate specification and in accordance with any site waste management plan.

GENERAL REQUIREMENTS

C40 Cleaning Masonry / Concrete

To be read with Preliminaries / General conditions.

GENERAL/ PREPARATION

110 SCOPE OF WORK

- The cleaning, repair, and refurbishment of Wrexham School of Creative Arts Portico and Regent street Elevation as indicated on drawings:
 - WGU-LAW-0-0-DEL-AR-061003
 - WGU-LAW-0-0-DEL-AR-061004
 - WGU-LAW-0-0-DEL-AR-061004

120A RELATED REPAIR AND REMEDIAL WORKS

- Work to be carried out once scaffold completed but before cleaning work: Close inspection / survey of façade and recording of defects.

142A RELOCATION OF FITTINGS

- Timing: Before commencement of cleaning work.
- Disturbance to surfaces: Minimize.
- Items to be relocated for continuity of security: Security cameras and security detection equipment.

160 PROTECTION

- Surfaces not designated for cleaning: 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: Security equipment left in-situ.

175A CONTROL AND DISPOSAL OF WASH WATER AND DETRITUS

- Disposal: Safely. Obtain approvals from relevant Authority.
- Control of wash water: Collect and divert to prevent ingress and damage to building fabric and adjacent areas including protection to the public and adjacent pavement area.
- Splash boards: Erect resin bonded plywood sheathed in polythene to form horizontal catchments collected in plastic gutter fixed at outer edge above ground floor entrance area.
- Above and below ground drainage systems: Keep free from detritus and maintain normal operation.

180 COLD WEATHER

- Cleaning procedures using water: Do not use when air temperature is at or below 5°C. Protect damp surfaces from frost.
- Chemical cleaning agents: Do not use when surface temperatures are below those recommended by manufacturer.

190 CLEANING GENERALLY

- Operatives: Appropriately trained and experienced for each type of cleaning work. - Evidence of training: Submit on request.
- 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.

215 RECORD OF CLEANING WORKS

- Written report: Record cleaning methods and procedures used for each type of surface and deposit.
 - Content: Relevant attributes of cleaning methods used including:
 - Equipment and settings.
 - Dwell times.
 - Number of applications.
 - Ambient temperatures.
- Additional documentation: N/A.
- Submission: At completion of cleaning works.

230A TRIAL SAMPLES

- Trial sample reference: Superheated water clean
- Surface: Glazed brickwork / rendered areas.
- Location/ Size: Front lightwells below GF level.
- Type of soiling: Heavy atmospheric dirt / soiling and encrusted deposit
- Cleaning methods: Stonehealth DOFF Integra, Tensid TORIK or Thermatech.
- Operational pressure: 50-100 bar, max temp 150 degrees.
- Records: Maintain written records for each trial area, including cleaning methods and conditions, to enable replication of results elsewhere.

PRODUCTS / EQUIPMENT

352A SUPERHEATED WATER / STEAM CLEANING EQUIPMENT

- Surface: Existing carboniferous sandstone rough ashlar and dressed stonework
- Location: Sandstone affected by organic growth, lichen, algae etc. particularly weathering courses.
- Manufacturer Product reference: Stonehealth DOFF Integra, Tensid TORIK or Thermatech.
- Operational pressure: 50-100 bar.
- Nozzles: Wide Fan nozzle.

APPLICATION

412 REMOVAL OF LOOSELY ADHERED DEPOSITS

- Timing: Before commencement of other cleaning methods.
- Surfaces: Prevent damage, including abrasion.

422 BIOCIDES APPLICATION

- Preparation: Cleaning as noted in clause 352A.
- Surfaces: Prevent damage, including abrasion.
- Biocide treatment: Appropriate solutions to kill growths and inhibit further growths.
 - Dead growths: Remove.

472A PRESSURIZED SUPERHEATED WATER CLEANING

- Surfaces: Prevent damage, including abrasion
- Equipment settings (including nozzle type and distance from surface): Adjust regularly to achieve optimum cleaning performance for each surface.

C41 Repairing / Renovating / Conserving masonry

To be read with Preliminaries / General conditions

GENERALLY / PREPARATION

110 SCOPE OF WORK

- Schedule: As Stone repair Plans, Elevations & Portico Works drawings.
- Records of masonry to be repaired: Before starting work, use measurements and photographs as appropriate to record bonding patterns, joint widths, special features, etc.
- 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.

125 REMOVAL OF FITTINGS / FIXTURES

- Items to be removed and reinstated on completion of repair work: All removed, none replaced.
 - Identification: Attach labels or otherwise mark items using durable, non-permanent means, to identify location and describe refixing instructions, where applicable.
 - Treatment following removal: As stone repair drawings.
 - Storage: Protect against damage, and store until required.
Storage location: Submit proposals.
 - Reinstatement: Refit in original locations using original installation methods.
- Items unsuitable or not required for reuse: All fittings.
 - Disposal: Submit proposals.
- Masonry fabric and surfaces: Do not damage during removal and replacement of fittings/ fixtures.

130 REMOVAL OF PLANT GROWTHS FROM MASONRY

- Plants, root systems and associated soil/ debris: Carefully remove from joints, voids and facework.
- Removal of roots: Where growths cannot be removed completely without disturbing masonry seek instructions.
- Unwanted plants close to masonry: Where removal of root system is not possible or desirable, cut through stem as close to the ground as possible. Remove bark from stump and apply herbicide paste. Leave stump to wither.

WORKMANSHIP GENERALLY

160 PROTECTION OF MASONRY UNITS AND MASONRY

- Masonry units: Prevent overstressing during transit, storage, handling and fixing. Store on level bearers clear of the ground, separated with resilient spacers. Protect from adverse weather and keep dry. Prevent soiling, chipping and contamination. Lift units at designed lifting points, where provided.
- 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.

165 STRUCTURAL STABILITY

- General: Maintain stability of masonry. Report defects, including signs of movement that are exposed or become apparent during the removal of masonry units.

- 170 DISTURBANCE TO RETAINED MASONRY
- Retained masonry in the vicinity of repair works: Disturb as little as possible.
 - Existing retained masonry: Do not cut or adjust to accommodate new or reused units.
 - Retained loose masonry units and those vulnerable to movement during repair works: Prop or wedge so as to be firmly and correctly positioned.
- 180 WORKMANSHIP
- Skill and experience of site operatives: Appropriate for types of work on which they are employed.
 - Documentary evidence: Submit on request.
- 185 ADVERSE WEATHER
- General: Do not use frozen materials or lay masonry units on frozen surfaces.
 - Air temperature: Do not bed masonry units or repoint:
 - In cement gauged mortars when ambient air temperature is at or below 3°C and falling or unless it is at least 1°C and rising, unless mortar has a minimum temperature of 4°C when laid and the masonry is adequately protected.
 - 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.
 - Temperature of the work: Maintain above freezing until mortar has fully set.
 - Rain, snow and dew: Protect masonry by covering during precipitation, and at all times when work is not proceeding.
 - Hot conditions and drying winds: Prevent masonry from drying out rapidly.
 - New mortar damaged by frost: Rake out and replace.
- 190 CONTROL SAMPLES
- General: Complete an area of each of the following types of work and arrange for inspection before proceeding with the remainder: Repointing – for each different type of mix/ pointing profile / finish prepare sample areas of approximately one square metre; first stage approval – after preparation; second stage approval – after repointing. .
- 220 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.

- 240 STONE
- Supplier: Contractor.
 - Type: Cefn stone – to be confirmed by petrographic testing.
 - 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: Ashlar to suit location.

245 REPLACEMENT STONE UNITS

- Sizes and profiles: To match existing masonry. Maintain existing joint widths.
- Sinkings for fixings, joggles and lifting devices: Accurately aligned and positioned in relation to existing masonry.
- Marking: Mark each block / dressing clearly and indelibly on a concealed face to indicate the natural bed and position in the finished work.

255 ASHLAR BLOCKS/ DRESSINGS

- Cutting and dressing stone: To true and regular surfaces, free from hollow or rough areas.

258 EXISTING TEMPLATES

- General: Templates for replacement stones are not available for making copy templates.

REPLACEMENTS AND INSERTIONS

330 PREPARATION FOR REPLACEMENT MASONRY

- Defective material: Carefully remove to the extent agreed. 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.

340A 'PLASTIC REPAIR', STONE REPAIR MORTAR.

- Repair mortar based on Natural Hydraulic Lime and aggregates for the repair or simulation of masonry, brick or stone.

For the purpose of this specification, the term 'plastic repair' or 'patch repair' is held to mean:

The application of a wet plastic lime-based repair mortar (such as Lithomex or a similar approved equivalent) to the eroded, damaged face or edges of natural stone masonry. The repair is to return the damaged host stone to its former shape or plane with any former decorative detailing applied to the repair in such a way as to as closely as possible reproduce the host masonry. Plastic repairs are to be closely colour matched the recipient masonry.

Repairs are only to be carried out by experienced and skilled operatives, with great attention to the quality of the finish and regard to the material used.

For surface repairs to be successful the repair mortar is required to have certain characteristics. It should:

- Have characteristics similar to the host masonry.
- Have adequate bond strength.
- Have a good modulus of elasticity.
- Be vapour permeable.
- Be durable.
- Be capable of being dressed with similar tools to the original masonry.
- Remain workable long enough to allow details to be fashioned.
- Match in colour and texture.
- Absorb water sufficiently in wetting and drying periods to match the adjacent masonry.
- They must be reversible.

It should not:

- Become significantly stronger than the surrounding masonry.
- Have a significantly lower rate of Absorption or Adsorption than surrounding units.
- Create a barrier to water diffusion.

For repair mortar to meet these criteria, the materials themselves do not require to match every characteristic of the host masonry.

The final finish of a repair is to be subject to some degree of licence by the operative and it is expected the material can be worked correctly with traditional tools after setting to afford excellent physical matching. In-situ samples and benchmarking will be required to be submitted 'for approval' and comment by the Architect.

Proprietary Lithomex Specification

Material Description:

- 'Lithomex' or equivalent approved material. *Mineral dry bagged masonry restoration repair mortar based on hydraulic binders with special aggregates.*
- Neutral white with site mixed pigment to colour or pre-coloured mortar supplied in 1KG to 25KG bags to which mixing water is added.

General application and uses:

- Lithomex Sandstone restoration mortar for surface repair or replacement of weathered and damaged stone that can be tooled and finished to match the original in both colour and texture.

Material Properties:

- Bulk Density 1.35g / cm³
- Granulometry: from 0.8 to 0.08mm
- Water demand 3.5 - 4.5L per 25kg
- Open time 60mins
- Compressive strength 7.25 N/mm²
- Flexural strength 2.38 N/mm²
- Modulus of Elasticity 7690 MPa
- Capillarity 2.06g/dm². min 1/2
- Vapour permeability 0.75 gxm²xhx mmHg

Mixing and use:

- Mixed manually or mechanically by whisk, adding up to 180ml water per kilogram of Lithomex used. Mix well for 3-5 minutes.
- Do not short mix, short - short mixing requires greater water content and will lead to bleed or shrinkage. Over mixing will weaken the material. If hand mixing mix only small amounts and ensure the materials are properly mixed, usually around 4 - 5 minutes of vigorous mixing.

Substrate preparation:

- Chisel out defective substrates back to a sound base using a toothed chisel.
- Cut edges to straight lines on flat work, ellipses on curved work, mortised with back chamfer to not less than 5mm depth.
- Where straight or ellipse line work is not possible, ensure mortar does not finish to a feather edge.
- All backgrounds must be free of salts, dust, loose or friable materials.
- Clean cavities with mild grit blasting, pressure washing, and / or brushing with a stiff bristle brush.
- Dampen, to control suction by pre-wetting.
- No standing water, remove with a sponge.

Pre-Application:

- The application surface must be clean, free from dust and oils. On porous surfaces, ensure that suction is controlled by pre-wetting and apply Lithomex before this is fully dry. Never apply to surfaces that are over saturated or have standing water.

Application (one or multiple coats):

- Minimum thickness is 5mm (can be dressed or cut back to a feather edge).
- Maximum thickness in 1 pass is 40mm. In cases where a thickness of more than 40mm is required, apply in layers of a maximum of 40mm, each one approximately 24 hours apart.
- Always dampen application areas.
- The mortar should be well pressed back in place. If required re-compact by pressing after a couple of hours to avoid shrinkage marks due to suction from the background. If required, support of the fresh mortar by using wires, anchorages, stainless steel fixings or formers, etc.
- Allow at least 2 hours between each application, work out to gradually thinner layers towards the face, the final coat must be capable of being tooled to an adequate depth to match the existing masonry and should be at least 5mm thick at the shallowest point.
- Ensure the final application is at least 2mm proud of the finished surfaces to allow for tooling - scraping, shaping back.

Protection:

- Proper protection must be maintained throughout the curing process, colour variation will occur if differential hydration takes place. After placing keep work protected from strong sunlight, drying winds, rain and frost until properly cured.

Finish:

- Simulation of stone / brick features, rough finishes, false joints etc. can be made approximately 5 hours from application (in damp cold weather up to 24 hours).
- Shaping and forming and finishing of details normally carried out within 24 hours but can be carried out for up to 1 week after placing by scraping to profile or level with metal tools, such as the edge of a trowel or steel float, tungsten carbide abrasive sheet, sculpting tools, sanding blocks, scratch floats and the like.
- Sculpting, using appropriate tools, requires waiting up to a week or more depending on the weather conditions. This affords sufficient time to achieve the very highest standard of work with the best quality reproduction.
- All repairs should be overfilled and cut back, where a tighter finish, closed down is required, scrape back and close down with a stainless steel float or a dry sponge while still sufficiently green to achieve the desired results.
- Where ashlar masonry or very finely jointed masonry has had considerable damage to the arises, flush finishing in Lithomex with a false struck joint is the ideal solution.

Consumption:

- 7 - 18 kgs per M2 at 10mm thick

Clean up:

- Wash tools with clean water immediately after use

Tests on hardened mortar (water addition at 18.7%)	
Capillarity 2.06 gr.cm ² . root2 min	LOW tested at 28 days
Water permeability 2.5 litres x m ² x day	LOW tested at 28 days
Vapour permeability 0.75gr.m ² .hour.mmHg	VERYHIGH tested at 28 days

	Tensile Strength N/mm ²	Compressive Strength N/mm ²	Elasticity Moduli MPa	Shrinkage mm.m
7 days	2.20	6.20		0.81
28 days	2.38	7.25	7690	0.85

395 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.

POINTING/ REPOINTING

F
Masonry

F21 Natural Stone/ Ashlar Walling / Dressings

To be read with Preliminaries / General conditions.

TYPES OF WALLING / DRESSINGS

110A FINE JOINT MORTARS FOR RE-POINTING AND BEDDING TO ASHLAR AND DRESSED STONE.

- Fine joint bedding and re-pointing mortar, based on Feebly or Moderately Hydraulic lime incorporating fine sands and/or stone dust where necessary, for the bedding of new dressed and ashlar stonework and the re-pointing of weathered ashlar and dressed stone joints.

For the purpose of this specification, the term 'Fine Joint' re-pointing mortar is held to mean:

The renewing of the pointing (the external part of mortar joints) in fine masonry construction, where, over time, weathering and decay has caused voids in the joints (joints between 1-3mm) between masonry units, allowing the undesirable entrance of water into the joint. (Joints over 3-5mm require a mix with a higher sand content).

Re-pointing is only to be carried out by experienced and skilled operatives, with great attention to the quality of the finish and regard to the material used.

The finish achieved on fine mortar joints can have a dramatic effect on the performance and visual appearance of the completed work. This is not immediately realised, sometimes only being condemned after the scaffold has been taken down and the full visual impact becomes apparent.

Fine masonry joints should only be re-pointed if there is evidence of open joints. Joints are usually no more than 1-3mm wide. It is difficult to successfully re-point fine masonry joints without causing unsightly damage.

The final re-pointing mortar structure must have certain characteristics to function satisfactorily. The re-pointing mortar should:

- Be durable and it must give protection against wind, rain and frost.
- Be permeable in itself, both so that the quantity of free water on the face of the building is reduced, thus reducing the possibility of wind-driven water penetration and so that moisture evaporation is not concentrated in the masonry.
- Contain a similar binder, aggregate size, colour and type.
- Bond firmly to the units so that a tight joint is obtained through which rain will find it difficult to penetrate.
- Be workable, so that the material may be applied easily and to ensure that the vertical as well as the horizontal joints can be adequately filled.
- Be resistant to salts. Soluble salts (sulphates, nitrates, chlorides) can be present in walls, they can be in the original mortar, in bricks and stones repair work), in ground water or from air bourn pollutants. It must not contain reactive components such as high levels of aluminium, potassium and sodium oxides and gypsum. Existing salts must be allowed to migrate out of the structure without affecting the soundness of the mortar and, in time, be washed off.

It should not:

- Set and harden so quickly that it becomes inflexible at any stage and cannot accommodate slight movement. There is normally no requirement for significant structural strength in the mortar of traditional masonry buildings, particularly in re-pointing work.
- Contain potentially damaging elements or constituents that can create an impermeable barrier obstructing vapour exchange and retaining moisture.

Pre-Commencement Survey

Before any re-pointing work is undertaken, a survey of the building should be carried out by the Architect and the Contractor to determine the precise areas to be re-pointed from a suitable access scaffold.

Analysis

Analysis is needed to determine correct binder, aggregate size, colour and type.

- Carry out disaggregation analysis of a series of samples of original lime mortar.
- Determine the proportion and grading / granulometry of the insoluble aggregate. This is with reference to the type of mortar used in the original building phase, not subsequent re-pointing,
- The samples to be representative of the bulk of the remaining material.

Adjacent Protection

- Before cutting out of defective mortars, windows, doors, drains, vegetation etc; should be covered and protected. Special care should be given to friable cut masonry and other special features such as antique glass etc.

Cutting Out Defective pointing / mortar

- For fine joints, mechanical tools must not be used and the use of bolsters or quirks for cutting out mortar joints is not permitted. Use of rotary grinders or air chisels is not permitted.
- On finer joints, a tap with a sharp masonry chisel on the top and bottom of the joint will help to break the bond to the masonry at the edge of the joint.
- Reciprocating Fein type tools may be used under strict supervision by experienced personnel.
- Particular attention is to be made to avoiding damage to the arises of masonry units
- When the mortar being removed is decayed or crumbly its removal can be carried out using hand tools. Masonry chisels and old hacksaw blades will easily remove mortar.
- Never use chisels that are wider than the mortar joint.
- Joints to be raked back to minimum depth of 10-20mm to allow a good body of repointing mortar, with masonry faces being free of loose or friable materials and dust free.

Joint Cleaning / Preparation

- Dust that is left in the joints will deplete the bond of the mortar
- Use brushes, low pressure compressed air. Remove all loose materials and dust.
- Joints should be well washed and flushed to remove any dust and loose friable material making sure that the entire elevation is cleaned down to prevent staining on the walls. Original backing mortar should be kept damp.
- Where there are deep joints or voids, care must be taken not to flood the core of the wall.
- Joints must remain damp enough to control suction during application and initial curing.

Application of Pointing Mortar

- Ensure the joint is well damped down.
- New mortar should be plastic and workable, but as stiff as possible (Certainly not sloppy, as this will result in shrinkage and leave a smudged and dirty finish).
- Fine joints should be filled with a small flat spatula or the square end of a trowel and square and allow the mortar to be firmly pressed into the joint.
- Deep or open joints particularly at cornices and projections may be impossible to fully and adequately fill. In these instances, consideration to the Clay Cup method should be given.

- Vertical joints almost always require greater amounts of filling than the bed joints, due to lack of compaction and filling when building.
- In-situ pointing samples required for comment and approval by the Architect. It is essential that all pointing is carried out to match previously approved samples.

Application New Stone (including indents)

New Sawn six-sided blocks (Joints not exceeding 3mm.)

- Butter beds and perpendicular ends a full bed of mortar, firmly pressed into place to slightly more than the desired bed thickness, lay next block in place to line and level by tapping firmly and repeatedly such that a slight excess of mortar is squeezed out when the correct joint size is achieved.(this indicates full face contact with the units) Leave excess in place for several hours.
Laying single faced masonry units. (Traditionally hewn ashlar masonry dressed only on the face)
- Lay a ribbon of ashlar mortar (approximately 25mm in width on the leading edge of the ashlar faced unit and a bed or normal coarse stuff to bed the irregular meeting faces. Tap down the stone to line and level and correct joint size, excess ashlar mortar will squeeze out. Leave excess in place for several hours or longer before trimming back.

Finishing

- Joints should generally be filled to flush, never recessed. Recessed joints will leave ledges for the accumulation of water that will keep the mortar joint wet for longer periods and accelerate the decay process.
- Where the arises of the stone have become rounded or damaged from previous repairs the weathered edge or a very slightly recessed joint produces a visually more acceptable finish.
- Ensure good compaction and adhesion within the joint, by pressing firmly back with the edge of a blade.
- Excess mortar can be left over the taped edges until the mortar stiffens sufficiently for it to be struck to flush when the tape is removed, usually within 24 hours.

Protection of New Pointing

- Work should be covered with hessian sheet, polythene or both. Polythene should never come in contact with the work.
- Accurate records of the minimum and maximum temperatures below the covers should be taken daily, with provision to record these over weekends and holiday breaks.
- To avoid rapid drying and consequent high shrinkage, especially in hot or windy weather conditions keep all work damp by repeatedly applying a fine mist of clean potable water, if necessary several times a day, until the mortar has hardened.
- New pointing work should be protected from frost, rapid drying and direct rain for a minimum period of 7 days.

Mixing Hydraulic Ashlar Mortars

- To be supplied as a premixed dry powder mortar for mixing on site with the minimum amount of clean potable water to produce a stiff putty to which a small amount of linseed oil may be added if required
- Course / sharp sands used for the pointing and bedding RFW are not suitable. -
If the mortar needs to include fine sand or stone dust as an aggregate for slightly wider joints or for matching to the original pointing mortar and colour, the particle size should be no larger than one third of the minimum joint width.

- Ensure all components are fully combined to make the material into a dough like consistency,
- If required a good double handful size lump of the mortar add a tablespoon of boiled linseed oil and knead into the mix until it leaves the hands clean and is fully plastic. (Disposable or rubber gloves are usually worn for this process).
- Feebly hydraulic mortars NHL 2 should be used within 24 hours. Moderately hydraulic mortars NHL 3.5 should be used within 4-6 hours. Keep all mixed hydraulic mortars covered in sealed containers once mixed.
- Moderately hydraulic lime mortars will require re-working.

Joint Type	Joint Size	As Pre-Mixed Mortar	Lime	Sand	Ratio Lime:Sand
Fine Ashlar	1-3mm	Ashlar Mix	NHL2 NHL3.5	Stone Dust	2 : 1
Fine Joint	3-6mm	Fine Joint	NHL2 NHL3.5	0.8mm to 0.075mm	2 : 1 / 1 : 1

110B WIDE JOINT MORTARS FOR RE-POINTING AND BEDDING/BACKINGS (COURSE STUFF) TO ROCK-FACED WALLING.

- General bedding and re-pointing mortar based on Natural Hydraulic Lime and aggregates for the bedding of new stonework and re-pointing of weathered joints to random block coursed 'rock-faced walling' (RFW).

For the purpose of this specification, the term 'Wide Joint' re-pointing mortar is held to mean:

The renewing of the pointing (the external part of mortar joints) in masonry construction, where, over time, weathering and decay has caused voids in the joints between masonry units, allowing the undesirable entrance of water into the joint.

Re-pointing is only to be carried out by experienced and skilled operatives, with great attention to the quality of the finish and regard to the material used.

The finish achieved on mortar joints can have a dramatic effect on the performance and visual appearance of the completed work. This is not immediately realised, sometimes only being condemned after the scaffold has been taken down and the full visual impact becomes apparent.

The final re-pointing mortar structure must have certain characteristics to function satisfactorily.

The re-pointing mortar should:

- Be durable and it must give protection against wind, rain and frost.
- Be permeable in itself, both so that the quantity of free water on the face of the building is reduced, thus reducing the possibility of wind-driven water penetration and so that moisture evaporation is not concentrated in the masonry.
- Contain a similar binder, aggregate size, colour and type.
- Bond firmly to the units so that a tight joint is obtained through which rain will find it difficult to penetrate.
- Be workable, so that the material may be applied easily and to ensure that the vertical as well as the horizontal joints can be adequately filled.
- Be resistant to salts. Soluble salts (sulphates, nitrates, chlorides) can be present in walls, they can be in the original mortar, in bricks and stones repair work), in ground water or from air bourn pollutants. It must not contain reactive components such as high levels of aluminium, potassium and sodium oxides and gypsum. Existing salts must be allowed to migrate out of the structure without affecting the soundness of the mortar and, in time, be washed off.

It should not:

- Set and harden so quickly that it becomes inflexible at any stage and cannot accommodate slight movement. There is normally no requirement for significant structural strength in the mortar of traditional masonry buildings, particularly in re-pointing work.
- Contain potentially damaging elements or constituents that can create an impermeable barrier obstructing vapour exchange and retaining moisture.

Pre Commencement Survey

Before any re-pointing work is undertaken, a survey of the building should be carried out by the Architect and the Contractor to determine the precise areas to be re-pointed from a suitable access scaffold.

Analysis

Analysis is needed to determine correct binder, aggregate size, colour and type.

- Carry out disaggregation analysis of a series of samples of original lime mortar.
- Determine the proportion and grading/ granulometry of the insoluble aggregate. This is with reference to the type of mortar used in the original building phase, not subsequent re-pointing,
- The samples to be representative of the bulk of the remaining material.

Adjacent Protection

- Before cutting out of defective mortars, windows, doors, drains, vegetation etc; should be covered and protected. Special care should be given to friable cut masonry and other special features such as antique glass etc.

Cutting Out Inappropriate and Defective pointing / mortar

- Mechanical tools should not be used on historic masonry except in very experienced hands and the use of bolsters or quirks for cutting out mortar joints should be avoided.
- Fine carving chisels or specially made tools should be used to remove hard dense over pointing.
- When the mortar being removed is decayed or crumbly its removal can be carried out using hand tools. Plugging chisels, masonry chisels and old hacksaw blades used in conjunction with a club hammer will easily remove mortar.
- Use of rotary grinders or air chisels is not permitted. Reciprocating Fein type tools may be used under strict supervision by experienced personnel.
- Never use chisels that are wider than the mortar joint.
- For wide joints a series of holes may be drilled through the centre of the joint, which will allow the joint to break inward when tapped with a chisel.
- Joints to be raked back to minimum depth of 25mm to allow a good body of repointing mortar, thoroughly cleaned, including the top and bottom faces of the beds. - For rubble masonry do not create overly deep joints, which may de-stabilise sections of masonry.
- Deep joints must be built up in consecutive layers with a minimum 4 days between layers.
- Pinning stones should not be removed if possible. Notes should be taken if pinnings are removed in the cutting out process and these should be retained for re-use.
- The walls should be well washed to remove any dust and loose friable material making sure that the entire elevation is cleaned down to prevent staining on the walls. original backing mortar should be kept damp.

Joint Cleaning / Preparation

- Dust that is left in the joints will deplete the bond of the mortar
- Joints should be thoroughly cleaned from top to bottom after pre-wetting the wall.
- Use brushes, low pressure compressed air or wash out the joints with a hose.

Remove all loose materials and dust.

- Where there are deep joints or voids, care must be taken not to flood the core of the wall.

Application of Mortar

- Ensure the joint is well damped down.
- New mortar should be plastic and workable, but as stiff as possible (Certainly not sloppy, as this will result in shrinkage and leave a smudged and dirty finish).
- The mortar should be pushed into the back of the joints in layers, avoiding large volumes of deep filling at all times.
- Apply using a pointing iron or a plasterer's small tools

- A "well filled" joint is close to flush with the surrounding masonry or to the weathered edge. Recessed joints define the masonry components and detract from the appearance of the wall. Historically the common practice was to fully flush point and line out rubblework.
- Deep joints should be done in layers of 20 - 25mm, allowing the preceding layer to take up before applying the next.
- In-situ pointing samples required for comment and approval by the Architect. It is essential that all pointing is carried out to match previously approved samples.

Finishing

- Ensure good compaction and adhesion within the joint, by tamping firmly back with a stiff bristle or churn brush as it starts to firm up, avoiding fines being drawn to the surface to leave an open texture, which will aid evaporation of moisture.
- Once firm (usually the next day) lightly scrape the surface to expose aggregate can improve the appearance of the mortar and make the joints less visible.
- Joints should be filled to flush, never recessed. Recessed joints will leave ledges for the accumulation of water that will keep the mortar joint wet for longer periods and accelerate the decay process.

Protection of New Pointing

- Work should be covered with hessian sheet, polythene or both. Polythene should never come in contact with the work.
- Accurate records of the minimum and maximum temperatures below the covers should be taken daily, with provision to record these over weekends and holiday breaks. -
To avoid rapid drying and consequent high shrinkage, especially in hot or windy weather conditions keep all work damp by repeatedly applying a fine mist of clean potable water, if necessary several times a day, until the mortar has hardened.
- New pointing work should be protected from frost, rapid drying and direct rain for a minimum period of 7 days.

Sands for Wide Joint Lime Mortars

Choosing the correct well-graded sand when making lime mortars is of extreme importance. The type of sand and constituent particle sizes are to be confirmed once disaggregation analysis is completed. Monogranular sands (particle size mainly between 1 or 2 grades) will not allow good vapour exchange and will also diminish workability of lime mortars. A typical well graded sand may be represented as follows:

General Building	
Maximum particle size approximately 1/3 of the height of the joint	
Depending on the size of the joint, sands from 6mm down to 0.075 can be used, with a proportion from 0.150 to 0.075 about 20% of the mass.	
Example (% retained):	
5mm	2
3.35mm	3
2.36mm	6
1.18mm	15
0.600mm	23
0.300mm	32
0.150mm	15
0.075mm	4

Sands for use in lime mortars should be clean and uncontaminated by clay/silt. These occur in the range from 0.04mm and below and the most effective method to establish their presence is the wet sieve analysis. (Normal dry sieve analysis does not accurately reveal the presence of clay or silt as they do not examine particles passing 0.075 sieve). The fines in a sand will demand more water due to much higher surface area to be wetted. Avoid too high a proportion of fines in the sand and consequent high water content in the mortar. Sands are mostly responsible for the void structure of lime mortars and, therefore, for its vapour permeability, so vital for the performance against accumulation of condensation. It is for this reason that well graded sands are recommended. If sharp, the void structure will be even more efficient.

The Lime : Sand mix ratios (by volume) recommended are noted in the table below.

General areas

1 VOLUME of NHL2: : 2 VOLUME of SAND

Exposed Areas Ranging from:

1 VOLUME OF NHL 3.5 : 2.5 VOLUMES OF SAND

to:

1 VOLUME OF NHL 5 : 3 VOLUMES OF SAND

Joint Type	Joint Size	As Pre-Mixed Mortar	Lime	Sand	Ratio Lime:Sand
Wide Joint + Exposed	5-10mm	EcoMortar type C NHL2 TF or NHL3.5 TF	NHL2 NHL3.5	1-2mm to 0.075mm	1 : 2 1 : 2.5
Wide Joint + Exposed	10-20mm	EcoMortar type C NHL3.5M	NHL2 NHL3.5	3-5mm to 0.075mm	1 : 2 1 : 2.5
V Wide Joint + Exposed	20-25mm	EocMortar type C NHL3.5M	NHL2 NHL3.5 NHL5	3-5mm to 0.075mm	1 : 2 1 : 2.5 1 : 2.5 or 3

GENERAL PRODUCTION

240 STONE SAMPLES

- Submit: Labelled samples of dressed stone or arrange for samples which represent the range of variation in appearance to be inspected. - Timing: Before placing orders.

250 CUTTING AND DRESSING OF STONE

- Timing: After seasoning but before delivery to site.
- Accuracy:
 - Exposed and joint surfaces: Square, true planes free from hollow or rough areas. -
 - Dimensions: Maintain specified joint widths.
- Orientation for natural bed of stones: Appropriate to properties of stones and positions in walling/ dressings.

260 IDENTIFICATION OF STONE UNITS

- Marking: Clearly and indelibly on concealed faces to indicate the natural bed and position in the finished work.

270 INSPECTION OF STONE UNITS

- Give notice: Before despatch to site, at appropriate stages of production.

LAYING AND JOINTING

315 ADVERSE WEATHER

- General: Do not use frozen materials or lay on frozen surfaces.
- Air temperature: Do not lay stones:
 - In cement gauged mortars: At or below 3°C and falling or below 1°C and rising.
 - In hydraulic lime:sand mortars: At or below 5°C and falling or below 3°C and rising.
- Temperature of walling during curing: Above freezing until mortar hardened.
- Newly erected walling: Protect at all times from: - Rain and snow.
 - Drying out too rapidly in hot conditions and in drying winds.

325 LAYING GENERALLY

- Stone selection: Do not use units with damaged faces or arrises.
- Accuracy:
 - Courses: Level and true to line.
 - Faces, angles and features: Plumb.
 - Setting out: Achieve satisfactory junctions and joints with adjoining or built-in elements and components.
- Absorbent stones: Dampen in warm weather to reduce suction. Do not soak.
- Mortar joints:
 - Laying: Full bed of mortar with all joints and voids filled.
 - Temporary distance pieces: Lead or stainless steel. Remove when mortar is sufficiently strong.
 - Appearance: Neat and consistent.
- Cleanliness: Keep facework clean. Rubbing and other abrasive or chemical cleaning methods to remove marks and stains not permitted.

340 PUTLOG SCAFFOLDING

- Use: Not permitted.

H
Cladding / Covering

H71 Lead Sheet Coverings / Flashings

To be read with Preliminaries / General conditions.

TYPES OF LEADWORK

230A BOX GUTTER LINING TO MAIN ROOF AND PARAPET ABUTMENT – (POVISIONAL SUM)

- Underlay: existing substrate.
- Type of lead: Rolled to BS EN 12588.
 - Thickness: 2.00 or 2.24 mm (Code 5).
- Pre-treatment: Apply thin coating of patination oil to underside of lead and allow to dry before laying.
- Laying: Over and beyond tilting fillets.
- Lengths: Not more than 2000 mm.
 - Cross joints: Lapped not less than 175 mm.
- Fixing: Welt edges. Nail top edge of each sheet. Dress bottom end neatly into eaves gutter.

440 SOAKERS AND FLASHINGS AT PARAPET AND ROOF FINISH ABUTMENT

- Lead soakers:
 - Thickness: 2.00-2.50 mm (Code 5).
 - Dimensions:
 - Length: Slate / tile gauge + lap + 25 mm.
 - Upstand: Not less than 75 mm.
 - Underlay: Not less than 100 mm. -
- Fixing: By roofer.
- Lead step flashings:
 - Thickness: 2.00 or 2.24 mm (Code 5).
 - Dimensions:
 - Lengths: Not more than 1500 mm.
 - End to end joints: Laps of not less than 100 mm.
 - Cover: Overlap to soaker upstands of not less than 65 mm.
 - Fixing: Lead wedges at every course.

GENERAL REQUIREMENTS / PREPARATORY WORK

510 WORKMANSHIP GENERALLY

- Standard: To BS 6915 and latest edition of 'Rolled lead sheet. The complete manual' published by the Lead Sheet Association.
- Fabrication and fixing: To provide a secure, free draining and completely weathertight installation.
- Operatives: Trained in the application of lead coverings/ flashings. Submit records of experience on request.
- Preforming: Measure, mark, cut and form lead prior to assembly wherever possible.
- Marking out: With pencil, chalk or crayon. Do not use scribes or other sharp instruments without approval.
- Bossing and forming: Straight and regular bends, leaving sheets free from ripples, kinks, buckling and cracks.
- Solder: Use only where specified.
- Sharp metal edges: Fold under or remove as work proceeds.
- Finished work: Fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.
 - Protection: Prevent staining, discolouration and damage by subsequent works.

516 LEAD WELDING

- In situ lead welding: Is permitted, subject to completion of a 'hot work permit' form and compliance with its requirements.

520 LEAD SHEET

- Production method:
 - Rolled, to BS EN 12588, or
 - Machine cast and BBA certified, or
 - Sand cast, from lead free from bitumen, solder, other impurities, inclusions, laminations, cracks, air, pinholes and blowholes; to code thicknesses but with a tolerance (by weight) of $\pm 10\%$.
- Identification: Labelled to show thickness/ code, weight and type.

570 EXISTING METAL RETAINED

- Type / Location / Extent: as Contractor recommendations.
- Cleaning: Remove dirt without damage to metal or adversely affecting other material.

610 SUITABILITY OF SUBSTRATES

- Condition: Dry and free of dust, debris, grease and other deleterious matters

620 PREPARATION OF EXISTING TIMBER SUBSTRATES

- Remedial work: Adjust boards to level and securely fix. Punch in protruding fasteners and plane or sand to achieve an even surface.
- Defective boards: Give notice.
- Moisture content: Not more than 22% at time of covering. Give notice if greater than 16%.

FIXING LEAD

710 FIXINGS

- Nails to timber substrates: Copper clout nails to BS 1202-2, or stainless steel (austenitic) clout nails to BS 1202-1.
 - Shank type: Annular ringed, helical threaded or serrated.
 - Shank diameter: Not less than 2.65 mm for light duty or 3.35 mm for heavy duty. - Length: Not less than 20 mm or equal to substrate thickness.
- Screws to concrete or masonry substrates: Brass or stainless steel to BS 1210, tables 3 or 4.
 - Diameter: Not less than 3.35 mm.
 - Length: Not less than 19 mm.
 - Washers and plastic plugs: Compatible with screws and lead.
- Screws to composite metal decks: Self tapping as recommended by the deck and lead manufacturer/ supplier for clips.

JOINTING LEAD

810 FORMING DETAILS

- Method: Bossing or lead welding except where bossing is specifically required.
- Lead welded seams: Neatly and consistently formed.
 - Seams: Do not undercut or reduce sheet thickness.
 - Filler strips: Of the same composition as the sheets being joined.
 - Butt joints: Formed to a thickness one third more than the sheets being joined.
 - Lap joints: Formed with 25 mm laps and two loadings to the edge of the overlap.
- Bossing: Carried out without thinning, cutting or otherwise splitting the lead sheet. - Details where bossing must be used: Not applicable.

970 PATINATION OIL

- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Location: to external face of all new leadwork.
- Application: As soon as practical, apply a smear coating to lead, evenly in one direction and in dry conditions.

J

Waterproofing

J31 Liquid Applied Water Proof Roof Coatings

To be read with Preliminaries / General conditions.

TYPES OF COATING

110 COLD DECK ROOF COATING

- Substrate: Existing Bituminous Felt waterproofing to Portico Stone Roof.
 - Preparation:
 - Ensure that bituminous felt is firmly adhered or mechanically fixed to the substrate and should not contain any baldly degraded areas.
 - Thoroughly clean by power wash and allow to dry.
 - Treat blisters by star cutting and removing any underlying water, allow to dry and re-adhere to substrate.
 - Badly degraded areas to be replaced.
 - Stonework - Stonework and mortar joints must be sound and preferably flush pointed.
 - Stonework – thoroughly clean using power wash and allow to dry. Use Biowash on surfaces where there is risk of algal re-growth.
 - Metals must be in sound condition.
- Water Proof Coating: Liquid applied Polyurethane
 - System manufacturer: Sika
 - Sika Liquid Plastics
 - Sika House
 - Miller Street
 - Preston
 - PR1 1EZ
 - Enquiries - 01772 259781
 - e-mail: liquidplastics@uk.sika.com
 - Primer reference: N/A
 - Coating reference: Decothane Ultra 25
 - Application: Roller
 - Reinforcement: Reemat Glass Fibre Matting
 - Minimum dry film thickness: 2.2mm
 - Colour: Decothane Ultra Slate Grey (RAL 7015)
- Surface protection: N/A
- Accessories: S-Leafquard basket with fixings wings.

353 WATERPROOF COATING

- Type: Liquid applied Polyurethane Water Proof Coating
- Manufacturer: Sika
 - Decothane Ultra 25
- Primer:
 - None – existing bituminous felt substrate primer not required
 - Metals – Liquid Plastics Metal Primer
- Application: Roller
- Reinforcement: Reemat Glass Fibre Matting
- Colour: Decothane Ultra Slate Grey (RAL 7015)
- Minimum dry film thickness: 2.2mm
- Surface protection

EXECUTION GENERALLY

410 ADVERSE WEATHER

- Do not apply coatings.
 - In wet conditions or at temperatures below 5°C, unless otherwise permitted by coating manufacturer.
 - In high winds (speeds > 7 m/s). Unless adequate temporary wind breaks are erected adjacent to working area.
- Unfinished areas of roof: Keep dry.

410 SUITABILITY OF SUBSTRATE

- Substrates generally:
 - Secure, clean, dry, smooth, free from frost, contaminants, loose material, voids, protrusions and organic growths.
 - Compatible with coating system.
 - Formation of upstand, kerbs, box gutters, sumps, grooves, chases and expansion joints.
 - Fixing of battens, fillets and anchoring plugs / strips.
- Moisture content and stability: Must not impair integrity of roof.

EXISTING SUBSTRATES

515 EXISTING FLASHINGS

- General: Raise to facilitate cleaning of surfaces to receive coatings.
- Timing: Leave raised during coating application and lower only after full curing.
- Damaged lengths: Replace with new, specified in section H71/440

520 PRELIMINARY POWER WASH TO EXISTING COVERINGS

- Timing: Before renewing existing coverings, water jet clean all areas. Allow to dry.

535 MAKING GOOD EXISTING REINFORCED BITUMEN MEMBRANE COVERING

- Blisters: Star cut, dry out and re-bond.
- Cracked and defective areas; Cutback to substrate.
- Substrate: Dry out.
- Bitumen membrane: Patch level with existing surface with layers of matching bitumen membrane lapped minimum 100mm onto existing membrane.

565 EXISTING GUTTERS / OUTLETS

- Dirt, debris and build up of previous coverings / coatings. Remove to restore free flow of water.

570 EXISTING CRACKS / GAPS

- General: Rake out, clean and make good with sealants or repair systems recommended by coating manufacturer.

575 FINAL POWER WASH TO EXISTING COVERINGS

- General: Water jet clean all areas. Allow to dry.

580 STERILIZATION TREATMENT TO EXISTING COVERINGS

- Preliminary work: Complete including making good and cleaning down.
- Biocidal solution: Apply to all areas previously subject to organic growth. Allow to dry.

ROOF COATING SYSTEM

760 APPLICATION OF ROOF COATINGS

- Thickness: monitor by taking wet / dry film thickness readings.
- Continuity: Maintain full thickness of coatings around angles, junctions and features.
- Rainwater outlets: Form with watertight joints.
- Drainage systems: Do not allow liquid coatings to enter piped rainwater or foul systems.
- Edge trims: Apply coatings over horizontal leg of trim and into recess.

770 SKIRTINGS AND UPSTANDS

- Top edges of coatings: Where not protected by flashings, apply into chases cut to a minimum depth of 10mm.
- Completion of chases: When coatings are fully cured, prepare chase and apply sealant as section Z22.
 - Sealant: SikaHyflex-250 Façade
 - Colour: Grey

COMPLETION

910 INSPECTION

- Coating surfaces: Check when cured for discontinuities.
 - Defective areas: Apply another coating.

940 COMPLETION

- Roof areas: Clean.
 - Outlets: Clear.
 - Flashings: Dressed into place
- Work necessary to provide a weathertight finish: Complete.
- Storage of materials on finished surface: Not permitted
- Completed coatings: Protect against damage.

M

Surface finishes

M60 Painting / Clear Finishing

To be read with Preliminaries/General conditions.

COATING SYSTEMS

130B ALKYD BASED GLOSS PAINT

- Manufacturer: Johnstone's Trade - a brand of PPG Industries.
 - Web: www.johnstonestrade.com.
 - Email: specifiers.acuk@ppg.com.
 - Product reference: Johnstone's Trade Professional Gloss (Trade Professional)
- Colour: Crushed Pine 1.
Primer: 1No. Zinc Phosphate Primer
Final: 1No. Top Coat

GENERALLY

215 HANDLING AND STORAGE

- Coating materials: Deliver in sealed containers, labelled clearly with brand name, type of material and manufacturer's batch number.
- Materials from more than one batch: Store separately. Allocate to distinct parts or areas of the work.

220 COMPATIBILITY

- Coating materials selected by contractor:
 - Recommended by their manufacturers for the particular surface and conditions of exposure.
 - Compatible with each other.
 - Compatible with and not inhibiting performance of preservative/fire retardant pre-treatments.

280 PROTECTION

- 'Wet paint' signs and barriers: Provide where necessary to protect other operatives and general public, and to prevent damage to freshly applied coatings.

PREPARATION

400 PREPARATION GENERALLY

- Standard: In accordance with BS 6150.
- Suspected existing hazardous materials: Prepare risk assessments and method statements covering operations, disposal of waste, containment and reoccupation, and obtain approval before commencing work.
- Preparation materials: Types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.
- Substrates: Sufficiently dry in depth to suit coating.
- Efflorescence salts: Remove.
- Dirt, grease and oil: Remove. Give notice if contamination of surfaces/ substrates has occurred.
- Surface irregularities: Remove.
- Joints, cracks, holes and other depressions: Fill flush with surface, to provide smooth finish.
- Dust, particles and residues from preparation: Remove and dispose of safely.
- Water based stoppers and fillers:
 - Apply before priming unless recommended otherwise by manufacturer.
 - If applied after priming: Patch prime.
- Oil based stoppers and fillers: Apply after priming.
- Doors, opening windows and other moving parts:
 - Ease, if necessary, before coating.
 - Prime resulting bare areas.

- 420 FIXTURES AND FITTINGS
- Removal: Before commencing work remove: Cover plates, grilles, wall clocks, and other surface mounted fixtures.
 - Replacement: Refurbish as necessary, refit when coating is dry.
- 430 EXISTING IRONMONGERY
- Refurbishment: Remove old coating marks. Clean and polish.
- 440 PREVIOUSLY COATED SURFACES GENERALLY
- Preparation: In accordance with BS 6150, clause 11.5.
 - Contaminated or hazardous surfaces: Give notice of:
 - Coatings suspected of containing lead.
 - Substrates suspected of containing asbestos or other hazardous materials.
 - Significant rot, corrosion or other degradation of substrates.
 - Suspected existing hazardous materials: Prepare risk assessments and method statements covering operations, disposal of waste, containment and reoccupation, and obtain approval before commencing work.
 - Removing coatings: Do not damage substrate and adjacent surfaces or adversely affect subsequent coatings.
 - Loose, flaking or otherwise defective areas: Carefully remove to a firm edge.
 - Alkali affected coatings: Completely remove.
 - Retained coatings:
 - Thoroughly clean to remove dirt, grease and contaminants. - Gloss coated surfaces: Provide key.
 - Partly removed coatings:
 - Additional preparatory coats: Apply to restore original coating thicknesses. - Junctions: Provide flush surface.
 - Completely stripped surfaces: Prepare as for uncoated surfaces.
- 651 EXISTING GUTTERS
- Dirt and debris: Remove from inside of gutters.
 - Defective joints: Clean and seal with suitable jointing material.

APPLICATION

711 COATING GENERALLY

- Application standard: In accordance with BS 6150, clause 9.
- Conditions: Maintain suitable temperature, humidity and air quality during application and drying.
- Surfaces: Clean and dry at time of application.
- Thinning and intermixing of coatings: Not permitted unless recommended by manufacturer.
- Overpainting: Do not paint over intumescent strips or silicone mastics.
- Priming coats:
 - Thickness: To suit surface porosity.
 - Application: As soon as possible on same day as preparation is completed.
- Finish:
 - Even, smooth and of uniform colour.
 - Free from brush marks, sags, runs and other defects. - Cut in neatly.
- Doors, opening windows and other moving parts: Ease before coating and between coats.

720 PRIMING JOINERY

- Preservative treated timber: Retreat cut surfaces with two flood coats of a suitable preservative before priming.
- End grain: Coat liberally allow to soak in and recoat.

N

Furniture / Equipment

N16 Bird and vermin control systems

To be read with Preliminaries/ General conditions.

GENERAL

110 BIRD CONTROL TO BUILDING FAÇADE

- Species: Feral pigeon.
- System manufacturer: Submit design proposals.
- Detection: None.
- Prevention: Net barriers.
- Other requirements: None.

SYSTEM PERFORMANCE

210 GENERAL REQUIREMENTS

- Standard: In accordance with BPCA members' information manual.
 - Documentation. Submit certification of training and experience for operatives.
- Survey: Identify nature, source and extent of infestation and/ or damage.
- Report content:
 - List pest species detected.
 - Factors affecting execution of the work: Identify problematic site conditions and restrictions, including the presence of protected species.
 - Associated work: Identify nature of repair and/ or replacement work required to building fabric in order to avoid re-infestation. - Other contaminants: Notify.
- Control measures: Submit proposals for:
 - Detection: Not required.
 - Prevention measures.
 - Elimination and disposal.
- Proposals: Include:
 - Drawings, schedules, technical information, calculations and manufacturers' literature.
 - Method statements.
 - Maintenance procedures and logbook.
- Mesh, nets, roost inhibitors, traps and guards: Capable of resisting temporary and permanent loads.

PRODUCTS

330 NET BARRIERS GENERALLY

- Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
- Duty: Heavy.
- Material: Polypropylene. - Gauge: 2 mm dia.
- Mesh size: 50 x 50 mm.
- Colour: Black.
- Straining wire: 2 mm dia. stainless steel.

FABRICATION

505 FABRICATION GENERALLY

- Design: Complete detailed design of items specified in this sub-section and obtain approval prior to commencing fabrication.
- Shop drawings: Submit.
- Structural calculations: Submit.
- Frameworks: Assemble and brace, including temporary members required for installation.
- Contact between dissimilar metals: Avoid.
- Temporary support: Do not subject members to non-design loadings.

EXECUTION

610 WORKMANSHIP GENERALLY

- Preparation:
 - Water supplies: Do not contaminate.
 - Existing building services and components: Protect and leave undamaged.
- Timing: Coordinate with other related trades.
- Damaged building components: Obtain instructions.
- Contaminants: Remove and leave affected area clean.
- Coatings:
 - Suitability of substrates: Sufficiently dry and sound, to suit coatings.
 - Preparation and application: As section M60, and in accordance with BS 6150.
- Fasteners and adhesives: As section Z20.
 - Material: Compatible with building components and substrate.
 - Metals: Isolate dissimilar metals to avoid electrolytic corrosion.
- Thermal and building movement: Allow for, where appropriate. - Movement joints: Do not bridge.
- Roost inhibitors, nets and mesh screens: Correctly fitted and tensioned.

620 DECONTAMINATION

- Bird droppings and other detritus: Remove.
 - Vermin contamination: Disinfect affected areas by fumigation.
- Supplementary treatments: Prevent re-infestation during defects liability period.

COMPLETION

940 DOCUMENTATION

- General: Submit:
 - Manufacturer's maintenance instructions.
 - Recommendations for measures to prevent re-infestation.
 - General product information.
 - Installation information.
 - Guarantees, warranties, test certificates, record schedules and log books.
- Number of copies: two.
- Submission: 2 weeks prior to date when principal contractor expects work to be practically complete.

R

Disposal systems

R10 Rainwater Drainage Systems

To be read with Preliminaries / General conditions.

SYSTEM PERFORMANCE

210 DESIGN

- Design: Complete the design of the rainwater drainage system.
- Standard: To BS EN 12056-3, clauses 3-7 and National Annexes.
- Proposals: Submit drawings, technical information, calculations and manufacturers' literature.

221 COLLECTION AND DISTRIBUTION OF RAINWATER

- General: Complete, and without leakage or noise nuisance.

PRODUCTS

380A HERITAGE CAST IRON PIPEWORK

- Pipes, fittings and accessories: To BS 460
Manufacturer: Alumasc Exterior Building Products Ltd, White House Works, Bold Road, Sutton St Helens, Merseyside WA9 4JG, or similar approved.
Tel: 01744 648400, Fax: 01744 648401.
Email: info@alumasc-exteriors.co.uk
Reference: Heritage cast iron rainwater system
Accessories: Bends, Branches, Access Pipes, Swan Necks, Plinth Offsets, Shoes, Rainwater Head
Size: 100 x 75 mm (or 125 x 100 mm if flow rates require)
Finish: Painted Finish
Colour: Black (Pre-painted)
Fixing: Fixed to the wall at approximately 1.83m centres through the ears integral to the pipe or via separate Galvanised steel holderbats. It is recommended that the fixings be round or dome head galvanised plugged screws with washers.

385A HERITAGE CAST IRON HOPPERS

- Pipes, fittings and accessories: To BS 460
Manufacturer: Alumasc Exterior Building Products Ltd, White House Works, Bold Road, Sutton St Helens, Merseyside WA9 4JG, or similar approved.
Tel: 01744 648400, Fax: 01744 648401.
Email: info@alumasc-exteriors.co.uk
Reference: Heritage cast iron rainwater system
Accessories: Bends, Branches, Access Pipes, Swan Necks, Plinth Offsets, Shoes, Rainwater Head
Size: 100 x 75 mm (or 125 x 100 mm if flow rates require)
Finish: Painted Finish
Colour: Black (Pre-Painted)
Fixing: Fixed to the wall through the ears integral plates to the hopper
It is recommended that the fixings be round or dome head galvanised plugged screws with washers.

EXECUTION

600A PREPARATION

- - Below ground drainage is ready to receive rainwater or that the discharge can be dispersed by approved means to prevent damage or disfigurement of the building fabric.
- - Any specified painting of surfaces which will be concealed or inaccessible is completed

605A INSTALLATION GENERALLY

- Install pipework/gutters to ensure the complete discharge of rainwater from the building without leaking.

Obtain all components for each type of pipework/guttering from the same manufacturer unless specified otherwise.

Provide access fittings and rodding eyes as necessary in convenient locations to permit adequate cleaning and testing of pipework.

Avoid contact between dissimilar metals and other materials which would result in electrolytic corrosion.

Do not bend plastics or galvanized steel pipes.

Adequately protect pipework/gutters from damage and distortion during construction. Fit purpose made temporary caps to prevent ingress of debris. Fit all access covers, cleaning eyes and blanking plates as the work proceeds.

Where not specified otherwise use plated, sherardized, galvanized or nonferrous fastenings, suitable for the purpose and background, and compatible with the material being fixed.

610A FIXING AND JOINTING GUTTERS

- - Fix securely at specified centres and at all joints in gutters, with additional brackets near angles and outlets.
- Provide for thermal and building movement when fixing and jointing, and ensure that clearances are not reduced as fixing proceeds.
- Seal as specified to make watertight.
- Spread jointing compound evenly over jointing face of socket.
- For gutters with bolted joints, tighten joints in the gutter sole before any other bolts. Fit suitable washers, and spacers to prevent overtightening, unless specified otherwise.
- Tighten fixing to squeeze out some compound.
- Remove surplus, squeezed out compound and neatly clean off.
- Ensure that roofing underlay is dressed into gutter.

615A SETTING OUT EAVES GUTTERS - TO FALLS

- - Set out to a true line and even gradient to ensure no ponding or back fall. Position high points of gutters as close as practical to the roof and low points not more than 50 mm below the roof.
- Position outlets to align with connections to below ground drainage, unless shown otherwise on drawings.

630A RAINWATER OUTLETS

- - Outlets are securely fixed before connecting pipework.
- Junctions between outlets and pipework can accommodate all movement in the structure and pipework.

635 FIXING PIPEWORK

- Pipework: Fix securely, plumb and/ or true to line.
- Branches and low gradient sections: Fix with uniform and adequate falls to drain efficiently.

- Externally socketed pipes and fittings: Fix with sockets facing upstream.
- Additional supports: Provide as necessary to support junctions and changes in direction.
- Vertical pipes:
 - Provide a loadbearing support at least at every storey level.
 - Tighten fixings as work proceeds so that every storey is self supporting.
 - Wedge joints in unsealed metal pipes to prevent rattling.
- Wall and floor penetrations: Isolate pipework from structure.
 - Pipe sleeves: As section P31.
 - Masking plates: Fix at penetrations if visible in the finished work.
- Expansion joint pipe sockets: Fix rigidly to buildings. Elsewhere, provide brackets and fixings that allow pipes to slide.

635A FIXING PIPEWORK

- - Fix securely at specified centres plumb and/or true to line.
- Make changes in direction of pipe runs only where shown on drawings unless otherwise approved.
- Fix branches and low gradient sections with uniform and adequate falls to drain efficiently.
- Fix externally socketed pipes/fittings with sockets facing upstream.
- Provide additional supports as necessary to support junctions and changes in direction.
- Fix every length of pipe at or close below the socket collar or coupling.
- Provide a load bearing support for vertical pipes at not less than every storey level. Tighten fixings as the work proceeds so that every storey is self supporting and undue weight is not imposed on fixings at the base of the pipe.
- Isolate from structure where passing through walls or floors and sleeve pipes as specified in Section P31.
- Provide for thermal and building movement when fixing and jointing and ensure that clearances are not reduced as fixing proceeds.
- Fix expansion joint pipe sockets rigidly to the building and elsewhere use fixings that allow the pipe to slide.

650A JOINTING PIPEWORK AND GUTTERS

- - Joint using materials, fittings and techniques which will make effective and durable connections.
- Joint differing pipework/gutter systems with adaptors recommended by manufacturer(s).
- Cut ends of pipes to be clean and square with burrs and swarf removed. Chamfer pipe ends before inserting into ring seal sockets.
- Ensure that jointing or mating surfaces are clean, and where necessary lubricated, immediately before assembly.
- Form junctions using fittings intended for the purpose ensuring that jointing material does not project into bore of pipes, fittings and appliances.
- Remove surplus flux/solvent/cement/sealant from joints.

675A COATED PIPEWORK/GUTTERS

- Make good to coatings after cutting and any other damage or recoat, as recommended by the manufacturer.

685A IDENTIFICATION OF INTERNAL RAINWATER PIPEWORK

- To BS 1710 using self-adhesive bands or identification clips located at junctions, at both sides of each slab, bulkhead and wall penetration, and elsewhere as directed.

690A ELECTRICAL CONTINUITY

- Use clips or suitable standard couplings supplied for the purpose by pipework manufacturer to ensure electrical continuity at all joints in metal pipes with flexible couplings and which are to be earth bonded.

700 ACCESS FOR TESTING AND MAINTENANCE

- General: Install pipework and gutters with adequate clearance to permit testing, cleaning and maintenance, including painting where necessary.
- Access fittings and rodding eyes: Position so that they are not obstructed.

COMPLETION

900A TESTING GENERALLY

- - Inform CA sufficiently in advance to give him a reasonable opportunity to observe tests.
- - Check that all sections of installation are free from obstruction and debris before testing.
- - Provide clean water, assistance and apparatus for testing as required.
- - Carry out tests as specified. After testing, locate and remedy all defects without delay and retest as instructed.
- - Keep a record of all tests and provide a copy of each to the CA.

905 INTERNAL PIPEWORK TEST - ENGLAND, WALES, IRELAND AND NORTHERN IRELAND

- Preparation: Temporarily seal open ends of pipework with plugs.
- Test apparatus: Connect a 'U' tube water gauge and air pump to pipework via a plug.
- Testing: Pump air into pipework until gauge registers 38 mm.
- Required performance:
 - Allow a period for temperature stabilization, after which the pressure of 38 mm is to be maintained without loss for at least 3 minutes.

910 GUTTER TEST

- Preparation: Temporarily block all outlets.
- Testing: Fill gutters to overflow level and after 5 minutes closely inspect for leakage.

915 MAINTENANCE INSTRUCTIONS

- General: At completion, submit printed instructions recommending procedures for maintenance of the rainwater installation, including full details of recommended inspection, cleaning and repair procedures.

920 IMMEDIATELY BEFORE HANDOVER

- Construction rubbish, debris, swarf, temporary caps and fine dust which may enter the rainwater system: Remove. Do not sweep or flush into the rainwater system.
- Access covers, rodding eyes, outlet gratings and the like: Secure complete with fixings.

Z20 Fixings and Adhesives

To be read with Preliminaries / General conditions.

PRODUCTS

310 FASTENERS GENERALLY

- Materials: To have:
 - Bimetallic corrosion resistance appropriate to items being fixed.
 - Atmospheric corrosion resistance appropriate to fixing location.
- Appearance: Submit samples on request.

320 PACKINGS

- Materials: Non-compressible, corrosion proof.
- Area of packings: Sufficient to transfer loads.

330 NAILED TIMBER FASTENERS

- Nails:
 - Steel: To BS 1202-1 or BS EN 10230-1.
 - Copper: to BS EN 1202-2.
 - Aluminium: To BS 1202-3.

340 MASONRY FIXINGS

- Light duty: Plugs and screws.
- Heavy duty: Expansion anchors or chemical anchors.

350 PLUGS

- Type: Proprietary types to suit substrate, loads to be supported and conditions expected in use.

360 ANCHORS

- Types:
 - Expansion: For use in substrate strong enough to resist forces generated by expansion of anchor.
 - Adhesive or chemical:
 - For use in substrate where expansion of anchor would fracture substrate.
 - For use in irregular substrate where expansion anchors cannot transfer load on anchor.
 - Cavity: For use where the anchor is retained by toggles of the plug locking onto the inside face of the cavity.

370 WOOD SCREWS

- Type:
 - Wood screws (traditional pattern).
 - Standard: To BS 1210.
 - Wood screws.
 - Pattern: Parallel, fully threaded shank or twin thread types.
- Washers and screw cups: Where required are to be of same material as screw.

380 MISCELLANEOUS SCREWS

- Type: To suit the fixing requirement of the components and substrate.
 - Pattern: Self-tapping, metallic drive screws, or power driven screws.
- Washers and screw cups: Where required to be of same material as screw.

- 390 ADHESIVES GENERALLY
- Standards:
 - Hot-setting phenolic and aminoplastic: To BS 1203.
 - Thermosetting wood adhesives: To BS EN 12765.
 - Thermoplastic adhesives: To BS EN 204.
- 410 POWDER ACTUATED FIXING SYSTEMS
- Types of fastener, accessories and consumables: As recommended by tool manufacturer.
- EXECUTION
- 610 FIXING GENERALLY
- Integrity of supported components: Select types, sizes, quantities and spacings of fixings, fasteners and packings to retain supported components without distortion or loss of support.
 - Components, substrates, fixings and fasteners of dissimilar metals: Isolate with washers/ sleeves to avoid bimetallic corrosion.
 - Appearance: Fixings to be in straight lines at regular centres.
- 620 FIXING THROUGH FINISHES
- Penetration of fasteners and plugs into substrate: To achieve a secure fixing.
- 630 FIXING PACKINGS
- Function: To take up tolerances and prevent distortion of materials and components.
 - Limits: Do not use packings beyond thicknesses recommended by fixings and fasteners manufacturer.
 - Locations: Not within zones to be filled with sealant.
- 640 FIXING CRAMPS
- Cramp positions: Maximum 150 mm from ends of frame sections and at 600 mm maximum centres.
 - Fasteners: Fix cramps to frames with screws of same material as cramps.
 - Fixings in masonry work: Fully bed in mortar.
- 650 NAILED TIMBER FIXING
- Penetration: Drive fully in without splitting or crushing timber.
 - Surfaces visible in completed work: Punch nail heads below wrot surfaces.
 - Nailed timber joints: Two nails per joint (minimum), opposed skew driven.
- 660 SCREW FIXING
- Finished level of countersunk screw heads:
 - Exposed: Flush with timber surface.
 - Concealed (holes filled or stopped): Sink minimum 2 mm below surface.
- 690 USING POWDER ACTUATED FIXING SYSTEMS
- Powder actuated fixing tools: To BS 4078-2 and Kitemark certified.
 - Operatives: Trained and certified as competent by tool manufacturer.
- 700 APPLYING ADHESIVES
- Surfaces: Clean. Adjust regularity and texture to suit bonding and gap filling characteristics of adhesive.
 - Support and clamping during setting: Provide as necessary. Do not mark surfaces of or distort components being fixed.
 - Finished adhesive joints: Fully bonded. Free of surplus adhesive.

Z22 Sealants

To be read with Preliminaries / General conditions.

EXECUTION

610 SUITABILITY OF JOINTS

- Pre-sealing checks:
 - Joint dimensions: Within limits specified for the sealant.
 - Substrate quality: Surfaces regular, undamaged and stable.
- Joints not fit to receive sealant: Submit proposals for rectification.

620 PREPARING JOINTS

- Surfaces to which sealant must adhere:
 - Remove temporary coatings, tapes, loosely adhering material, dust, oil, grease, surface water and contaminants that may affect bond.
 - Clean using materials and methods recommended by sealant manufacturer.
- Vulnerable surfaces adjacent to joints: Mask to prevent staining or smearing with primer or sealant.
- Backing strip and/ or bond breaker installation: Insert into joint to correct depth, without stretching or twisting, leaving no gaps.
- Protection: Keep joints clean and protect from damage until sealant is applied.

630 APPLYING SEALANTS

- Substrate: Dry (unless recommended otherwise) and unaffected by frost, ice or snow.
- Environmental conditions: Do not dry or raise temperature of joints by heating.
- Sealant application: Fill joints completely and neatly, ensuring firm adhesion to substrates.
- Sealant profiles:
 - Butt and lap joints: Slightly concave.
 - Fillet joints: Flat or slightly convex.
- Protection: Protect finished joints from contamination or damage until sealant has cured.