Appendix D

Specification Part 2 extract; C41 repair of masonry

Part 3 Schedule of Work

C41 Repairing/ Renovating/ Conserving masonry

To be read with Preliminaries/ General conditions

GENERALLY/ PREPARATION

100 INFORMATION TO BE PROVIDED WITH TENDER

- Submit names, CVs and qualifications for personnel to be engaged in the repair of facades in accordance with clause A33/120..

101 TERMINOLOGY/NOTATION

- Masonry units as referred to in this section includes; bricks, special profile bricks, precast units, existing intact run mouldings, mass masonry and render sections.
- Key to notation of repair schedules and drawings
  - SW = Screen Wall West, SE =Screen Wall East
  - SW.M1 = Screen Wall West.Merlon 1, SW.E1 = Screen Wall West.Embrasure 1, SE.M1= Screen Wall East.Merlon 1, WT.M1 = Watchman's Tower.Merlon 1, etc.
    See descriptions on the repair schedule for works to walling which are located in relation to the merlon and embrasures above.
  - C = Conserve, Rr = Reform Render, Rb = Rebuild masonry.
- All mortar mix proportions are by volume unless otherwise stated. See clause 214.
  Key to notation of mortar and render mixes;
  - HL = hydraulic lime mortar, PM = 100% Prompt mortar, PHL = Prompt and hydraulic lime mortar.
  - P100 = 100% Prompt bound render, P75 =75% Prompt & 25% hydraulic lime bound render, P50 = 50% Prompt & 50% hydraulic lime bound render, RHL = hydraulic lime bound render.

110A SCOPE OF WORK

- Refer to Repair Schedule and drawings:
  - treat vegetation with biocide and allow to die back before removing, including woody growths and roots from wall tops and surfaces. Allow for temporary support and partial dismantling to complete removal of roots and growths.
  - Repair schedules are provisional subject to provision of full access and inspection by the Architect.
  - Take down unsound masonry to merlons and parapets to Screen Walls, Watchman's Tower and Stair Turret and rebuild using new or salvaged brickwork, new precast copings and new render.
  - Stabilise existing fragile parapets by core drilling vertically through brickwork, pinning and grouting.
  - Pin and grout sections of run moulding to copings and string courses and hollow and/or friable areas of render to walling surfaces.
  - Reform missing sections of run moulding on new stainless steel armatures/backing.
  - Repair and/or re-form tile weathering to walling offsets below the parapet of south elevations.
  - repair brick background and reform render where missing.
  - Repair cracks by grouting and filling/filleting to weather exposed edges.
  - Replace eroded bricks to the south elevation of the east Screen Wall
- Records of masonry to be repaired: Before starting work, use measurements and photographs as appropriate to record profiles, sizes, brick bonding patterns, render ruling/ashlar lines, joint widths, special features, etc. Record by marking up existing positions clearly on record drawings set up for the purpose, as clause 140.
- Identification of masonry units to be removed, replaced or repaired: Attend on the Architect and jointly carry out an inspection to 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. Refer also to clause 120 and 140 below.

120 SITE INSPECTION

- Purpose: To confirm type and extent of repair/ renovation/ conservation work shown on drawings and described in survey reports and schedules of work.
- Parties involved: Architect and Foreman mason. Provide attendance on the architect by competent mason/foreman and conservator/mason to test areas of render and examine structures to confirm the extent and type of repair work. Include for 2 days work by two operatives in total, not necessarily consecutive..
- Timing: At least 5 working days before starting each section of work and as soon as scaffold access is available.
- Instructions issued during inspection: Confirm in writing, with drawings and schedules as required, before commencing work.

121 PRELIMINARY INSPECTION/INVESTIGATION FOR HIDDEN IRON

- Purpose: To identify the presence and/or extent of hoop iron embedded within masonry.
- Commission specialist to carry out an impulse radar survey of all facets of the Water Tower
- Timing: As soon as scaffold access is available and prior to commencement of any works to the Water Tower..
- Submit report and marked up drawings: within 2 weeks of survey.. submit electronically.

122 ASSESSMENT OF RENDER TO BE RETAINED AND RENDER TRIALS PREVIOUSLY CARRIED OUT

- Carry out pull test on existing render to be retained at 8 No locations, as directed by the architect.
- Carry out pull test on each of 3No. render trial panels as directed.
- Allow to remove up to 6No. small samples of render and mortars, label and record locations and hand to the architect.

125A REMOVAL OF FITTINGS/ FIXTURES

- Items to be removed not required for reuse: Embedded iron nails within string courses and projections, corroded iron plant support eyelets.
- Removal:
  - Minimize disturbance to surfaces.
  - Carefully drill around iron pins and other metal fixings at right angles to the wall face.
  - Carefully remove top course of brickwork or tiles: and remove iron armatures.
- Items to be retained: Sound embedded iron plant support eyelets, redundant former services support bracket.
- Masonry fabric and surfaces: Do not damage during removal and replacement of fittings/ fixtures.

126 REMOVAL OF IRON HOOP RESTRAINT TO HOUSE SE. STAIR TURRET PARAPET

- Items to be removed, and not required for re-use: existing iron hoop bolted around the parapet masonry.
- Protect existing adjacent House roof structure and Stair Turret roof, keep existing outlets and discharge points clear.
- Provide access for inspection at the earliest opportunity and a method statement for temporary works and dismantling.
- Provide support to the Stair Turret parapets by cross bracing and securing to the scaffold structure and/or temporary supports
  - Remove fixings at joints or carefully cut through iron band and remove. Dismantle unstable masonry with care and re-build masonry to the extent indicated.

130A REMOVAL OF PLANT GROWTHS FROM MASONRY

- Plants, root systems and associated soil/ debris: Carefully remove from joints, voids and facework.
- Removal of roots: cut through stem as close to the base as possible. Remove bark from stump and apply herbicide paste. Leave stump to wither. Where it may be difficult to remove growths completely without disturbing masonry, provide temporary support and use dampened temporary timber wedges or other approved method to assist removal.
- Notify the architect of poor bonding or suspect conditions in the masonry background and 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.

131 MOSS AND LICHEN

- Moss: carefully remove from retained surfaces.
- Lichen: Do not scrape or remove. Carry out work carefully to protect lichen and retain the weathered appearance of all surfaces.

132 CLEANING OF ALGAE ON WALL SURFACES

- Remove defective render as directed by the architect.
- Treat exposed areas of brickwork supporting green algae or lichen growth using the DOFF or ThermaTech steam cleaning system.

140A RECORD OF WORK

- General: maintain accurate records of work carried out to masonry as follows;
  - Mark drawings provided by the architect to show the extent and type of repair, location of pins, areas of core grouting, repointing, new masonry and render etc.
  - Record existing ruled ashlar lines found in render to be replaced for reproduction on new render.
  - Retain manufacturer's drawings for new pre-cast elements, forward copies to the architect and copy to O&M manuals.
- Specific records: Compile a comprehensive photographic record of the areas of work before commencement and on completion .
- Documentation: Submit 1 copy of record drawings and photos 1 week before Practical Completion, this is a pre-requisite for issue of the Practical Completion Certificate. Allow for comments from the design team, updating/revising and/or additions to the record and re-submission incorporating comments.
- Final record set to be submitted in electronic format and full size hard copies as follows;
  - Number of sets: Two .

144 SORTING AND ASCERTAINING QUANTITIES OF MATERIAL DISMANTLED

- The building is of considerable architectural and historic significance. It is therefore intended that existing dismantled material consisting of walling bricks, special bricks, tiles, run mouldings that come away entire in section and any precast units are to be marked and recorded and set-aside in safe storage for reuse in the repair works.
- Sorting and identification of dismantled material, carry out as follows;
  - dismantle areas identified with care and set aside sound units
  - establish the quality of material to be salvaged and re-used, offer samples to the architect. Sort accordingly and report quantities.
    store retained material on timber palettes off the ground, cover and protect.

WORKMANSHIP GENERALLY

150 POWER TOOLS

- Usage for removal of mortar: Permitted for removal of hard cementitious mortar and render and where vibration may cause instability.
  - use with care to prevent damage to adjacent materials and 'run-out' chases.
- Use to drill and insert pins and armatures in repairs. Select approriate tools for the material to be drilled. An SDS drill has been found useful for hard coping finishes and battery rotary drill for the softer masonry background.
- Use a small grinder with diamond tipped cutting disc for cutting out cracks, chases and undercutting render finishes above repairs and scoring/cross hatching the edge of existing retained render as a key for the new work..
- Use for removal of bedding mortar to facing brickwork and in replacing isolated bricks by prior agreement. Where hard mortar is encountered in facing brickwork repeat drilling into mortar joints and working between with a chisel has been found effective. .

155 PUTLOG SCAFFOLDING

- Usage: Not permitted, refer to Preliminaries.

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 arrises, projecting features and delicate, friable surfaces. Prevent mortar/ grout splashes and other staining and marking on facework. Protect using suitable nonstaining 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.

180A WORKMANSHIP

- Skill and experience of site operatives: Appropriate for types of work on which they are employed.All operatives are to be registered with the Construction Skills Certification Scheme, Gold Standard and/or conservators on the Conservation Register or accredited under the PACR scheme.
  - Documentary evidence: Submit CV's and evidence of skills qualifications for the personnel proposed to carry out the masonry and stucco repair work with the tender.

185A 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 NATURAL 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 with two layers of starch-free hessian and an outer layer of bubble wrap.
- Hot conditions and drying winds: Prevent masonry from drying out rapidly by covering and keeping damp.
- New mortar damaged by frost: Rake out and replace.
- Submit method statement and monitoring proposals if it is intended to carry out work in adverse weather, including heating within the scaffold enclosure. Technical proposals for the plant proposed [including noise levels], operating periods and monitoring to be submitted to the architect in advance for comment.

186 PROTECTION AND CURING OF LIME MORTARS

- Protection: Submit a method statement for the proposed method, including monitoring and reporting techniques.
- Tending: Tend mortars to keep damp and protect to ensure slow and full curing/carbonation. Protect and tend for the period necessary for the mortar to cure and gain sufficient strength to act in the designed manner, taking into account mix composition and prevailing weather conditions.
- Timing: Programme works to ensure protections, access and temporary works are in place for the period required following placing of mortars and renders. Allow sufficient time for curing, protection and inspection of completed work.

187 APPLICATION/TENDING/PROTECTION/CURING OF NATURAL CEMENT MORTARS AND RENDERS

- The application of natural cement renders and mortars differs from that of lime renders.
  - Apply render coats fresh on fresh, including over the first stipple coat i.e. when the stipple coat is firm [has lost its workability] and still 'green' before the full set is reached.
- Tending: Apply a light water mist to finish coats as often as required by the prevailing weather conditions.
- Protection: Protect fresh work from direct rain, wind, frost and sun by covering with 2 layers of starch free hessian hung not less than 75mm clear of the work.
- Curing period: Natural cement mortars gain strength very rapidly and setting times are very short. Refer to the manufacturers technical documents for guidance. Setting times are affected by the ambient temperature.
- Setting times require speed and experience in applying renders fresh-on-fresh to gauge the correct timing for application of following coats before set is reached. The set may be slowed in warm weather to allow extended workability by the addition of Tempo retarder.

190A CONTROL SAMPLES

- General: Obtain approval of the following before proceeding with the remainder:
  - Sands and aggregates/stone dust for mortars and renders as clause C41/210
  - Sample biscuits: - of each mortar mix type prepared with the selected sands
    - mortar for new renders as clause C41/214
    - mortars for new precast items as clause C41/271
    - mortars for in-situ mortar repairs as described in clauses C41/214, 522 & 524.
    - mortar for pointing and bedding brickwork as clause C41/214, 820

  For the agreement of colour and texture by the architect.
- Control samples for repair methods and workmanship, obtain approval of sample type before proceeding with the remainder:
  - pinning cracked run mouldings to copings where the profile is largely intact C41/377
  - Pinning sections of string course moulding as C41/377
  - taking down and re-building loose brickwork as C41/320
  - cutting out and inserting new bricks to wall faces as clause C41/366-368
  - removal of defective render as clause C41/149. Note approval required for use of power tools as C41/151.
  - pinning and grouting cracks in the render as clause C41/622
  - pinning and grouting areas of hollow render as clause C41/621
  - run mouldings to string course 1 linear metre at 2No. locations and different profiles as clause C41/523
  - site modelled mouldings as C41/524.
  - new render trial repairs as C41/214
- Number of trials: for each type of sample allow for adjustments of mix and technique to be made following the architect's comments. The number of trials required for each task will vary. Allow for 3No material samples of each type and 2No samples of in-situ work.
- prepare a schedule of all samples and trials required. Keep a record of mixes used, dates of preparation/placing and presentation for approval and record comments. Protect and maintain samples selected for implementation as reference panels throughout the duration of the work.

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MATERIAL/ PRODUCTION/ ACCESSORIES

210A SAND FOR MASONRY MORTARS AND RENDERS

Type: Sharp, well graded to BS882 Table 4: C or M for brickwork, M or F for Ashlar.

Sand for mortars and renders to be washed, coarse pit sand, entirely free from organic matter and to match aggregates in the existing, both in material and grain size. Refer to Sandberg test report and report on trials carried out by the Conservator.

Where used for render and exposed pointing to contain 15% grit of approved colour to be retained on a mesh of 1.18mm.

Table 4. Sand

Sieve size	**Percentage by mass passing BS sieve**			
	Overall limits	**Additional limits for grading**		
		C	**M**	**F**
10.00 mm	100	-	-	-
5.00 mm	89 to 100	-	-	-
2.36 mm	60 to 100	60 to 100	65 to 100	80 to 100
1.18 mm	30 to 100	30 to 90	45 to 100	70 to 100
600 um	15 to 100	15 to 54	25 to 80	55 to 100
300 um	5 to 70	5 to 40	5 to 48	5 to 70
150 um	0 to 15	-	-	-

NOTE: Individual sands may comply with the requirements of more than one grading. Alternatively some sands may satisfy the overall limits but may not fall within any one of the additional limits C, M or F. In this case and where sands do not comply with table 4 an agreed grading envelope may also be used provided that the contractor can satisfy the CA that such materials can produce mortar of the required quality.

- Quality, sampling and testing: To BS EN 13139.
- SAMPLES - Provide a 400 gm sample of each aggregate proposed and forward to the CA 2 weeks in advance of commencement of works on site. For each sand sample state: the region and quarry of origin and the grading and mineralogy of the aggregate.
- Prepare sample 'biscuits' of mortar of each of the types listed produced with each of the sand samples offered for approval.
- Sand for hydraulic lime mortars should be kept covered to prevent washing out of fines, separation and to stabilise the water content.
- Sand and aggregates for Natural cement mixes are to be kiln dried and maintained bagged and dry up to the point of use.
- If damp sand is used for Natural cement mixes then it must be pre-mixed with Tempo retarder before adding Prompt and used immediately and not 'knocked up'.
- Crushed stone and stone dust may be substituted for sand as a proportion of the aggregate to obtain the desired mortar colour.

211 HYDRAULIC LIME FOR MORTARS AND RENDERS

- Hydraulic Lime for mortar will be pure, natural hydraulic lime to BSEN 459 Part 12001, NHL designation.
- Manufacturer/ Supplier: St Astier Ltd.
  - available from: Anglia Lime Company, Windham Road, Chilton Industrial Estate, Sudbury, Suffolk, CO10 2XD. Tel 01787 313 974
  - Product reference: [NHL2, NHL3.5 according to mix specified and location].

212 NATURAL CEMENT FOR MORTARS AND RENDERS

- Natural cement for mortars and renders shall be pure VICAT Prompt Natural Cement.
- Retarders where necessary to control setting shall be pure citric acid Tempo Retardant.
- Manufacturer: S.A. VICAT
  Direction Commerciale Ciments et Liants Hydrauliques
  4 rue Aristide Berges
  BP 137
  38081 L'ISLE D'ABEAU Cedex
  FRANCE
  Tel: +33 4 74 27 40 10
  e-mail: fds.ciment@vicat.fr
- Supplier: CORNISH LIME
  Brims Park
  Old Callywith Road
  Bodmin
  Cornwall PL31 2DZ
  Tel: 01208 79779
  e-mail: phil@cornishlime.co.uk

214 MORTARS AND RENDERS

- Natural Cement and Natural Hydraulic Lime:Sand mortar mixes; use the following mixes where indicated.

This schedule is to be read with Part1 Preliminaries/General conditions, Part 2 Materials and Workmanship C41 clauses, repair schedules and details.

Mix Designation All mix proportions are by volume using clean gauge boxes.	**Thickness (mm) & to match existing o/a**	**BINDER**		**AGGREGATES as C41/210 and BS882 Table 4**					
		VICAT Prompt Natural Cement [+T = a few grains of Tempo]	**Natural Hydraulic Lime**	**Coarse (C) Sharp Sand**	**Medium (M) Sharp Sand**	**Fine (F) Sharp Sand**	**Stone Dust (M or F)**	**Soft Sand (M or F)**	**Polypropylene fibres 20mm long**
MORTARS FOR BEDDING AND JOINTING MASONRY AND TILE WEATHERINGS									
HL2			**1** [NHL2]	2			0.5		
HL3			**1** [NHL3.5]	2			0.5		
MORTARS FOR POINTING HOLES AND CRACKS									
PM1		**1**				**1**			
PHL50		**0.5**	**0.5** [NHL3.5]			**2**	**0.5**		
GROUT		**1**	**1** [NHL3.5]						
RENDERS FOR REPAIRS AND NEW WORK									
P100									
D: Slurry, dubbing out and scratch coats	**12**	**1+T**		**2**			**0.5**		2.0 kg/m^3
F: Floating coat	**6 - 9**	**1+T**		**1**			**0.5**	**1**	
S: Setting coat	**4 - 6**	**1+T**				**1**	**0.5**	**1**	
P75									
D: Slurry, dubbing out and scratch coats	**12**	**0.75**	**0.25**[NHL3.5]	**2**			**0.5**		2.0 kg/m^3
F: Floating Coat	**6 - 9**	**0.75**	**0.25**[NHL3.5]	**1**			**0.5**	**1**	
S: Setting Coat	**4 - 6**	**0.75**	**0.25**[NHL3.5]			**1**	**0.5**	**1**	
P50									
D: Slurry, dubbing out and scratch coats	**12**	**0.5**	**0.5**[NHL3.5]	**2**			**0.5**		2.0 kg/m^3
F: Floating Coat	**6 - 9**	**0.5**	**0.5**[NHL3.5]	**1**			**0.5**	**1**	
S: Setting Coat	**4 - 6**	**0.5**	**0.5**[NHL3.5]			**1**	**0.5**	**1**	
RHL2									
D: Slurry, dubbing out and scratch coats	**12**		**1** [NHL2]		**1.5**		**0.5**		
S: Setting coat	**4 - 6**		**1** [NHL2]		**2**		**0.5**		
RHL3									
D: Slurry, dubbing out and scratch coats	**12**		**1** [NHL3.5]		**1.5**		**0.5**		
S: Setting coat	**4 - 6**		**1** [NHL3.5]		**2**		**0.5**		

215A MATERIAL SAMPLES

- Representative samples of designated materials: Submit before placing orders.
  - Designated materials: aggregates (sands and stone dusts) for mortars and renders:
  - sands for bedding and pointing mortars for backing brickwork and facing brickwork
  - aggregates (sand and stone dusts) for repairs to renders and run mouldings or new precast units: including dark coloured aggregates to achieve the grey colour to match the existing in repairs. NB requirement for varying the grain size for render finish coats.
  - Designated materials: Masonry elements
    - new or salvaged bricks for exposed fair faced masonry to match existing as clauses 260 and 261
  - new tiles as clause 262
  - Cured mortar biscuits/samples from a mould, using mixes proposed for precast coping units - 3 No samples.

  Designated materials -
- Samples: representative of the range of variation in appearance for each type of material to be matched.
- Appearance: Obtain approval of mortar biscuits before placing orders with suppliers or proceeding with production. Allow for offering samples listed in C41/190 in 2No. presentations until approval is given. Prepare a schedule of all samples required. keep a record of materials presented, dates when presented and record of the architects comments and approvals. .
- Retention of samples: Retain samples of materials and workmanship on site for reference. Protect from damage and contamination.

220A RECORDING EXISTING PROFILES TO BE REPRODUCED

- Profiles: Take measurements and profiles from existing sound units, as instructed, to allow accurate matching of replacements in an un-weathered state. Take profiles for all moulded coping stones to be replaced as listed on the Schedule of Work.
- Location: agree locations for taking profiles with the architect.
- Recording in situ:
  - Copings: take profiles by inserting rigid sheets alongside merlons or between embrasure copings and merlons
  - Run mouldings; for preparation of templates for 'horses', if there are no suitable joints or breaks in the moulding to be reproduced, allow for disc cutting to insert a metal sheet and take profile. Agree location with the architect in advance. Point cut afterwards as if pointing a fine joint with mortar to match the existing render finish.
- Drawings and templates: Prepare as necessary. Templates must be clearly and indelibly marked to identify use and location. Retain drawings and templates and hand to the Employer on completion of the work.
- Submit full size profiles for the architect's approval as clause 230. Allow for necessary adjustments and include for 2 presentations.
- Provide proposals and templates for all profiles needed and agree with the architect before manufacture.
- Note that most prototypes are existng in-situ. Some may be missing, seek instructions.

221 MOULDS FOR PRECAST WORK

- Profiles: As clause 220A, Moulds as clause 271.
- Moulds and surplus casts: to be delivered to site on completion and handed to the Employer.

230 INSPECTION OF DRAWINGS, TEMPLATES, CASTS, ETC

- Timing: Before starting production of masonry units associated with the following items: copings.
- Period of notice (minimum): One week.

236 INSPECTION OF PRECAST UNITS

- Timing: Before despatch to site inspect and check completed units for
  - match with approved samples
  - compliance with drawings and specification
- Give notice: at appropriate stages in production to allow inspection of masonry units before delivery to site.
- Period of notice (minimum): One week to allow the architect to visit the works. .

260A NEW BRICKS

- It is anticipated that salvaged material will be obtained from the dismantled masonry on site. However, new material may be considered subject to approval of samples.
- Manufacturer: new handmade bricks to match existing and to approved sample.
  -Product reference: to match existing texture and porosity characteristics.
- Size: to match existing in each location and for each use, check before ordering.
- Special shapes: as existing.
- Recycled content: Submit proposals.

262 TILES FOR WEATHERING PROJECTIONS

- Manufacturer: subject to approval, contractor's choice, new or reclaimed hand made, clay roofing tiles.
  Size: obtain tiles with the same thickness, coarse open texture and same porosity as the existing tiles.
- Submit samples for the architect's approval.

265A SALVAGED AND SECOND HAND BRICKS

- Source: It is anticipated that all salvaged material will be obtained from the dismantled masonry on site. However, other second hand material may be considered provided this matches the original bricks in the particular location in dimensions, texture and porosity characteristics.
- Condition:
  - Free from matter such as mortar, plaster, paint, bituminous materials and organic growths.
  - Sound, clean and reasonably free from cracks and chipped arrisses.
  - Subject to agreement of samples

271 PRECAST ELEMENTS - MANUFACTURE

- Manufacturer/ Supplier: Cranborne Stone, Butts Pond, Sturminster Newton, Dorset DT10 1AZ Tel: 01258 472685 e-mail: emma@cranbornestone.com.
- Moulds:
  - Materials: silicone, approximately 5mm thick. Allow for trials to ascertain optimum thickness for ease of demoulding and satisfactory product finish.
  - Preparation: Apply mould release agent suitable for pre-cast concrete or pre-cast stone products. Submit details for architect's approval.
- Materials:
  - Binder: Natural cement PROMPT as manufactured by Vicat as C41/212
  - Retarder: Citric Acid TEMPO as C41/212
  - Filler: Metamorphic Limestone dust such as DURCAL 5 or equal and approved, composition and colour to be agreed.
  - Sands and Aggregates: as C41/210 and 215.
- Mixes:
  - Top coat mix: Fine mortar used for the outer surface of casts. PROMPT : FILLER: STONE DUST in the ratio 1:1:0.5 by volume. Mix PROMPT with one cup (top of bottle) TEMPO retarder per litre of PROMPT before mixing mortar in temperatures above 15degC. Use half a cup of TEMPO per litre of PROMPT in temperatures below 15degC.
  - Base coat mix: Coarse mortar for filling the body of the cast. PROMPT: FILLER: AGGREGATE: STONE DUST in the ratio 1:1:1.2:0.5 by volume. PROMPT to be mixed with TEMPO retarder as above. AGGREGATES: well graded sharp sand 0 -4mm.
- Reinforcement: Stainless steel to manufacturers recommendations - submit proposals.
- Quality: Free from imperfections that will adversely affect durability.
- Finish/texture: Colour to match existing as closely as possible.
- Colour/ Texture: to approved sample. select sands and stone dusts to match existing.
- Dimensions: Each unit to be dimensioned to match its specific location in replacement of existing units.
- Note fast setting of mixes using PROMPT binders. As a rough guide small casts can be demoulded within hours. Large casts within 12 hours. Initial tests and trials specified elsewhere will determine times for each component.
- Other requirements:
  - Colour of stone dust, sands and aggregates to be agreed as C41/210 and 215 and samples of mixes to be submitted and agreed as specified elsewhere.
  - Cure pre-cast elements in damp conditions with high relative humidity such as a damp basement or factory with sprinkler system, for 3 weeks.
  - Accessories: include for 4No 15mm diameter threaded stainless steel dowels to be secured to masonry of walling below.
    Marking: Mark each unit clearly and indelibly on a concealed face to indicate position in the finished work.

281A FIXINGS FOR PINNING RUN MOULDINGS AND PROFILES TO BE RETAINED

- Type: Helifix DryFix/Terracotta Tie pins.
- Material: Type 304 Grade 18/8 Austenitic stainless steel.
- Size, strength and number: 8mm diameter x 150mm Predrilled with 6mm drill bit using a combination of SDS drill [rotary and hammer] initially and battery rotary to brick background. Pin at approximately 250mm centres and as necessary to resist loads likely to occur during the life of the building, and to prevent lateral displacement or pulling apart of the construction.
- Method: as clause 377.

283 FIXINGS FOR PINNING HOLLOW RENDER

- Type: Helifix RenderPin
- Material: Type 304 Grade 18/8 Austenitic stainless steel.
- Size, strength and number: 8mm diameter x 150mm Predrilled with 6mm drill bit using a combination of SDS drill [rotary and hammer] initially and battery rotary to brick background. Pin at approximately 250mm centres and as necessary to resist loads likely to occur during the life of the building, and to prevent lateral displacement or pulling apart of the construction.
- Method: as clause 378 and 710

284 BED JOINT REINFORCEMENT FOR STRING COURSE MASONRY

- Manufacturer: Telling Architectural Ltd, http://www.telling.co.uk/telling-lime/brick-mesh/.
  - Product reference: Brick Mesh.
- Material: Austenitic stainless steel wire coated with clay.
- Width: Approximately 30-40 mm less in width than profile to be reproduced.
- Laying: To manufacturer's recommendations.
  OR
- 4.5mm diameter HeliBar, Austenitic stainless steel Grade 304, at 75mm centres, bent to profile and with 2no stainless steel wire strands connecting at approximately equal centres.
- Width: Approximately 30-40 mm less in width than profile to be reproduced.
- Fixing: drill background, dampen masonry, prime and insert pins dipped in HeliBond grout.

285 BED JOINT REINFORCEMENT TO MASONRY IN REBUILDING

- Manufacturer: Contractor's choice, .
  - Product reference: submit proposals.
- Material: Austenitic stainless steel Grade 304.
- Width: Approximately 40-50 mm less in width than wall or leaf.
- Laying: On an even bed of mortar in a continuous strip with
- 225 mm laps at joints and full laps at angles. Keep back
- 20 mm from face of external work, 12 mm back from face of internal work and finish mortar joint to normal thickness.

287 CRACK STITCHING - HELIBAR

- Manufacturer: Helifix, www.helifix.co.uk, +44 (0)208 735 5200 .
  - Product reference: HeliBar and HeliBond.
- Material: Austenitic stainless steel Grade 304.
- Length: Long enough to extend 500mm either side of the crack in bed joints.
- Laying: 4.5mm or 6mm helical bars horizontally in bed joints dampen masonry, prime to prevent premature drying of the HeliBond grout.

288 CRACK STITCHING - S/S DOWELS/PINS

- Manufacturer: [Contractor's choice].
  - Product type: [10 - 15mm stainless steel threaded rod cut to length].
- Material: [Austenitic stainless steel Grade 304].
  Length: Long enough to extend as vertical pins 500mm into the masonry walling below the embrasure coping bed joint level.
- Preparation: Specialist to core drill using a rig attached to the scaffolding, blow and flush out debris, prime to prevent premature drying of the grout.
  Insert: 10mm diameter pins and grout up solid with proprietary grout or in accordance with the engineer's directions.

DISMANTLING/ REBUILDING

310A DISMANTLING MASONRY FOR REUSE

- Masonry units to be reused: Remove carefully and in one piece.
  - Treatment: Clean off old mortar, organic growths and dirt, and leave units in a suitable condition for rebuilding.
  - Identification: Mark each unit clearly and indelibly on a concealed face, indicating its original position in the construction. Transcribe markings to drawings/ photographs.

311 CUTTING OUT DEFECTIVE RENDER/INTERFACE WITH RENDER TO BE RETAINED

- Carry out inspection and recording as clause 120, 140 and 142.
- Removal of defective render
  - Removal is to be to a straight line where possible. Draw neat lines on the surface of the render marking the perimeter of the area to be removed with chalk. Horizontal lines are to follow the nearest ashlar lines. Vertical lines are to be closest to the area of hollow render to be removed.
  - Scribe lines using rules and levels and score surface of render with sharp tool to help guide disc cut.
  - Cut along the score lines with a small, sharp, diamond or carborundum tipped disc cutter. On no account allow the disc to score the brick or overrun the scribed lines.
  - Sharp chisels may be used or short cuts with the disc cutter when an irregular line of removal is agreed.
  - Cut away defective render, working inwards from the edges of the repair. Leave the edges of the retained render undercut above and the lower edge scored with the disc cutter for key for the new render. Brush and flush loose material off the retained render and from brickwork.

312 PINNING MASONRY MERLONS

- Preparation:
  - Provide temporary support and restraint to merlon masonry.
  - Carefully remove remnants of loose coping material and loose brickwork.
- Fixings: Drill and insert proprietary pins as clause 288 as directed and in accordance with manufacturer's and/or engineer's recommendations..

320A REBUILDINGAREAS OF MISSING AND/OR UNSTABLE BRICKWORK

- Replacement materials: Bricks as clause 260 or 265.
- Mortar: As clause 214.
  - Mix: HL2. 1 : 2.5, NHL2 : sand and stone dust aggregates, to approved sample.
  - Sand source/ type: C or M to BS 882 as clause 210.
- Dismantling and preparation: as section C20 and clauses 140 and 144..
- Preparation: inspect background for soundness and report defects to the Architect. Flush out voids and seek instructions.
- Mortar preparation: Mixing hydrated hydraulic lime:sand: Follow the lime manufacturer's recommendations for each stage of the mix.
  In mixing hydraulic lime mortars a whisk attachment to an electric drill has been found useful. Mix for 10 minutes thus
  - Water quantity: Only sufficient to produce a workable mix.
  - Working time: Within limits recommended by the hydraulic lime manufacturer.

  Use mortar within about two hours of mixing at normal temperatures. Do not use after the initial set has taken place and do not retemper.
- Rebuilding: To match previous face and joint lines, joint widths and bonding. Rebed salvaged and new bricks leaving joints recessed for pointing or new render. Adequately bond to retained work/ backing masonry, as appropriate with ties and/or bed joint reinforcement to adjacent retained work as clause 285.
- Joint surfaces: Dampen, as necessary, to control suction.
- Laying masonry units: On a full bed of mortar; perpend joints filled.
- Exposed faces: Remove mortar and grout splashes immediately.
- Joints: Leave recessed to a minimum of 25mm or twice the width of the joint to receive pointing as clause 820. Point facing brickwork in one operation. .
- Other requirements: Bed joint reinforcement as clause 285 and 287, as directed by the CA. .

321 DISMANTLE AND REBUILD STRING COURSES - RUN MORTAR MOULDINGS ON ARMATURE OR TILE COURSED BACKGROUND

- Generally: the run moulded string course is to the north elevation of the screen walls and Water Tower below the parapet. The top weathering splay is more or less failed. The lower cavetto section survives and is to be retained..
- Preparation:
  - Make a neat angled under cut, using a disc cutter, at the joint between the vertical face of the render and weathering splay.
  - Remove failed, eroded and weathered sections of string course and tile backing. Remove rusted iron armatures. Retain sound tiles.
- Fixings: bed joint reinforcement as clause 284.
- Joint surfaces: Rake back tile armature joints by repeat drilling and chiseling between or careful use of a grinder. Cut scores and cross hatch the edges of existing render and clean back the weathered surface of backing brickwork. Dampen, as necessary, to control suction.
- Run moulding: refer to the table at C41/214 for mix proportions. A slurry coat of Mix P100-D as clause 214 to be applied over the prepared surfaces. Build up coats of coarse render P100 in succession allowing adequate time for each coat to stiffen [prevent slumping] but not to fully set before the next is applied. Allow for a 4-6mm fine set coat to be run to a matching profile.
- Joints with existing: Prepare by undercutting above and cross hatching to key abutting and horizontal surfaces. .
- Other requirements: Include for armature or BrickMesh, as clause 284, to weathered profile to receive render finish.

322 DISMANTLE AND REBUILD EXPOSED TILE WEATHERING

- Generally: The tiled weatherings are to the south face of the screen walls below the parapets at the head of the wall thicknessing
- Preparation:
  - Where tile weathering is damaged and broken make a neat cut to the cement fillet at the abutment of the tile weathering and vertical wall face. Undercut the vertical render to release the tiles.
  - Remove damaged tiles and any rusted iron armatures. Set aside sound tiles for re-use.
  - Retain cement fillet where top tiles are sound.
- Rebuild oversailing courses using salvaged new tiles as clause 262.
- Mortar:
  - Mix: HL2 as C41/214.
  - Sand source/ type: C or M to BS 882.
- Fixings: Pins for additional support or bed joint reinforcement as 284.
- Rebuilding: To match previous face and joint lines, joint widths and bonding. Adequately bonded to retained work/ backing masonry, as appropriate.
- Joint surfaces: Dampen, as necessary, to control suction.
- Laying masonry units: On a full bed of mortar; perpend joints filled.
- Exposed faces: Remove mortar and grout splashes immediately.
- Joints: Recessed weathered, with brushed finish as clause 860.
- Other requirements: new code 5 lead flashing lead wedged or plugged and screwed to the backing brickwork and pointed to match the render finish..

REPLACEMENTS AND INSERTIONS

330A 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, hoop iron etc: Report when exposed and remove. Refer to clause 410.
- 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.

361 TILE REPLACEMENT TO TOP OF STRING COURSES/WEATHERING COURSES TO BUTTRESS

- Tiles: New to match existing or salvaged tiles as clause 262.
  - Installation: Tiles cut neatly, laid to break joints, set into backing on a full bed of mortar.
- Preparation: Drill out individual broken or decayed tiles. Flush out and clean cavity.
- Insert new tiles to match.
- Mortar: As C41/214
  - Mix: HL2, C41/214.
  - Sand source/ type: Sharp well graded sand grade C or M to BS882 .
- Joints: As clause 322.
- Other requirements: As clause 322.

365A REPLACEMENT OF BRICKS GENERALLY

- A limited number of existing bricks are frost damaged or have lost their face due to the hardness of the original cement render. Cut out and replace as clauses 366-368 below.
- Bricks: New or salvaged as clauses 260 and 265.
- Mortar: As C41/214.
  - Mix: HL2 as C41/214.
  - Sand source/ type: Sharp well graded sand, grade C or M to BS882.
- Fixings: Not required.
- Joints: recessed by 2-3mm .

366 CUT OUT AND REPLACE BRICKS GENERALLY; FACEWORK- RED STOCKS 2 - 3 BRICKS OR MORE

- Carefully cut out individual damaged and defective bricks to the extent marked on site by the Architect. Drilling may be found useful to start removal before a hammer and chisel is then used. Do not damage adjacent material and arrisses of adjacent retained bricks. Take particular care when cutting out headers and closers. Remove all mortar from all faces of the cavity.
- Flush out cavity with clean water to remove all dust.
- Install replacement bricks, with bed joints and perpends filled solid with mortar, match existing joint widths and bonding. Leave joints recessed to a minimum of 25mm or twice the width of the joint to receive pointing as clause 820. Point facing brickwork in one operation.

367 CUT OUT AND REPLACE ORDINARY STRETCHER TO FACE WORK- 1 SINGLE BRICK

Carry out work as specified in clause 366.

368 CUT OUT AND INSERT BRICK SLIP TO HEADER - RED FACING BRICK

- Carefully cut out the face of individual bricks as marked, to a depth of 60mm. .
- Cut a brick slip at least 55mm deep from either end of a reclaimed (preferably damaged) stretcher or new brick to match..
- Insert the slip into the prepared cavity ensuring that the finished face of the brick is flush with the existing walling face .
- Other requirements: match existing joint widths and bonding. Leave joints recessed to a minimum of 25mm or twice the width of the joint to receive pointing as clause 820. Point facing brickwork in one operation.

376 REPLACEMENT PRECAST COPINGS

- Materials and manufacture: as clause 271 and 276
- Mortar: As C41/214
  - Mix: HL3 C41/214 .
  - Sand source/ type: To approved sample, sharp well graded to BS882 grade C or M .
- Fixings: stainless steel dowels as clause 271 .
- Joints: Flush and to match render finish .
- Other requirements: None .

377 PINNING SECTIONS OF INTACT RUN MOULDINGS TO BE RETAINED

- Generally: Hollow mouldings are noted on copings and string courses. The material is hard, acting as one unit of masonry. Pinning in place would prolong its life.
  Fixings: as clause 281 .
- Spacing: Position fixings at approximately 250mm centres, staggered where possible .
- Method: Using a 6mm drill bit and a combination of SDS drill [rotary and hammer] initially and battery rotary to brick background. Angle holes to ensure maximum insertion into the body of the masonry background. Drill and pin at approximately 250mm centres, using the appropriate drill attachment in accordance with the manufacturer's recommendations, to recess the pin end 5mm below the finished face.
- Other requirements: Where directed by the CA pre-grout hollow areas/backgrounds as clause 214 and allow 96 hours to consolidate before drilling. Make good drill holes by first injecting with a 50:50 PROMPT:NHL3.5 grout and capping with mortar mixPM1 as C41/214 to match adjacent render .

378 PINNING HOLLOW AREAS OF RENDER TO BE RETAINED

- Generally: Hollow render is noted either side of vertical cracks or horizontal open joints following background brickwork joints.
- Fixings: As clause 283 .
- Spacing: Place fixings at regular intervals at staggered centres 250 - 400mm .
- Method: Pre-grout hollow areas/backgrounds as clause 214,610 & 710 with grout mix as C41/214 and allow 96 hours to consolidate before drilling. Using a 6mm drill bit and a combination of SDS drill [rotary and hammer] initially and rotary only to brick background. Drill and pin perpendicular to the render face at approximately 250mm centres, using the appropriate drill attachment in accordance with the manufacturer's recommendations, to recess the pin end 5mm below the finished face..
- Other requirements: Make good drill holes by first injecting with a 50:50, PROMPT:NHL3.5 grout, and capping with mix PM1 as C41/214 fmortar to match adjacent render .

415A STONE PINNINGS FOR WIDE BRICKWORK JOINTS

- Material for pinnings: Slate recessed 20mm back from the face of the joint .
- Placing: Tamp pinnings firmly into fresh mortar. Ensure mortar is thoroughly compacted into voids and that levelling and load distribution functions of pinnings are retained.

MORTAR REPAIRS

501A GENERALLY

- These include:
  - Type A; Small repairs not exceeding 1000x50x50mm in cross section e.g.mouldings at the base of copings - a profiled repair requiring the use of a 'horse'.
  - Type B; Larger section repairs e.g.to upper section of string course on north side of screen walls or outer face of copings - a profiled repair requiring the use of a horse.
  - Type C; Larger section repairs to plain profiles e.g the rear of copings to merlons or embrasures either run with a horse or modelled in-situ. Work in conjunction with exposed tile weathering and lead cover flashings to rear south side of screen walls as clause 322.
- Samples:
  - Provide samples to agree colour match and texture for mortar mixes as clause 214 and workmanship as clause 190 and 215.
- Other requirements:
  - The contractor's attention is drawn to the fast setting of PROMPT natural cement and the need to work quickly and confidently. Competent and experienced operatives must be employed.

510A PREPARATION FOR MORTAR REPAIRS

- Decayed masonry: Cut back carefully to a minimum depth of 20 mm to a sound background. Where the depth of removal exceeds 50 mm, seek instructions.
- Precautions: Do not weaken the element by removing excessive material. Do not damage adjacent sound material.
- Top and vertical reveals of repair area: Undercut.
- Remove all loose and friable material. Wash and sterilise the exposed original surface with water and formalin.
- Wet exposed surface.

515A REINFORCEMENT FOR SMALL MORTAR REPAIRS TYPE 501A

- Application: In isolated areas where depth of repair exceeds 50mm.
- Material: BrickMesh or stainless steel pins as clause 284.
- Reinforcement: place front edge to suit profiles of adjacent original work and to provide effective support for the mortar repair. Reinforce with stainless steel pins where necessary. Drill holes into background to receive reinforcement, bond pins firmly with Helifix resin.
- Cover to reinforcement: Not less than 18 mm.

516 REINFORCEMENT FOR LARGER MORTAR REPAIRS

- Application: Where depth of repair exceeds 50mm for long insitu run mouldings..
- Material: BrickMesh or stainless steel pins as clause 284..
- Reinforcement: place front edge to suit profiles of adjacent original work and to provide effective support for the mortar repair. Place rear edge at least 20mm behind the face of the render above wherever possible. Reinforce with stainless steel pins where necessary. Drill holes into background to receive reinforcement, bond pins firmly with Helifix resin.
- Cover to reinforcement: Not less than 18 mm.

522 MORTAR REPAIR FOR IN-SITU RUN MOULDINGS - TYPE 501A

- Substrate: repaired background as clause 515, or existing cement core.
- Preparation of background:
  - Remove all loose and friable material
  - Thoroughly wet background and apply splatter coat of slurry repair mix. Allow to firm slightly [but not dry out], roughen surface and apply repair mix.
- Repair mixes:
  - initial coating: Spatter/Tack coat of slurried version of the undercoat mix.
- Undercoats: As clause 214.
  - Mix: P100-D & F as C41/214 .
  - Sand source/ type: Sharp well graded sand to approval.
  - Building up: In layers where necessary, each layer not exceeding 12 mm.
- Finishing coat: To match approved samples.
  - Mix: P100-S as C41/214.
  - Sand source/ type: Fine sharp and soft well graded sand and stone dust to approval and to achieve a match with the existing adjacent.
  - Finished thickness: 4 - 6mm.
  - Finish: to approved sample.
- Reinforcement: as clause 515.

523 MORTAR REPAIR FOR IN-SITU RUN MOULDINGS - TYPE 501B

- Substrate: Rebuilt or repaired background as clause 515, 516 or existing cement core.
- Preparation of background:

- Pin areas of moulding to be retained as clause 377. The retained section is usually the lower cavetto and roll mould.
- Remove all loose and friable material from the section to be repaired and flush out loose material to pinned lower section.
- Grout up behind retained moulding as clause 622.
- Thoroughly wet background and apply splatter coat of slurry repair mix. Allow to firm slightly [but not dry out], roughen surface and apply repair mix.

Repair mixes:

- Initial coating: Spatter/Tack coat of slurried version of the undercoat mix.

Undercoats: As clause 214.

- Mix: [P100-D & F as C41/214].
- Sand source/ type: [Sharp well graded sand to approval].
- Building up: In layers where necessary, each layer not exceeding 12 mm.

Finishing coat: To match approved samples.

- Mix: [P100-S as C41/214].
- Sand source/ type: [Fine sharp and soft well graded sand and stone dust to approval and to achieve a match with the existing adjacent].
- Finished thickness: [4 - 6mm].
- Finish: [to approved sample].

Application: as clause 540

- Use a profile and 'horse' for finishing coat to match up with sound retained profiles.
- Cure and protect as clause 187

524 MORTAR REPAIR FOR IN-SITU RUN MOULDINGS - TYPE 501C

- Substrate: Repaired tile background as clause 515, 516 or brick background or existing cement core.

Preparation of brick background to copings to be reformed:

- Prepare background as clauses 125, 130. Re-bed any loose bricks and insert new bricks, cut and shaped as necessary, to follow the coping profile.
- Repair tiled weatherings as clause 322.
- Thoroughly wet background and apply splatter coat of slurry repair mix. Allow to firm slightly [but not dry out], roughen surface and apply repair mix.

Repair mixes:

- Initial coating: Spatter/Tack coat of slurried version of the undercoat mix.

Undercoats: As clause 214.

- Mix: [P100-D & F as C41/214].
- Sand source/ type: [Sharp well graded sand to approval].
- Building up: In layers where necessary, each layer not exceeding 12 mm.

Finishing coat: To match approved samples.

- Mix: [P100-S as C41/214].
- Sand source/ type: [Fine sharp and soft well graded sand and stone dust to approval and to achieve a match with the existing adjacent].
- Finished thickness: [4 - 6mm].
- Finish: [to approved sample].

Application: as clause 540

- Use a profile and 'horse' for finishing coat to match up with sound retained profiles.
- Stop mortar above new lead covering to top of tile weathering courses or marry up to retained existing render and fillet where retained.
- Cure and protect as clause 187
- install code 5 sand cast lead weathering over roll mould and clip to south protect the sky-facing joint with retained sections of moulding as detailed.

540A APPLYING MORTAR

- Surfaces to receive mortar: Clean, and free from dust and debris. Dampen to control suction.
- Applying coats: Build up in layers to specified thickness. Apply mortar firmly, ensuring good adhesion with no voids. Form a mechanical key to undercoats by combing or scratching to produce evenly spaced lines.
  Apply fresh on fresh before hardening. Prevent each layer from drying out rapidly by covering immediately with plastics sheeting and/ or dampening intermittently with clean water.
- Finishing mortar coat: Form accurately to required planes/ profiles, and finish flush with adjacent masonry. Strike ruled ashlar joints in render to match existing.
- Profile templates for in-situ run mouldings: Prepare as clause 220A and use to run mouldings
- Protection: Protect completed repairs from adverse weather as clause 187 until mortar has fully set.
- Other requirements: Refer to clause 186 for the characteristics of PROMPT natural cement and demonstrate competence and experience of the proposed operatives in working with the material.

555A FLOAT FINISH TO MORTAR REPAIRS

- Finish: Use a wood float and/or a hard rubber float and sponge to reveal the aggregate and match adjacent original render finish and texture. Do not use steel floats.

CRACK REPAIRS/ TIES/ REINFORCEMENT

610A MORTAR REPAIR OF CRACKSTO RENDER

- Mortar: As C41/214.
  - Mix: PHL50 C41/214.
  - Sand source/ type: fine to approved sample and to match adjacent surfaces.
- Preparation: Clean out cracks to remove debris, dust and dirt. Cut out principal cracks and open up with a grinder using a diamond tipped cutter disc. Drill locations along the crack with 10mm diameter drill to allow grout injection using a syringe. Blow and flush out recesses to control suction.
- Grout and consolidate: grouting mix as C41/214 using syringes or gravity feed through clay cups.
- Applying mortar: mix PM1 C41/214. Press well into cracks so that they are fully filled. Ensure that mortar does not encroach upon exposed faces. Finish mortar flush with masonry face.
- Other requirements: Exclude isolated hair line cracks (less than about 1.0 mm wide) and grout deep voids as clause 720.

630A TIESFOR REPAIR OF CRACKS IN EXPOSED BRICKWORK

- Tie system manufacturer: HELIFIX as clause 287.
  - Product reference: HeliBar.
- Type/ Diameter: 4.5, 6, 8 mm as directed.
- Grout: HeliBond cementitious grout.
- Holes: Drill carefully and accurately, in locations as shown on drawings or as directed on site, to suit types and lengths of tie. Remove drilling dust and debris with blow pump and flush out with water.
- Adjacent masonry: Do not damage during drilling. Keep cavities behind facings free from debris.
- Tie installation:
  - Bonded ties: Inject bead of HeliBond to back of horizontal slots/bed joint Insert HeliBar and insert a further bead of HeliBond finishing 10-15mm from brickwork face.
  - Ends of ties: Keep back from face of masonry to allow for making good.
- Exposed masonry faces: Clean and free from grout/ mortar stains.
- Making good: repoint as clause 820 .

690 MAKING GOOD TO INJECTION AND INSERTION HOLES

- Preparation: Clean out holes thoroughly.
- Repair mortar: To match existing masonry units/ joints in colour and texture. Fill holes and finish mortar neatly and flush with surrounding masonry.
- Finished appearance: Obtain approval for first 5 holes before completing the remainder.

GROUTING VOIDS

710A PREPARATION FOR GROUTING HOLLOW RENDER TO BE RETAINED

- Generally: Hollow render is noted either side of vertical cracks or horizontal open joints following brickwork joints.
- Preparation:
  - Pin render to be retained [as clause 283 and 378] before grouting
  - Flush out voids behind render, rake out cracks and open joints, open out principal cracks with a grinder using a diamond cutting disc.
- Drill along cracks at approximately 250mm centres with 10mm diameter drill. Grout thoroughly using syringes or gravity feed as appropriate to the size of void or width of crack: Regulate height of each grout pour to prevent disruption to masonry. Work quickly to prevent setting of mortar before grouting is complete.
- Open joints in masonry: Seal with an approved temporary material to prevent leaking of grout. Maintain and monitor weep holes at appropriate centres to assist in flushing out dust and debris and to prove effectiveness of grouting. Locate temporary seal back from facework to allow for specified repointing.

711 PREPARATION FOR GROUTING RUN MOULDINGS TO BE RETAINED

- Generally: Hollow mouldings are to copings and string courses.
  Preparation:
  - Pin mouldings/sections to be retained [as clause 377] before grouting
  - Flush out voids and rake out cracks and open joints

  Grout thoroughly using syringes or gravity feed, as appropriate to the size of void or width of crack: Regulate height of each grout pour to prevent disruption to masonry. Work quickly to prevent setting of mortar before grouting is complete.
  Prevent grout from running over finished surfaces by sealing open joints with an approved temporary material to prevent leaking of grout. Wipe off immediately any excess material.

712 FLUSHING OUT

- Timing: Before grouting.
- Requirement: Flush out core of masonry walls using clean water delivered under moderate pressure through grouting holes.

740 APPLICATION OF GROUTING

- Grouting: Continuous operation during each lift. Allow grout to set before commencing subsequent lifts.
- Monitoring: Monitor grouting carefully and continuously at each delivery point (flow and delivery pressure), and at adjacent/ opposite wall faces, to ensure that there is an effective distribution of grout with no leaking, staining, or disruption to the masonry.
- Temporary seals: Remove on completion of grouting and leave joints in a suitable condition for repointing.

POINTING/ REPOINTING

810A PREPARATION FOR REPOINTING FACING BRICKWORK

- Existing mortar: Working from top of wall downwards, remove mortar carefully, without damaging adjacent masonry arrises or widening joints, to a minimum depth of 20mm.
  - Loose or friable mortar: Seek instructions when mortar beyond specified recess depth is loose or friable and/or if cavities are found. Include for tamping with slate pinnings as clause 415.
- Raked joints: Remove dust and debris, dampen joints to control suction..
- Embedded iron: record location and seek instructions.
- Repoint facing brickwork in one operation.

820A POINTING ERODED JOINTS TO FACING BRICKWORK

Preparation of joints: as clause 810, dampen joints to control suction.

- Mortar: As clause C41/214.
  - Mix: H2 as C41/214.
  - Sand source/ type: C or M to approved sample.
- Joints profile/ finish: recessed 3mm.
- Other requirements: Stipple joints with a stiff bristle brush.

821 POINTING ERODED BRICKWORK JOINTS PRIOR TO RENDERING

- Preparation of joints: as clause 810.
- Mortar: As clause 214.
  - Mix: H2 as clause 214.
  - Sand source/ type: C or M as clause 210 and BS 882.
- Joints profile/ finish: leave recessed at least 5mm back from the face of brickwork .
- Other requirements: stipple to receive render.

840 POINTING WITH TOOLS/ IRONS

- General: Press mortar well into joints using pointing tools/ irons that fit into the joints, so that they are fully filled.
- Face of masonry: Keep clear of mortar. Use suitable temporary adhesive tape on each side of joints where necessary. Finish joints neatly.

P0513 Specification Part 3 Schedule of Work

12 January 2018

Table of Contents

Title	Page
3.0 Generally	**1**
3.1 Access	**1**
3.2 Protections	**1**
3.3 Scaffolding	**2**
3.4 Watchman's Tower refurbishment	**3**
3.5 External Walling Masonry and Render Repairs	**6-10**
3.5.14 West Screen Wall repair schedule	**7**
3.5.15 East Screen Wall repair schedule	**8**
3.5.16 Watchman's Tower repair schedule	**9**
3.6 Completion	**10**

To be read in conjunction with Part 1 Preliminaries and Part 2 Materials and Workmanship clauses, rhp scheme drawings and details, repair schedule, engineer's drawings, details and all relevant information.

Item	Scope/description	**£**
3.0	**GENERALLY**	
3.01	The contractor is reminded that the building is a Grade II* listed structure of the highest historic interest and importance. The parkland and gardens are registered Grade II* on the Register of Historic Parks and Gardens. The utmost care is to be taken in all aspects of access, protection and in carrying out the work.	
3.02	The House and gardens are open to the public at weekends from 24 March 2018 to 30 September 2018 and daily during the school holidays, 26 May to 3 June, 30 June to 2 September 2018. Appropriate precautions are to be taken during visitor opening periods.	
3.03	Maintain safe access to the Raj Exhibition for visitors during open periods and check routes are clear for weekend opening.	
3.04	Maintain safe access routes for residents, estate staff, their vehicles and emergency services at all times.	
3.1	**ACCESS**	
3.1.1	Refer to rhp drawing P0513 1000 & 1001 for site access, routes and constraints. The access from Old Knebworth Lane is to be used by general site traffic subject to precautions regarding widths of approach roads, gateways, overhead services, trees and overhanging branches.	
3.1.2	The main drive and approach to the House from the north east may be used for deliveries by prior arrangement. Any such scheduled and agreed deliveries on days when the site is open to visitors shall be completed before 1100 and/or after 1600hrs.	
3.1.3	Site personnel are restricted to the site area and access routes south of the screen walls. Scaffolding is to be so arranged as to provide access to all working areas from the south side. Site personnel will not be permitted to enter the entrance courtyard or deer park to the east except to erect and dismantle the scaffolding.	
3.1.4	The contractor is to prepare a comprehensive photographic record of the approach routes, driveways, designated parking area, site areas, scaffolded structures and structures below scaffolding, bearing areas etc. Photographs are to be referenced to the plans provided and 2 copies of plans and photographs are to be forwarded to the CA within 2 weeks of the start on site.	
3.2	**PROTECTIONS**	
3.2.1	Protect balustrade masonry extending north west of the Watchman's Tower with rigid plywood enclosure extending through and 1.5m beyond the scaffolding zone. Maintain for the duration of the works.	
3.2.2	Form protected routes through and below the scaffolding; • for public access to the Raj exhibition entrance door on the north side of the west screen wall. • for Knebworth staff to access to doors on the south side of the screen wall. 1 No east of the Raj exhibition, 1No west of the Raj exhibition and double doors for access to the boiler house to the west. • For access to the hose cabinet and water hydrant/stop valve east of the Water Tower. Protection to routes is to include double boarding with polythene interleaved and protective fans.	
3.2.3	Protect the Deer fence and gate to the SE of the Watchman's Tower and maintain clear for access by Knebworth staff.	

To be read in conjunction with Part 1 Preliminaries and Part 2 Materials and Workmanship clauses, rhp scheme drawings and details, repair schedule, engineer's drawings, details and all relevant information.

Item	Scope/description	**£**
3.2.4	Form enclosures to the extent of the tree canopy to protect root zones of 2No. trees south and east of the site compound. Maintain clear throughout the contract. Do not permit site traffic, compaction of the ground, storage of materials, plant and equipment within the root protection zones.	
3.2.5	Masonry materials south of the east screen wall. There are a number of masonry items stored on the ground within the fenced area south of the screen wall. Lift and stack on pallets clear of the site compound and tree protection zones and protect from abrasion or other damage. Liaise with Knebworth staff and provide assistance in replacing for permanent storage following dismantling of scaffolding.	
3.2.6	Note location of underground and overhead cable routes carry out CAT scan in advance of any excavations. Mark up a site plan with survey findings and report to CA.	
3.3	**SCAFFOLDING**	
3.3.1	Refer to Part 1 Preliminaries A36/141-146 and Appendix B for scaffolding requirements. Provide a fully documented scaffold design and method statement to the CA within 2 weeks of confirmation of acceptance of tender and at least 4 weeks before commencement of site set-up. It is the duty of the Principal Contractor to check the design and/or to appoint a competent person to do so. When directed by the CA submit further drawings and calculations for appraisal and modify such drawings until approval is obtained.	
3.3.2	The utmost care is to be exercised in carrying out the scaffolding work. Note supervision requirements and deliveries constraints.	
3.3.3	Allow for access and working scaffolding designed, constructed and maintained in accordance with BS 5973 1993, Code of Practice for Access and Working Scaffolds and Special Scaffold Structures in steel. BS5974, Construction (Health Safety and Welfare) Regulations 1996, CIS 49 'General Access Scaffolds and Ladders' 1997. Scaffolding is to provide safe working platforms to all levels of the work to the Watchman's Tower and east and west screen walls. No part of the existing building shall be used as bearing for scaffolding and access towers. Ties and anchorages to external walls will not be permitted.	
3.3.4	The Principal Contractor is responsible for ascertaining the requirements of all subcontractors including the use of each platform, the number to be fully boarded, those to be sheeted, location and purpose of hoists, fans, hoardings, loading bays and the length of time the facility will be in position, together with other relevant information.	
3.3.5	Designers of special scaffolds shall attend site on the first day of erection to liaise and brief the Scaffolding Supervisor on the requirements of the design. Designers shall emphasise that any variations to the design will not be permitted without the designers written authority. Any agreed variations must be clearly documented and must go through the Main Contractor and CDM-PD to be checked by a competent person. Designers shall visit the site at least weekly during erection. On completion the Designer shall certify (on F91 part 1 section A) to the Principal Contractor that the scaffold has been erected fully in accordance with the design and any approved variations. Copies of the certification should be passed to the CA.	
3.3.6	All scaffolds and structures should be inspected at least every seven days (and after weather conditions likely to have affected their strength or stability) by a	

To be read in conjunction with Part 1 Preliminaries and Part 2 Materials and Workmanship clauses, rhp scheme drawings and details, repair schedule, engineer's drawings, details and all relevant information.

Item	Scope/description	**£**
	competent person, provided by the scaffolding contractor. Records of such inspections together with necessary action must be made in register F91 and signed by the person making the inspection. The register entry is to be copied to the CA.	
3.3.7	No alterations to the scaffold structure may be made at any time without written authority from the Designer and the Principal Contractor.	
3.3.8	Provide an extra-over price for a full working scaffold to the full height and each face of the stair turret at the SE. corner of Knebworth House, abutting the west end of the west screen wall. **Provisional.**	
3.4	**WATCHMAN'S TOWER REFURBISHMENT**	
	STRIPPING OUT – PREPARATORY WORKS	
3.4.1	Assess evidence before removal of loose material inside the Tower, collect any artefacts in a box for review by the CA and Employer's representative.	
3.4.2	Remove bird and other debris and vegetation from all levels of the Tower internally.	
3.4.3	Remove boarding to windows and arrow loops and wire mesh to entrance door frame.	
3.4.4	Provide access for inspection of all levels by the CA, internally and externally at the earliest opportunity.	
3.4.5	Treat woody growths to kill, allow to die back and remove, clean off moss and algae internally. Refer to C41/130, 131 and 132.	
3.4.6	Remove brick infill from Ground Floor fireplace.	
	FLOORS	
	<u>Ground Floor</u>	
3.4.7	Excavate guano and debris to sound natural ground level as D20 and lay geotextile, new sub-base of recycled foamed glass wrapped in geo-textile membrane and lay limecrete slab overall within a 40 mm cork board perimeter as E10. New finished floor level to be at existing threshold level.	
	<u>First Floor</u>	
3.4.8	All new timbers to be isolated from existing masonry with black bituthene membrane trimmed to suit. All fixings to be stainless steel Grade 304.	
3.4.9	Install main beam and trimming steels for support of the new floor structure, to engineer's details.	
3.4.10	Install timber joists at 400 centres with 20mm thick, 150mm wide European Oak floor finish above.	
	<u>Second Floor</u>	
3.4.11	All as First Floor.	
	INTERNAL WALLS	
3.4.12	Allow for brickwork repairs to internal walls, cut out and replace eroded bricks as C41/365 - 368 **Provisional 100No.**	
	WINDOWS; all timber used in repairs to be North American Mountain Grown Douglas Fir to G20 and approved sample	
3.4.13	<u>Ground Floor:</u> Both sashes to be replaced to match within existing sash box. Include for new lead sash weights and polypropylene sash cords. Putty glaze with clear float glass,	

To be read in conjunction with Part 1 Preliminaries and Part 2 Materials and Workmanship clauses, rhp scheme drawings and details, repair schedule, engineer's drawings, details and all relevant information.

Item	Scope/description	**£**
	prime before fitting. Include for refurbishing existing sash pulleys and ironmongery to full working order. Cill to be replaced entirely. Retain and repair sash boxes, allow for 4 hours joiner/carpenter for repairs.	
3.4.14	<u>First Floor:</u> Bottom sash to be replaced to match existing. Include for refurbishing existing sash pulleys and ironmongery to full working order. Cill to be replaced entirely. Ease and adjust top sash, retain and repair sash boxes, allow for 4 hours joiner/carpenter for repairs.	
3.4.15	<u>Second Floor Arrow loops:</u> Form new oak framed inward opening casements to detail, 7No.	
	DOOR	
3.4.16	New European oak framed glazed external door and frame to tower entrance.	
	STAIRS- DESIGN AND MANUFACTURE BY SPECIALIST SUBCONTRACTOR	
	Generally	
3.4.17	<u>Ground floor to First floor and First floor to Second floor:</u> Curved stair with two stainless steel spine/carriage beams 50x50mm SHS or CHS with sleeved joints and countersunk retaining screws. Steel bracket supports welded to carriage beam and 12mm plate to support each rebated european oak tread spanning over. 9mm diameter stainless steel rod to reduce opening at risers. 2No. 40 mm diameter stainless steel hand rails fixed to masonry of perimeter walling at two levels. Full height European oak guarding to inner curve of stair and floor openings, fixed to steel supports top and bottom at each floor level. All stainless steel to be bead blasted finish to approved sample.	
3.4.18	<u>Second floor to Roof level</u>: Stair and guarding as above, form landing to flight as detailed drawings. Final flight to be straight.	
	ROOF	
3.4.19	Allow to rebuild 3 courses of brickwork all round the head of the walling internally and to form a splay weathering with mortar bedded tile creasings to receive lead weathering.	
3.4.20	Install new roof structure to engineer's details supported on existing step in masonry of tower walls.	
3.4.21	Form code 8 lead gutter sole over douglas fir boarding to 1 in 80 fall to chute outlet through the masonry at the NE all as H71.	
3.4.22	Form code 7 lead roof in bays not exceeding 600mm wide over douglas fir boarding with tapered wood core rolls all as H71.	
3.4.23	Install 40mm diameter bead blasted stainless steel handrail/ guarding at 1100mm above roof level, fixed back to merlons on matching brackets.	
3.4.24	Install glazed roof access enclosure onto prepared kerb with sliding/ hinged top and door out. As L10.	
	SERVICES	
3.4.25	<u>Electricity</u>: Performance specification as Part 2 Materials and Workmanship section V90	

To be read in conjunction with Part 1 Preliminaries and Part 2 Materials and Workmanship clauses, rhp scheme drawings and details, repair schedule, engineer's drawings, details and all relevant information.

Item	Scope/description	**£**
	A new Electrical connection is to be run from an existing distribution board either in the Estate Office or the Raj Exhibition, subject to assessment by the specialist subcontractor, via anew trench on the South Side of the screen wall to the Tower. Allow for provision of the new supply and all associated works.	
3.4.26	Drainage: Existing gulley to be repaired and re-used. Existing outfall to be checked. Allow to form a new soakaway as R17 located in adjacent field.	
3.4.27	Allow for a new lead hopper with embellishment to detail and connection to a new cast iron rwp as R10.	
	EXTERNAL WORKS	
3.4.28	Lift turf and reinforce the grass to the bank and lawn to the tower approach. Install Ecogrid E40 gravel filled crates to final 4 metres of the approach. Lay new 60mm thick Yorkstone slab over the masonry footing external to the threshold slab.	
3.4.29	Allow for remedial work to compacted areas, reinstating the ground, turf and grassed areas on completion.	

To be read in conjunction with Part 1 Preliminaries and Part 2 Materials and Workmanship clauses, rhp scheme drawings and details, repair schedule, engineer's drawings, details and all relevant information.

Item	Scope/description	**£**
3.5	**EXTERNAL WALLING- MASONRY & RENDER REPAIRS** To be read in conjunction with Appendix A; Simon Swann Associates report on Trials dated 13.12.2017	
	WORKSHOP, TRIALS, SAMPLES	
3.5.1	Allow for 4 days attendance by Simon Swann to demonstrate and advise site operatives on repair techniques and preparation of trials and samples for approval by the CA as C41/190. Including assessment of render trials previously carried out all as C41/122. **PC Sum** plus all attendance.	
3.5.2	Allow for hire of Helifix pull tester gear and the testing of 3No. pins inserted in the December 2017 trials and a further 10 pins inserted by the contractor as identified by Simon Swann and/or the CA as C41/122. Make a photographic record of the procedure and outcome.	
	WATER TOWER	
3.5.3	Allow for 4 days hire of a suitably sized MEWP [to accommodate 1 operator and 2 tradesmen] to access and carry out repairs to the external walls of the Water Tower above the level of the screen walls and full height to 1m above the merlons at parapet level.	
3.5.4	Allow for impulse radar survey of all facets of the Water Tower as C41/121.	
3.5.5	Provide access for inspection by the CA. and site foreman to mark up repairs. Allow to prepare documentation and record drawings as C41/140.	
3.5.6	Allow for 2 operatives for 3 days each carrying out repair types C41/377 & 522, 523, C41/524 and materials allowance. **Provisional**	
	KNEBWORTH HOUSE SE. STAIR TURRET	
3.5.7	Provide access for inspection by the CA. and site foreman to mark up repairs. Allow to prepare documentation and record drawings as C41/140.	
3.5.8	Subject to inspection, agreement of scope of repair, protections and method statement, remove iron hoop restraint and provide temporary support to masonry as C41/126.	
3.5.9	Allow for 2 operatives for 6 days each in carrying out repair types C20, C41/310, 320 C41/130, 287, 510, 525 and materials allowance. **Provisional**	
	WATCHMAN'S TOWER AND SCREEN WALLS	
3.5.10	Remove embedded iron nails to string courses where rusted, rust jacking and/or exposed. **Provisional allowance 150No**.	
3.5.11	Remove embedded iron plant support rings where rusted, rust jacking. **Provisional allowance 50No.**	
3.5.12	Existing dismantled material, walling bricks, special bricks, tiles, run mouldings and massive units that are loose and/or removed in one piece are to be marked, set-aside and refixed in the completed works and existing locations wherever possible. C41/144 refers.	
3.5.13	Allow for inspection and marking up of areas of repair in conjunction with the CA.	
	Allow for repairs as the schedules that follow;	
3.5.14	WEST SCREEN WALL	
3.5.15	EAST SCREEN WALL	
3.5.16	WATCHMAN'S TOWER	

3.5.14 WEST SCREEN WALL TENDER

Repair description \ location - zone	SW.M1/E1	SW.M2/E2	SW.M3/E3	SW.M4/E4	SW.M5/E5	SW.M6/E6	SW.M7/E7	SW.M8/E8	N. Buttress	Relevant Specification clause
MERLON/EMBRASURE COPINGS										
Replace with new pre-cast masonry unit	**M1 & E1**	**E2**	**M3 & E3**	**M4 & E4**	**M5**	**E6**	**M7 & E7**	**M8**		C41/271 & 376
Run-moulded repair		**M2**			**E5**	**M6**		**E8**		C41/220, 377 & 522, 523
Pin moulded projection/weathering		**M2**				**M6**		**E8**		C41/377
Re-render plain return faces						**M6**				C41/525, 540, 555
Mortar repair and re-render profiled rear face from roll mould						**M6**				C41/220, 524
MERLON MASONRY										
Rebuild entire above the S. tile weathering	**M1**		**M1**	**e/o PS M4**	**M5**		**e/o PS M7**			C20, C41/310, 320
Crack repair/grout hollow areas		**2.5 lin m**		**W. 0.5m² N. 2 lin m**		**W. 0.5m² S. 0.5m²**	**N. 0.5m² S.0.5m²**	**N. 0.5m²**	**N. 0.5m² E.&W. 1.0m²**	C41/610, 710-740
New bricks in addition to lower courses	**S. 2, N. 4**									C41/320
Dub out eroded brickwork and render finish	**N. 0.5m²**	**N. 0.5m²**		**0.2m²**			**0.25m²**			C41/525, 540, 555
Prop and investigate removal of woody growth				**1**						C41/130
Include re-forming run moulding to N. profile		**1**								C41/220, 377 & 522, 523
Core drill and pin vertically to stabilise. Pins No.				**3**			**3**			C41/288
WALLING OF SECOND STAGE N. [ABOVE STRING COURSE]										
Dub out eroded brickwork and render finish	**N. 0.5m²**	**N. 0.25m²**			**N. 0.2m²**					C41/525, 540, 555
Grout inject & repair cracks [lin' m] and hollow areas [m²]	**N. 1.0 lin m**	**N. 1.0 lin m**	**N. 2.0 lin m**		**N. 3.0 lin m**	**N. 2.0 lin m**	**N. 2.0 lin m**	**N. 1.0 lin m**	**Full height**	C41/610, 710-740
Remove fractured/hollow render and re-render including dub out and ruled finish.				**1.5 x 0.25m²**				**PS 0.5m²**	**PS 2.0m²**	C41/525, 540, 555
STRING COURSE										
Pin/secure lower moulding at 250mm centres No.				**7**	**7**	**7**	**7**	**7**	**3**	C41/377
Remove hollow sections, re-form armature, prepare and run moulded profile.	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**						**0.45 lin m to tabling**	C41/321, 510, 515, 516,
Grout inject and repair cracks,				**1.5 lin m**	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**	**0.45 lin m**	C41/610, 710-740
Extra over for reforming top splay				**PS 1.5 lin m**	**PS 1.5 lin m**	**PS 1.5 lin m**				C41/523
WALLING OF FIRST STAGE N. – BELOW STRING										
Grout inject cracks [lin' m] and hollow areas [m²]	Allow for 7.0 lin' m to N. First stage walling. Allow for 0.5m² to N. First stage walling									C41/610, 710-740
Remove fractured/hollow render and re-render including dub out and ruled finish.	Allow 0.5m² to N. First stage walling									C41/525, 540, 555
WALLING OF SECOND STAGE S. ELEVATION										
Reform upper tile splay including inserted code 5 lead flashing to detail	**1.5 lin m**	**repair**	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**		C41/361 & H71/XXX
Form new tile splay weathering to detail	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**	**1.5 lin m**					C41/322 & 361
Grout inject and repair cracks between tile weatherings	**say 2.0 lin m**	**say 2.0 lin m**	**say 2.0 lin m**	**say 2.0 lin m**	**say 2.0 lin m**					C41/710-740
Extra\over to remove render, dub out and replace between tile weatherings.	**4.0m²**									C41/525, 540, 555
Patch repair 'soft' render below new lower tile weathering/splay C41/214 Mix RHL2 or RHL3	**5.0m²**				**0.5m²**					C41/214
Re- render below tile weathering down to flashing at the head of the roof below. Mix RHL2 or RHL3					**entire**					C41/214
New code 5 lead weathering and code 4 soakers to roof/ridge and abutments				**entire**						H71/XXX

3.5.15 EAST SCREEN WALL TENDER

Repair description \ location - zone	**SE.M1/E1**	**SE.M2/E2**	**SE.M3/E3**	**SE.M4/E4**	**SE.M5/E5**	**SE.M6/E6**	**SE.M7/E7**	**SE.E8**	**Buttress**	**Relevant Specification clause**
MERLON/EMBRASURE COPINGS										
Replace with new pre-cast masonry unit	**M1**	**E2**	**M3 & E3**	**M4 & E4**	**M5 & E5**	**E6**	**e/o PS E7**			C41/271 & 376
Run-moulded repair		**M2**				**M6**	**M7**			C41/220, 377 & 522, 523
Pin moulded projection/weathering and grout							**M7 & E7**	**E8**		C41/377, 711-740
Re-render plain return faces							**M7**			C41/525, 540, 555
Crack repair/ grout hollow areas	**E1**	**M2**				**M6**	**M7**	**E8**		C41/610, 710-740
Mortar repair and re-render profiled rear face from roll mould						**M6**	**M7 & E7**	**E8**		C41/220, 524
MERLON MASONRY										
Rebuild entire above the S. tile weathering				**PS M4 & E4**						C20, C41/310, 320
Crack repair/ grout hollow areas	**N. 1.5lin m** **S. 1.5lin m**	**N. 2.5lin m** **S. 2.0lin m**	**N. 3.5lin m** **S. 2.0lin m**	**N. 3.5lin m** **S. 2.0lin m**	**N. 3.5lin m**	**N. 2.0lin m** **S. 2.0lin m**	**N. 4.0lin m** **S. 2.0lin m**			C41/610, 710-740
Dub out eroded brickwork and render finish	**S. 0.1m²**	**N. 0.5m²**	**N. 1.5m²**	**N. 1.5m²**	**N. 1.0m²** **S. 0.2m²**	**N. 0.4m²** **S. 0.3m²**	**N. 1.0m²**			C41/525, 540, 555
Prop and investigate removal of woody growth			**M3**	**M4**			**M7**			C41/130
Core drill and pin vertically to stabilise Pins No			**3**	**3**			**2 RAKING**			C41/288
WALLING OF SECOND STAGE N. [ABOVE STRING COURSE]										
Grout inject & repair cracks [lin m] and hollow areas [m²]				**2 lin m** **4.0m²**				**5 lin m**		C41/610, 710-740
Re-render				**4.0m²**						C41/525, 540, 555
STRING COURSE										
Pin/secure lower moulding at 250mm centres No.	**3**	**3**	**3**	**3**						C41/377
Remove hollow sections, re-form tile armature, prepare and run moulded profile.	**1.5lin m**	**1.5lin m**	**1.5lin m**	**1.5lin m**	**e/o PS**	**e/o PS**	**e/o PS**	**e/o PS**	**N. 0.5 lin m**	C41/321
Grout inject and repair cracks					**1.5lin m**	**1.5lin m**	**1.5lin m**	**0.5lin m**	**N. 0.5 lin m**	C41/710-740
Re-render				**4.0m²**						C41/525, 540, 555
WALLING OF S. ELEVATION										
Reform upper tile splay including inserted code 5 lead flashing to detail	**entire**									C41/361 & H71/XXX
Grout inject and repair cracks [lin m] and hollow areas [m²]	**7.0m lin m vertical** **8.0 lin m horizontal**								**N. [W]** **0.3m²**	C41/710-740
Dub out and re- render including ruling.		**PS 2.0m²**		**0.5m²**						C41/525, 540, 555
Patch repair/New code 5 lead weathering	**PS throughout**									C41/525, 540, 555 & H71/XXX
Treat and remove vegetation and woody growths	**throughout**									C41/130 - 132
Patch repair tiles No.				**4**					**S. 6 upper** **4 lower**	C41/322
Replace eroded bricks; 3 courses high	**3.0 lin m**									C41/365, 366
Replace eroded bricks; 2 courses high	**2.0 lin m**		**1.5 lin m**		**4.0 lin m**					C41/365, 366
Replace eroded bricks; 1 brick course		**2.5 lin m**			**3.0 lin m**					C41/365, 366, 367 368
Replace isolated eroded bricks	**45**			**25**	**40**					C41/365, 367 368

3.5.16 WATCHMAN'S TOWER TENDER

Repair description \ location - zone	**E12**	**M1/E1**	**M2/E2**	**M3/E3**	**M4/E4**	**M5/E5**	**M6/E6**	**M7/E7**	**M8/E8**	**M9/E9**	**M10/E10**	**M11/E11**	**M12**	**Relevant Specification clauses**
MERLON/EMBRASURE COPINGS														
Replace with new pre-cast masonry unit		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**		**M9+E9**	**M10+E10**	**M11+E11**	**M12**	C41/271 & 376
Trial removal of embrasure coping as a masonry element and re-instate.								**E7**						C41/310 & 281
Re-render plain return faces		**M1**												C41/525, 540, 555
Crack repair/ grout hollow areas	**E12**								**M8**					C41/610, 710-740
Mortar repair and re-render profiled rear face from roll mould	**PS.**	**PS.**							**M8**				**PS.**	C41/524
MERLONS & MASONRY ABOVE CORBELLING														
Take down to level of daywork joint, [1, 2 or 3 above corbelling] rebuild brick masonry and re-render			**M2 to M5 2nd ashlar/ruling above corbel**							**M9 3rd**	**M10 1st + chimney**	**PS M11 2nd**		C20, C41/310, 320, C41/525, 540, 555
Rebuild top courses [No.] and re-render							**M6 -5**	**M7 -6**						As above
Crack repair, including s/s pins/ grout hollow areas	**0.5m²**	**M1 0.5m²**	**PS. 1.0m² to each element**						**M8 0.5m²**			**M11 0.5m² E11 1m²**	**M12 0.5m²**	C41/710-740
Replace eroded bricks and re-render.						**E5 10No.**	**M6 6No PS.E6 6No**	**M7 11No**					**15 No**	C41/365-368 & C41/525, 540, 555
Dub out eroded brickwork and render finish							**E6 0.5m²**	**M7 0.5m²**					**0.5m²+1.5m²**	C41/525, 540, 555
Prop and remove woody growths, treat with biocide.								**M7**				**M11**		C41/130 - 132
Pin vertically to stabilise Pins No.								**M7 - 3**	**M8 - 3**					C41/388 & 312
WALLING OF LOWER STAGE														
Grout inject and repair cracks [lin m] and hollow areas [m²]	**PS. 11 lin m & PS. 8m²**													C41/710-740

To be read in conjunction with Part 1 Preliminaries and Part 2 Materials and Workmanship clauses, rhp scheme drawings and details, repair schedule, engineer's drawings, details and all relevant information.

Item	Scope/description	**£**
	SHELTERCOATING NEW AND EXISTING RENDER TO INTEGRATE REPAIRS	
3.5.17	Allow for integration and protection of repaired render by applying a sacrificial coat of NHL:Prompt:coloured selected stone dust. Stone dust to pass a 600um sieve. Thick textured material that includes visible lumps is unacceptable.	
3.5.18	The contractor is responsible for obtaining suitable aggregates to achieve an exact match between the dried coating and the clean original render. The following materials have been found useful: • Powdered brick dust or red sandstone • Golden sand, Clipsham or Ketton stone dust • Dark or Delabole slate • Yellow Guiting stone dust • Hornton Brown stone dust • BayFerrox and Colortherm LANXESS inorganic colour powder pigments in combination with aggregates as above.	
3.5.19	Allow for preparing in advance of the work 4No samples of alternative mixes and seek approval of colour and texture of the completely dry samples prior to application. Using the selected mix, apply to a repaired area of the south elevation as a reference sample for the completed work.	
3.5.20	Thoroughly mix aggregates and binders in a 3:1 ratio to achieve a wet mortar consistency with a few grains of Tempo retarder. Dilute the mix to the consistency of thin cream. Ensure the face of the render is clean and free from lichens and dust. Apply sheltercoat sparingly with a soft short-haired bristle brush thoroughly working into the surface, especially pits and hairline cracks.	
3.5.21	Allow for preparation and application of shelter coating, as above, to 20m^2 in areas not exceeding 2m^2. **Provisional**	
3.6	**COMPLETION**	
3.6.1	Clean down all masonry surfaces with a medium bristle brush as works are completed.	
3.6.2	Clear away all scaffolding and temporary works to each elevation as works are completed, clear debris from the base of all walls and elsewhere and leave the works and site in a clean, neat and orderly condition on completion.	
3.6.3	Clear away hoardings, site enclosure and accommodation as above.	
3.6.4	Allow to make good the parking area set aside for the contractor's use and driveway up to the Water Tower gateway following removal of site vehicles to the condition found on commencement of the works.	
	Record Drawings and Report	
3.6.5	Provide annotated copies of the contract drawings marked up to show the actual masonry repairs carried out cross referenced to photographs of work in progress and on completion. Provide a report detailing the techniques, and mortar mixes used. Provide details of all materials and components used including their origin and mineralogy where appropriate.	
3.6.6	The above documents to be prepared and submitted in draft to the CA on or before completion of the works on site. On agreement of content 3 copies of the final report and drawings are to be forwarded to the CA for distribution.	