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Tim Cronin
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London Borough of Camden
Town Hall
Argyle Street
LONDON
WC1H 8ND

Our ref: WL98708/L003/RJF/LT

3 January 2002

Dear Mr Cronin

WATERLOW PARK HIGHGATE N19

Thank you for your letter dated 21 December 2001 notifying us that our application was deemed incomplete due to a lack of details relating to repairs to statues, plinths and sundials. Most of the requested details can be found under 'Action' following each individual entry in the comprehensive schedules dispatched with the application. Please refer to the table below.

SCHEDULE NO.	STATUE	DETAILS
2.01	Sir Sydney Waterlow	Contractor to provide method statement
2.02	John van Nost Shepherd/Shepherdess	Refer to Appendix 1 for cleaning of statues and repairs to plinths
2.03	Pineapple/Urns	Refer to Appendix 1 for cleaning and repair work
2.04	Eagles	Paint-removal only; no other action
2.05	Urn on Upper Terrace	Refer to Appendix 1 & 3 for repairs and cleaning

SCHEDULE NO.	SUNDIAL	DETAILS
4.01	Small	Contractor to provide method statement for moving and dismantling sundial
		Refer to Appendix 3 for cleaning
		No details given for replacement of stone slab/marble/bronze dial

Should you have any further queries that are not covered in the schedule of Artefacts and Features, please do not hesitate to contact this office.

Yours sincerely
FERGUSON & McILVEEN

Rokos Frangos

FERGUSON McILVEEN

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Camden Town Hall
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WC1H 8ND

3 December 2001

Our ref: WL98708/L002/RJF/LT

To Whom It May Concern

RESTORATION OF WATERLOW PARK, HIGHGATE

Please find enclosed an application for Listed Buildings Consent for the above development, together with the required maps and documents.

The proposals relate to the general restoration of Waterlow Park, which will involve the restoration, relocation and repair of some of the listed features. Although Lauderdale House itself is not the subject of proposals, the work includes the following:

- The Entrance Paving to Lauderdale House is to be carefully lifted and re-laid. The original area of paving is to be extended by the addition of reclaimed yorkstone and flint. The existing (unlisted) railings are to be relocated to the outer edges of Lauderdale House.
- The statue of Sir Sydney Waterlow is to have its bronze key reinstated, and a new inscribed plaque is to be placed at the base of the statue.
- The John van Nost Shepherd and Shepherdess Statues are to have their plinths repaired.
- The small Portland stone sundial is to have its capping stone, marble dial plate and bronze dial reinstated. It is then to be re-located to the Western end of the Upper Terrace.
- The large wrought-iron sundial is to be relocated and set in a new base.

Further details, accompanied by illustrations and photographs, can be found in the accompanying document 'Schedule of Artefacts and Features (Listed and Unlisted.'

We trust the application and enclosed documentation is in order, but if any aspect relating to the development or the application requires clarification, please do not hesitate to contact this office, preferably by telephone in the first instance if this will help expedite matters.

Yours sincerely
FERGUSON & McILVEEN

Rokos Frangos
Enc.

FERGUSON
McILVEEN

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WATERLOW PARK

HIGHGATE

SCHEDULE OF ARTEFACTS AND FEATURES (LISTED AND UNLISTED)

PROPOSALS FOR REPAIR OR REINSTATEMENT

FINAL DRAFT

LONDON BOROUGH OF CAMDEN

WL98708L

November 2001

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5.02 Internal Steps by Highgate Hill Entrance

5.03 Electricity Box by Bandstand

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APPENDIX II

Ingram Consultancy's description and recommendation for repairs to John van Nostrum Statues

APPENDIX III

Ingram Consultancy's Detail specification for repair and conservation of Natural Stone Masonry and repointing and conserving Natural Stone Masonry

APPENDIX IV

N.B.S. instructions for painting metalwork

LIST OF ILLUSTRATIONS

1.00 ENTRANCES

1.01 SWAINS LANE GATE

Description

- Highly decorative cast iron gates with wrought iron detailing.
- Currently painted black with features picked out in creamy-grey.
- Evidence of green paint under present paint coating.
- Stone gate piers.
- Wrought iron orbs on ornate cast iron finials.
- Entrance also consists of side gates and ornate section of boundary railings.
- Tarmac threshold and vehicular entrance separated by 2 rows of granite setts.

Condition

- Gates are moderate condition, given their age and the delicacy of the cast iron details.
- General flaking, corrosion and algae.
- Left-hand gate (looking inwards) has lost part of the central decorative motif, see figures 1a and 1b.
- Orb missing to top of right-hand Pier, see figures 2a and 2b.
- Both gates have missing ornamentation at uppermost level. Fortunately symmetrical features remain for accurate detail mouldings to be taken, see figures 3a and 3b.
- Lower Gate Latch is bent, see figure 4.
- Stone piers are in good condition but require gentle cleaning.
- Chain to side gate (to the left looking inwards) has been heavily painted onto the gate frame.

Action

Refer to specification for detail action on cleaning and repairs to stone work; see appendices.

Contractor to take mouldings of missing features for recasting:

1. Central circular panel to right hand gate, see figures 1a and 1b.
2. Wrought Iron 'Orb' from top of gate pier, see figures 2a and 2b.
3. Missing section of detail ironwork at central feature on uppermost level of gate, see figures 3a and 3b.
4. Lower gate latch detail, see figure 4.

Contractor to carry out paint flake test for reference and colour specification. Remaining metal work to be sand blasted. All damaged edges to metal work to be filed down in preparation to receive new replacement features / fittings.

Replacement features to be doweled into existing metal work, filled and sanded down to true profiles and forms.

Gates and railing to be painted as per specification. Colour to be approved.

Stone piers to be cleaned down gently as per section 1.2 of specification, see Appendix 1.

Exposed mortar jointing to be repaired and recessed as per section 2.0 of specification, see Appendix 1.

Contractor to provide method statement for all repair work to metal features for approval prior to work commencing.

1.02 LOWER DARTMOUTH HILL GATE

Description

- Cast iron gates with wrought iron detailing.
- Made by Coules and Sons, renovated by Arc Fabrications Ltd 020 7402 5905. Currently painted black.
- Brick piers with stone sections and capping.
- Poured concrete threshold and tarmac vehicular entrance with no clearly delineated threshold.

Condition

- Ironwork in good condition with few layers of paint.
- Evidence of recent cleaning, repair and painting.
- Missing 'swirling' segments to top and middle of left-hand gate (looking inwards). Not very noticeable.
- General flaking, corrosion and algae.
- Bent upright bar to right-hand gate.
- Badly cracked concrete threshold.

Action

Sand blast and repaint metalwork as per specification refer to Appendices.

Colour to be approved.

All damaged and sharp edges to be filed down to receive new paintwork.

Bent finials to be straightened. Contractor to provide method statement for doing so in situ if possible.

1.03 MIDDLE GATE ON DARTMOUTH HILL BY LODGE

Description

- Cast iron Gate and piers with wrought iron detailing.
- Painted black.

- Threshold mainly granite setts and cast iron gate runner.
- Vehicular access.

Condition

- Ironwork in reasonable condition (few layers of paint).
- Right-hand gate (looking inwards) has bent uprights to the middle and outer edge.
- General flaking and corrosion.

Action

Sand blast and repaint metalwork as per specification, refer appendices.

Colour to be approved.

All damaged and sharp edges to be filed down to receive new paintwork.

Bent finials to be straightened. Contractor to provide method statement for doing so in situ if possible.

1.04 HIGHGATE HILL GATE

Description

- Cast iron Gate and piers and railings with wrought iron detailing. Currently painted black.
- Yorkstone threshold.
- No vehicular access.

Condition

- Gates are in moderate to poor condition. All sections and features remain.
- General flaking, corrosion and algae.
- Three uprights on left-hand gate (looking inwards) are bent.
- Horizontal stop plate is bent.
- Threshold consists of 3 x large slabs of yorkstone – both outer slabs are cracked.
- Ornamental iron uprights with coiled backstay details immediately to the side of each gate.
- On the left-hand side the coil detail is half sunk in a concrete block, see figure 5. On the right-hand side the coil detail is partially sunk in a broken concrete block with broken stone slab on top, see figure 6.
- Extensive algae to the low wall outside on the street.

Action

Sand blast and repaint metalwork as per specification, refer to appendices.

Colour (possibly blue) to be approved to match paint flake analysis.

All damaged and sharp edges to be filed down to receive new paintwork.

Bent finials to be straightened. Contractor to provide method statement for doing so in situ if possible.

Base to coiled backstays to be broken out and reset on new Yorkstone bases as per attached sketch figure 7.

Yorkstone flag and wall to be cleaned down as per section 1.2 of specification. Repointing to all joints as per section 2.0 of specification, see Appendix 1.

1.05 UPPER SWAINS LANE GATE BY TENNIS COURTS

Description

- Cast iron Gates with wrought iron detailing.
- Currently painted black. Upper decorative features painted creamy-grey.
- Brick piers with lime / Portland sections and capping.
- York stone threshold.

Condition

- Flaking and corrosion – several layers of paint including greyish-blue and green.
- No sections missing.
- Graffiti on left gate (looking inwards), to stone sections of brick piers on both sides and on outer boundary wall left of the gates.
- The vehicular entrance paving (between kerbs) is unattractive and has been badly repaired.
- There is a fall of approx. 340mm due to the natural slope.
- There is an awkward 'step' down and into the park.
- Old granite setts (approx. 150x70mm) separate the Yorkstone threshold from vehicular approach.
- Concrete haunching to setts.
- Threshold consists of 3 x large Yorkstone flags – two of which are cracked.

Action

Sand blast and repaint metalwork as per specification refer to appendices.

Colour to be approved.

All damaged and sharp edges to be filed down to receive new paintwork.

Bent finials to be straightened. Contractor to provide method statement for doing so in situ if possible.

Concrete mortar to be carefully removed from brick piers and replaced with lime mortar as per section 2.0 of specification, Appendix 1.

1.06 ST JOSEPH'S GATE

Description

- Cast iron Gates with wrought iron detailing.
- Currently painted black, but evidence of green paint on paint flake observation.
- Cast iron piers.
- Poured concrete threshold.
- Vehicular entrance paving of setts approx. 200 x 140mm.

Condition

- General flaking and corrosion to ironwork.
- Few layers of paint.
- No segments missing from ironwork.
- Threshold is badly cracked
- Full crack in low stone wall immediately to left of left-hand pier (looking inwards).

Action

Sand blast and repaint metalwork as per specification refer to appendices.

Colour to be approved following paint flake analysis.

All damaged and sharp edges to be filed down to receive new paintwork.

Bent finials to be straightened. Contractor to provide method statement for doing so in situ if possible.

Cracked Yorkstone wall to reset and infilled with colour matching mortar. Refer to 2.0 of specification, Appendix 1.

1.07 LAUDERDALE HOUSE GATE

Description

- Grade II Listed.
- Narrow pedestrian entrance consisting of single cast iron gate with narrow panels either side.
- Attractive overhead wrought iron detailing.
- Brick piers with lime/Portland stone section.
- Stone Finials similar to urn on upper terrace.

Condition

- Ironwork generally in good condition.
- General flaking, corrosion and algae.
- Brick piers generally in good condition.

Action

Sand blast and repaint metalwork as per specification refer to appendices.

Colour to be approved following paint flake analysis.

All damaged and sharp edges to be filed down to receive new paintwork.

1.08 GATES TO WEST OF LAUDERDALE HOUSE

Description

- Cast iron gates with wrought iron detailing.
- Currently pointed black, but evidence of green and blue paint.
- Wrought iron piers.
- Poured 'ridged' concrete forms threshold and gentle ramp.
- No vehicular access.
- Continuous pavement.

Condition

- Extensive flaking and corrosion to Ironwork.
- Small sections missing from finial detailing on the top of both gates and piers.

Action

Sand blast and repaint metalwork as per specification, refer to appendices.

Colour to be approved following paint flake analysis.

All damaged and sharp edges to be filed down to receive new paintwork.

Bent finials to be straightened. Contractor to provide method statement for doing so in situ if possible.

Mould to be taken of finial detail for replacement and / or repair to existing. Contractor to provide method statement for replacing finials.

Ingram
Consultancy

The Repair and Conservation
of Historic Buildings and Archaeological Sites

Terraced Garden Walls, Waterlow Park, Highgate

Report on the condition of the brick terraced garden walls with recommendations for repair, conservation, and reinstatement

Prepared for London Borough of Camden, Parks and Open Spaces

November 2000

Project 20033

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Netley House
Gomshall
Guildford
Surrey GU5 9QA

Tel: **01483 205 170** Fax: 01483 205 175
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Elevation: - Wall D -

Drawing No: -

Survey Issue/Revision: - First Issue
Date: - 27 November 2000

Item	Grid Ref	Defect and Location	Repair Type	Size (mm) / Quantity (m^2) length x depth x height	Comments	Photo No	Bill Item Ref.
190	Pier 17	Isolated sections of decayed brick joints	RP	1.5Lm			
191	Wall panel 17	Open joints and displacement of Portland stone coping and upper 7 courses of brickwork with heavy ivy growth into wall	RB	3340 x 380 x 9 brick courses + coping	Step down area of rebuild from centre to the left hand side of the wall from 7 to 9 course from the wall top		
192	Wall panel 17	Isolated sections of decayed brick joints	RP	8Lm			
193	Pier 18	Failing poor quality mortar repair to the urn pedestal	RPL S	O/a 300 x 255	Allow to take down and refix urn Pedestal in formed in two stone. Upper stone is turned to a circular profile. Lower stone is square		
194	Pier 18	Fracture to Portland stone pier base caused by corroding iron fixing rod	REM + PIN	450 x 160 x 450			
195	Pier 18	Isolated sections of decayed brick joints	RP	4Lm			

SPECIFICATION

C41: Repairing/Renovating/Conserving masonry

C41.2b: Grouting fractures in brickwork

C41.3a: Repairing and conserving natural stonemasonry
C41.3b: Repairing and conserving brickwork

C41.4a: Repointing natural stonemasonry
C41.4b: Repointing brickwork

Schedule of Revisions

Issue No.	Date	Amendments	Page No's.
First issue	27 Nov 2000	Issued as part of condition survey report for discussion/approval by Local Planning Authority and English Heritage	63 to 93

C40.2b Grouting Fractures in Brickwork

C40.2b/100 Scope of the Grouting Works

The scope of grouting works is limited to filling fracture and separation voids between 1 and 5mm wide to prevent water ingress into the structure of the brick masonry walls at Waterlow Park as described within the schedule of works and recommendations section of this report.

C40.2b/105 Standards and Codes of Practice

All works are to be carried out in accordance with current British Standards, published technical papers from recognised authorities and experts within the industry, and manufacturers' and suppliers' recommendations.

C40.2b/110 Health and Safety Considerations

Prior to undertaking any repair works, detailed method statements must be provided describing the work process accompanied by a specific risk assessment identifying all known or reasonably anticipated risks, with procedures to maintain a safe working environment. COSHH assessments must be provided for all materials used in the grouting process.

These details must take into consideration the requirements of the Health and Safety Plan and be submitted for approval by the Planning Supervisor prior to works commencing.

C40.2b/115 Types of Grouting Techniques

Heavy ivy and shrub growth in the wall tops and buttresses has resulted in fracturing and separation between the wall and supporting buttresses. In many cases the fracture occurs in the vertical mortar joint leading to decay of the mortar and creation of voids. The failed and fractured brick joints are to be cut out carefully by hand using suitable chisels and repointed. Once the vertical joint between the wall and buttress is repointed the void between the pointed joint is to be filled with a hydraulic lime to allow the buttress to provide support to the wall once again. This work is to be carried out in accordance with *Repair Technique GR-1.*

C40.2b/120 Repointing of Brickwork Joints – *Repair Technique GR-1*

Carefully cut out existing pointing using a sharp tungsten tipped quirk chisel always cutting into the void created by the cutting out to minimise stress within the joint. Where previous cement based repointing mortar is found to be very hard and there is a risk of spalling the brick arrisses by using hand chisels, small drills may be used to frill along the centre of the mortar joint to weaken the hard repair mortar before continuing to cut out by hand with the quirk chisel.

The existing mortar is to be raked or cut back to a minimum depth of twice the face width of the joint or 25mm whichever is the greater. The pointing cavity is to be left with a square back and any mortar residue cleaned off from the sides of the joint ready to receive the new pointing mortar.

Clean out the back of the joint to remove all loose dust and debris using a solution of masonry biocide to kill root growth and minor vegetation. Ensure that the joint has been sufficiently wetted so that the back of the joint and surrounding brickwork will remain damp for at least 24 hours to control curing of the mortars.

Using a pointing key, place the mortar into the joint and press in firmly to ensure the mortar fills the back of the joint and bonds with the existing bedding mortar. Continue to pack the joint in layers to leave the mortar joint slightly recessed from the surrounding decayed and/or weathered brick arrisses. Allow the mortar to stiffen slightly and finish the joint by tamping the mortar face with a stiff natural bristle brush to compact the joint and expose the aggregates within the mortar. The joints are to be repointed using the mortar mix in specification clause C41.4b/125. Once the joints

have been finished and whilst the mortar is beginning to cure and stiffen, holes are to be drilled into the mortar face commencing at the base of the fracture and at 200mm intervals to allow a grouting tube to be installed. The holes should be drilled in line with the void behind the pointed mortar face to ensure that the grout will flow into the void. Allow the pointing mortar to cure for a minimum of 72 hours.

Install a short length of clear plastic pipe into each grouting hole and flush through the fracture void with clean cold water. Commencing at the bottom of the fracture inject the lime based grout into the void and fill until grout begins to flow from the grouting pipe above. Plug the grouting tube and recommence grouting at the next tube above working systematically up the full high of the joint. Grouting is to be limited to filling 600mm of vertical joint each day to prevent excessive hydrostatic pressure. Where a void occurs between the wall and supporting buttress the void is to be grouted from both sides of the vertical joint. A lime based grout is to be used in accordance with specification clause C41.4b/130.

On completion of the grouting and once the grout has cured for at least 24 hours remove each grouting tube and fill the hole in the joint face with mortar.

Ensure that the newly pointed joints are protected from the heat of the sun and drying wind. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 72 hours to control curing of the mortar. Grouting work must not be undertaken when the temperature is 7°C and falling.

C40.2b/125 Mortar Mix

The mortar for repointing the vertical joints between the wall and supporting buttresses is to be 1 part natural hydraulic lime (NHL2) and 2½ parts well graded clean sharp quartz sand, graded from 2.36mm down. The sand should not contain more than 10% of aggregate that passes through a 150micron sieve.

A suitable lime is St Astier NHL 2 natural hydraulic lime available through the following supplier. The contractor can propose alternative materials with manufactures technical data sheets and Risk and COSHH assessments for approval by the C.A.

Setra Marketing Ltd
16 Cavendish Drive
Claygate
Esher
Surrey KT10 0QE

Contact: - Ugo Spano

Tel: - 01372 465 779 Fax: - 01372 801 302

Samples of the sand to be used for the pointing mortar are to be provided by the contractor for approval by the C.A.

The mortar aggregates are to be mixed dry in a drum mixer for 10 to 15 minutes to ensure even and consistent mixing. Hand mixing of small quantities in a bucket or on a spot board can be undertaken provided accurate gauging and thorough mixing is achieved. Add a minimum amount of water to make a stiff but pliable mortar that can be placed into the joints without sliding off of the hawk or pointing key. All mortars are to be mixed and used in accordance with the supplier's recommendations.

C40.2b/130 Suitable Products and Suppliers

The following is specified as a suitable grout. The contractor can propose alternative materials with manufactures technical data sheets and Risk and COSHH assessments for approval by the C.A.

CMS Pozament Heritage Grout, hydraulic lime grout

CMS Pozament Limited
Swains Park Ind. Est.

Overseal
Derbyshire
DE12 6JT

Tel: 01283 554 800 Fax: 01283 552 923

C40.3a Repairing and Conserving Natural Stonemasonry

C40.3a/100 Scope of the Repair Works

The scope of repair works is limited to spalled, decayed and missing areas of natural stonemasonry to the terrace garden walls of Waterlow Park as described within the schedule of works and recommendations section of this report.

The use of natural stone is limited to quoin stones, copings, a threshold and carved pier ornamentation to walls B and C and to Portland stone copings to walls D and E.

C40.3a/105 Standards and Codes of Practice

All works are to be carried out in accordance with current British Standards, published technical papers from recognised authorities and experts within the industry and manufacturers' and suppliers' recommendations.

C40.3a/110 Health and Safety Considerations

Prior to undertaking any repair works, detailed method statements must be provided describing the work process accompanied by a specific risk assessment identifying all known or reasonable anticipated risks, with procedures to maintain a safe working environment. COSHH assessments must be provided for all materials used in the repair process.

These details must take into consideration all the requirements of the Health and Safety Plan and be submitted for approval by the Planning Supervisor prior to works commencing.

C40.3a/115 Types of Repair Techniques

a) Minor areas of spalling and decay in sheltered areas are to be repaired using a stone repair mortar in accordance with *Repair Technique MR-1*. In certain cases mortar repairs have been selected to provide an unobtrusive repair in obvious locations and to reduce the extent of cutting out required to achieve the repair. An example of this situation is the replacement of existing poor quality mortar repairs to the ashlar masonry.

b) Where spalling or decay is found in exposed locations, such as copings and steps, the repair will serve as a weathering/wearing surface and the defective areas are to be repaired by piecing in new natural stone, shaped and finished to match the original design and appearance in accordance with *Repair Technique PI*.

Where possible it is intended to keep the repair to the smallest size possible and follow the irregular perimeter of the decay/spall. The edge of a repair may also be taken to the edge of a moulding or joint to provide a more discreet repair.

c) Where corroding fixing cramps are found these are to be cleaned and treated with a rust inhibitor. Where these fixings are heavily corroded and beyond their useful life they are to be replaced with new stainless steel fixings. This work is to be carried out in accordance with *Repair Technique CR*.

d) Previous repairs to fractures, which are now shrinking, cracking, and failing or a poor colour match, are to be replaced using either *Repair Technique MR-1 or Repair Technique PI*.

e) Portland stone copings to walls D and E are to be carefully removed at the commencement of repair works to the walls and stored on pallets on site with cushioning between each stone. Following repair works to the brick walls, the coping are to be cleaned of old mortar residue and re-bedded on the wall tops. This work is to be carried out in accordance with specification clause C40.3a/155.

f) If the Portland stone details have been extensively repaired, fractured or are substantially decayed they are to be replaced in accordance with *Repair Technique*

RPL S.

g) Missing sections of Portland stone copings are to be replaced with new natural Portland stone items cut and shaped to match the original design in accordance with *Repair Technique RPL S.*

h) For small spalls up to 20mm x 20mm the cavity can be filled in accordance with *Repair Technique MG.*

i) For small holes up to 20mm in diameter the cavity can be filled in accordance with *Repair Technique FH.*

j) Fractured masonry is to be pinned in place and grouted in accordance with *Repair Technique PIN*

k) The heavily decayed natural stone threshold is to be consolidated in accordance with *Repair Technique CSL-1.*

l) The corroded remnants of iron balustrades set into the Portland stone copings are to be removed and the sinking cleaned out and filled with the Portland stone repair mortar in accordance with *Repair Techniques REM and FH, MG or MR-01* as appropriate.

C40.3a/120 Samples and Exemplar Work

Prior to undertaking the contract works the proposed specialist contractor is to provide a list of the craft people who will undertake the work together with a résumé for each person, describing the sites and type of work undertaken in the past two years, with contact phone numbers for reference.

Each craft person is to carry out sample repairs for each of the repair techniques specified to confirm the ability and quality of the craft person's work. Samples must demonstrate all aspects of the specification. Samples of mortar colours, carving and masonry designs, and tool finishes can be carried out off the wall using blocks of stone and mortar tile samples.

Once each craft persons' work has been approved, the specialist contractor must ensure that these people are used for the contract works. In the event that personnel need to be changed all new personnel will need to carry out the trial procedure described above.

In the event that the craft person is known to the Contract Administrator (C.A.) and their work has been previously proven, the requirement for site trials may be reduced or omitted with the consent of the C.A.

C40.3a/125 Mortar Repair to Spalled and Defective Masonry – *Repair Technique MR-1*

Carefully cut around the perimeter of the decay, spalling or previous repair to form a square or rectangular repair to the minimum size to encompass the defect. The edges of the repair aperture are to be slightly undercut to form a physical key for the repair mortar.

Where possible it is intended to keep the repair to the smallest size possible and to follow the irregular perimeter of the decay/spall. The edge or a repair may also be taken to the edge of a moulding or joint to provide a more discreet repair.

Repair apertures are to be cut out to a minimum depth of 20mm or until a sound substrate is found, whichever is the greater.

Clean out the back of the repair aperture using clean water to remove all loose stone dust and debris. Ensure that the repair aperture has been sufficiently wetted so that the substrate and surrounding masonry will remain damp for at least 24 hours to control curing of the mortars.

Place the repair mortar into the aperture and tamp back firmly to ensure the mortar fills

the back of the repair and the undercut edges.

For repairs to deeper areas of spalling or decay, the repair is to be reinforced with thin brass rod to form a support armature for the repair mortar. The repair is be built out in layers not exceeding 20mm thick, with each layer left with a scratch finish to form a key for subsequent layers. Each layer is to be left to form an initial set before applying subsequent layers.

The final layer of mortar is to be finished with a small wooden float to match the original profile. The mortar repairs are to be built up and finished using mortar mix 1 (see specification clause C41.3a/180).

Ensure at all times that the face of the existing masonry is kept clean and free of mortar smears.

For repairs to areas of weathered masonry where the surface has become rough or textured following procedure is to be adopted.

Allow the mortar to stiffen and spray the surface with a fine spray of water to wash away some of the surface fines to expose the aggregate within the mortar. Alternatively tamp the surface with a dry compact brush to expose the aggregate to match as closely as possible with the surrounding weathered masonry.

All new repairs are to be protected from the heat of the sun and drying wind and rain. In warm weather ensure that the surrounding masonry and face of the repair are kept damp for at least 72 hours to control curing of the mortar. These repairs must not be carried out if the temperature is 7°C and falling.

C40.3a/130 Making Good Minor Spalling of Masonry – *Repair Technique MG*

This repair method is to be used where a small spall has occurred (up to 20mm x 20mm) in a visually remote location and the depth of the spall is at least 10mm. Maintain the existing broken edge of the hole and only carry out further cutting out if some tidying up of the hole is required to provide an adequate key.

Clean out the back of the repair using clean water to remove all loose dust and debris. Ensure that the repair aperture has been sufficiently wetted so that the substrate and surrounding masonry will remain damp for at least 24 to 48 hours to control curing of the mortars.

Place the repair mortar into the hole and tamp back to ensure the mortar fills the back of the aperture. The repair is to be built up in layers not exceeding 20mm thick with each layer left with a scratch finish to form a key for subsequent layers. Each layer is to be left to form an initial set before applying subsequent layers.

The final layer of mortar is to be finished with a small wooden float to match the original profile. The mortar repairs are to be built up and finished using mortar mix 1 (see specification clause C41.3a/180).

For repairs to areas of weathered masonry where the stone surface has become rough or textured, following procedure is to be adopted.

Allow the mortar to stiffen and spray the surface with a fine spray of water to wash away some of the surface fines to expose the aggregate within the mortar. Alternatively tamp the surface with a dry compact fine bristle brush to expose the aggregate to match as closely as possible with the surrounding weathered masonry. "Pin holing" and drag marks from brush finishing are not acceptable.

Ensure at all times that the stone face is kept clean and free of mortar smears and that the repair is level with the surrounding surface.

All new repairs are to be protected from the heat of the sun and drying wind. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 72 hours to control curing of the mortar. These repairs must not be carried out if

the temperature is 7°C and falling.

C40.3a/135 **Filling of Small Holes with Mortar** – *Repair Technique FH*

This method is to be used to fill small holes of up to 20mm in diameter. Maintain the existing broken edge of the hole and only carry out further cutting out if some tidying up of the hole is required to provide an adequate key.

Clean out the back of the repair using clean water to remove all loose dust and debris. Ensure that the repair aperture has been sufficiently wetted so that the substrate and surrounding masonry will remain damp for at least 24 to 48 hours to control curing of the mortars.

Place the repair mortar into the hole and tamp back to ensure the mortar fills the back of the hole. The repair is to be built up in layers not exceeding 20mm thick with each layer left with a scratch finish to form a key for subsequent layers. Each layer is to be left to form an initial set before applying subsequent layers.

The final layer of mortar is to be finished with a small wooden float to match the original profile. The mortar repairs are to be built up and finished using mortar mix 1 (see specification clause C41.3a/180).

For repairs to weathered with rough or textured surface the following procedure is to be adopted.

Allow the mortar to stiffen and spray the surface with a fine spray of water to wash away some of the surface fines to expose the aggregate within the mortar. Alternatively tamp the surface with a dry compact brush to expose the aggregate to match as closely as possible with the surrounding weathered masonry.

Ensure at all times that the face of the existing masonry is kept clean and free of mortar smears and that the repair is level with the surrounding surface.

All new repairs are to be protected from the heat of the sun and drying wind. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 72 hours to control curing of the mortar. These repairs must not be carried out if the temperature is 7°C and falling.

C40.3a/140 **Removal of Redundant and Corroded Fixings and Railing Ends** – *Repair Technique REM*

Carefully drill around the perimeter of the fixing/railing end using a small (maximum 5mm diameter) tungsten tipped masonry drill to release the fixings. Where possible drill to one side of the fixing/railing end only to loosen the fixing and reduce the size of the repair hole. Hand all redundant fixings to the C.A. for further retention and historical examination.

Where the hole is very small and discreet, fill the cavity with repair mortar in accordance with *Repair Technique FH.* For larger holes from approximately 20mm x 20mm, carry out a repair in accordance with *Repair Techniques MG, MR-1 or PI* as appropriate.

C40.3a/145 **Piecing-In of Natural Stone Ashlar** - *Repair Technique PI*

Mark out the size of repair on the stone face as described within the schedule of works and agreed on site with the Contract Administrator. It is intended to minimise the size of each repair to the area of spalling, decay or previous repair only. However where appropriate the repair may be extend to the edge of a moulding or joint to provide a more discreet repair. Each repair is to be marked out square.

All cutting out for the repairs is to be carried out using either masons fire sharp or tungsten tipped chisels unless otherwise directed. Electric cutters will only be permitted with the written consent of the Contract Administrator and only if it can be demonstrated that no over cutting or damage will occur.

Carefully cut out the existing decayed stone or previous defective repair within the areas marked to the required depth. The sides of the mortice are to be undercut to form a key for the repair. The top and bottom faces of the mortice are to be square cut to allow accurate location of the natural stone indent.

Ensure that the perimeter of the mortice is square, with a sharp arris. No chips or spalling to this edge will be accepted.

The new natural stone indents are to be cut from stone scant or sawn six sides stone sourced in accordance with specification clause C41.3a/195. Where the repair bridges a joint, the indent is to be made in separate pieces with the joint width and position maintained. All indents are to be laid on their natural bed unless standard masonry practice would dictate otherwise.

The exposed face of the indent is to be finished with a fine rubbed face to match the original masonry detailing. Repairs to the plinth should be finished with a gouge to match the original tooled finish.

Each indent is to be cut square and slightly oversized to the repair mortice. The sides of the indent piece are to be rubbed down by hand to form fine rubbed joints to the perimeter of the repair. This joint must not exceed 2mm in width. No chips or spalling to this edge will be accepted.

Carefully drill holes into the back of each indent to accept a suitably sized threaded stainless steel dowel glued in place with a masonry resin. Dry fit each indent into place and mark out the position of the dowels in the mortice. Drill holes in the back of the mortice to accept dowels.

Clean out the back of the mortice using clean water to remove all loose dust and debris. Ensure that the repair aperture has been sufficiently wetted so that the substrate and surrounding masonry will remain damp for at least 24 hours to control curing of the mortars.

Fill each hole with masons resin ready to accept the dowel. Resin is only to be used to secure the dowels in place and must not be used to fix the stone indent in place. The sides and back of the indent are to be coated with a lime mortar slurry to fill the perimeter joints.

Coat the sides of the indent with a lime slurry mortar and fit each indent into the mortice with a bed of mortar on the back face of the indent (see specification clause C41.3a/180). Lightly wash the face of the repair with clean water and a sponge to remove excess mortar and smearing.

C40.3a/150 Piecing In of Natural Stone to Moulded Copings and Carved Ornamentation - *Repair Technique PI*

Mark out the size of the repair on the face of stone as described within the schedule of works and agreed on site with the Contract Administrator. It is the intention to minimise the size of each repair to the area of spalling, decay or previous repair. However, where appropriate, the repair may be extended to the edge of a moulding or joint to provide a more discreet repair. Each repair is to be marked out square.

All cutting out in preparation for piecing-in is to be carried out using either masons fire sharp or tungsten tipped chisels unless otherwise directed. Electric cutters will only be permitted with the written consent of the Contract Administrator and only if it can be demonstrated that no over cutting or damage will occur.

Carefully cut out the existing decayed stone or previous defective repair within the areas marked to the required depth. The sides of the mortice are to be undercut to form a key for the repair. The top and bottom faces of the mortice are to be square cut to allow accurate location of the natural stone indent.

The new natural stone indents are to be cut from stone scant or sawn six sides stone sourced in accordance with specification clause C41.3a/195. Where the indented repair oversails the wall line, for example when the front face of a string course or moulded detail is repaired, the repair must be cut out to a minimum depth equal to the amount of stone projecting past the wall line. The wall line is defined as the furthermost projecting line of support.

Ensure that the perimeter of the mortice is square, with a sharp arris. No chips or spalling to this edge will be accepted.

Where the repair bridges a joint, the indent is to be made in separate pieces with the joint width and position maintained. All indents are to be laid on their natural bed unless standard masonry practice would dictate otherwise. The indent is to be carved on site from one piece of stone and must match the original size and profile of the moulded detail.

The exposed face of the indent is to be finished with a fine rubbed face to match the original masonry detailing.

Each indent is to be cut square and slightly oversized to the repair mortice. The edges of each indent are to be rubbed down by hand to form fine rubbed joints to the perimeter of the repair. This joint must not exceed 2mm in width. No chips or spalling to this edge will be accepted.

Carefully drill holes into the back of each indent to accept a suitably sized threaded stainless steel dowels glued in place with a masonry resin. Dry fit each indent into place and mark out the position of the dowels in the mortice. Drill holes in the back of the mortice to accept dowels.

Clean out the back of the mortice using clean water to remove all loose dust and debris. Ensure that the repair aperture has been sufficiently wetted so that the substrate and surrounding masonry will remain damp for at least 24 to 48 hours to control curing of the mortars.

Fill each hole with masonry resin ready to accept the dowel. Resin is only to be used to secure the dowels in place and must not be used to fix the stone indent in place.

Coat the sides of the indent with a lime slurry mortar and fit each indent into the mortice with a bed of mortar to the back face of the indent. Lightly wash the face of the repair with clean water and a sponge to remove excess mortar and smearing.

C40.3a/155 Removal of existing coping stones and re-bedding following repair of the brick walls

Before carrying out any repair work to brick walls D and E the wall is to be accurately surveyed and measured, and detailed drawings produced recording the sizes and construction of the walls. Each coping is to be measured and numbered and its location identified on the drawing so that the wall can be rebuilt with all copings relocated in their original position.

Following recording of the wall and approval of the record drawings by the C.A. the copings are to be carefully removed and stored on pallets with cushioning between stones to prevent damage. Each pallet is to be covered to keep the stone dry and store on site in a location to be agreed.

Following repair of the brick wall and modification of the adjacent landscaping the copings are to be re-bedded in their original location in the wall top.

Before refitting the copings each coping is to be carefully cleaned by hand using sharp mason's chisels to remove all existing mortar residue.

Ensure that the wall top has been sufficiently wetted so that the substrate and surrounding masonry will remain damp for at least 24 hours to control curing of the mortars.

Thoroughly wet down the new stone and bed the stone down on a full mortar bed gently tapping the surface of the stone until level and in line. The perpendicular joint face of each stone is to be lightly buttered with mortar during fixing to ensure that the perpend joints are completely filled with mortar. The original fine joint width is to be maintained when re-bedding the copings. Clean off any squeezed out mortar residue with a trowel ensuring that no mortar smears onto the brickwork.

The use of a DPC course below the copings is not required.

The copings are to be re-bedded using mortar mix 1 in accordance with specification clause C40.3a/180.

The re-bedded copings are to be protected from the heat of the sun and drying wind and rain. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 72 hours to control curing of the mortar. This work must not be carried out if the temperature is 7°C and falling.

C40.3a/160 **Replacement of Defective or Missing Coping, Quoin and Ornamental stones, etc.** – *Repair Technique RPL S*

Prior to replacement of the stone carry out a survey of the area of replacement and record the size, profile, construction method, and other information to allow for replacement of the stone. All new masonry is to be replaced to match the size, profile, finish and design of the original stonework.

New stone is to be sourced and selected in accordance with specification clause C40.3a/195.

C40.3a/165 **Lifting requirements for stones.**

Coping stones and sculpture must be lifted during removal and repair/re-bedding by two skilled masons familiar with the work in hand. Where the load is greater than 40Kg lifting equipment must be used that is suitable for the proposed works. Detailed method statements and risk assessments must be provided by the contractor confirming their preferred methods before works commences. All lifting equipment must be tested and maintained in accordance with current health and safety legislation and test and inspection certificates kept on site in the health and safety file. All access plant such as scaffolding, mobile towers and the supporting ground must be suitable to support the loads imposed by the lifting operation.

All masonry to be lifted into place must be adequately protected to prevent damage during the lifting operation.

C40.3a/170 **Pinning and Grouting of Spalling and Fractured Masonry** – *Repair Technique PIN*

Areas of fractured and spalling masonry are to be secured in place using threaded stainless steel pins. Where possible, carefully remove the spalling section of masonry and thoroughly clean the back of the stone to remove any organic soiling. Drill holes into the back of the spalled section of masonry to accept suitably sized and spaced threaded stainless steel pins. Secure the pins into position using masonry resin.

Dry fit the section of masonry into position, and mark out the location of the dowels onto the substrate. Drill holes into the substrate to accept the pins. Half fill the dowel holes with resin and coat the substrate and back of the stone with the mortar slurry. Slide the stone into position and install temporary propping as required.

Where the spalled masonry is partially secured and cannot be carefully removed, drill through the spalled stone and into the substrate to a suitable depth to accept the threaded stainless steel pins. Using a syringe or small injection gun to half fill the dowels holes with resin and slide the dowels into position.

Following curing of the resin, fill the face of the fracture with a stiff paste of fine stone mortar and grout the fracture in accordance with *Repair Technique GR-2*. Wipe away

any residue from the face of the stone ensuring that no smears are left. Fill any face fixed dowel holes with mortar mix 1 in accordance with *Repair Technique FH.*

C40.3a/175 Application of a Lime Shelter Coat to Decayed Surfaces – *Repair Technique SC*

Carefully brush down the decayed surface to remove any loose dust and debris.

Thoroughly wet down the substrate to ensure the surface is sufficiently damp to control curing of the shelter coat. Prepare sufficient quantities of lime shelter coat in accordance with specification clause C41.3a/185 stirring regularly during the course of the works to ensure the aggregate is evenly suspended in the liquid.

Apply a liberal coat of the shelter coat to the stone with a soft brush flooding the application into the cracks and surface imperfections. Allow to partially dry, until the glossy appearance is lost. Using a damp wad of hessian cloth rub the shelter coat into the texture and particularly the cracks and voids in the stone surface. Regularly rinse out the hessian wad in clean water to prevent smearing across the masonry. The surface should not appear to have been painted or lime washed and should provide a surface consolidation treatment only.

Allow to cure and dry for at least 24 hours. Thoroughly wash down all surrounding masonry to remove any residue and smearing.

To control the curing of the shelter coat a curtain of wet hessian cloth should be draped within 75 to 100mm from the treated areas to create a damp environment. This should be maintained for up to 7 days depending on the weather conditions.

C40.3a/180 Mortar Mixes

When using mortar in any repair work the exposed face or surface of new or repair work must be protected from the heat of the sun and drying wind. In warm weather ensure that the surrounding masonry and face of the mortar repair/joint is kept damp for at least 3 days to control curing of the mortar. Any work using mortars must not be carried out if the temperature is 7°C and falling.

a) Mortar mix 1

The repair mortar is to be a mixture of 1 part St Astier NHL 3.5 hydraulic lime to 2½ parts of sand and crushed stone aggregate.

The sand and stone mix is to be a combination 3 parts of sharp, well graded clear sand and 2 parts of graded Portland stone aggregate. The mix should have a maximum aggregate size of 2 to 3mm.

Mortar used for a backing coat or to bed copings can be made using a coarser aggregate mix. A finer aggregate not exceeding 1.18mm should be used for filling the narrow perpend joints to the copings.

The mortar aggregates and binder are to be mixed thoroughly in a bucket dry to ensure even and consistent mixing. Add the minimum amount of water required to make a stiff but pliable mortar that can be placed into the repair without sliding off of the hawk or trowel. All mortars are to be mixed and used in accordance with the supplier's recommendations.

b) Mortar Slurry mix for stone piecing-in

The slurry mortar used to coat the sides of the stone indent can be made from a mix of 1 part St Astier NHL3.5 hydraulic lime to 1 part fine Portland stone dust. The mortar is to be mixed with water to form a creamy consistency.

c) Mortar mix 2

The mortar for all masonry repointing is to be a mixture of 1 part St Astier NHL 2 hydraulic lime to 2½ parts sand and stone dust mix.

The sand and stone mix is to be made from 3 parts sharp, well graded, clear sand to 2 parts graded Portland stone aggregate with a maximum sieve size of 2.36mm. For narrow joints the aggregate size should be reduced to maximum of 1.18mm. For pointing to Portland stone a white silver sand and crush Portland stone aggregate should be used. For pointing to the granite a fine sand may be used and a natural pigment to match the original colour of the grout/pointing to the joints.

St Astier NHL 2 and NHL 3.5 naturally hydraulic lime is available through the following supplier. The contractor can propose alternative materials with manufacture's technical data sheets and Risk and COSHH assessments for approval by the C.A.

Setra Marketing Ltd
16 Cavendish Drive
Claygate
Esher
Surrey KT10 0QE

Contact: - Ugo Spano

Tel: - 01372 465 779 Fax: - 01372 801 302

C40.3a/185 Shelter Coat Mix

The shelter coat is to be made with 1 part of well-matured lime putty, 2 parts crushed Portland limestone and 1 part crushed Guiting. All aggregates to pass a 300-micron sieve. Thoroughly mix the mortar in a pan mixer for 20 to 30 minutes to ensure even and consistent mixing and remove mortar from pan mixer.

Add sufficient water to the lime putty mortar and mix with a plasterer's whisk to form a creamy liquid as thick as single cream. Measure out 9 parts of the creamy liquid and 1 part of semi-skimmed milk and whisk for a further 5 minutes. Regularly stir the liquid during application to ensure that the aggregates are completely suspended in the liquid.

C40.3a/190 Grout Supplier

The following is specified as a suitable grout. The contractor can propose alternative materials with manufactures technical data sheets and Risk and COSHH assessments for approval by the C.A.

CMS Pozament Heritage Grout, hydraulic lime grout

CMS Pozament Limited
Burma Drive
Marfleet
Hull
HU9 5SG

Tel: 01482 706 443 Fax: 01482 374 106

C40.3a/195 Source of Natural Stone for Piecing-in and Stone Replacement

The stone is to be a Portland Stone free from vents, cracks, fissures, discolouration or other defects, which may adversely affect strength, durability or appearance.

The stone for isolated repairs is to be worked and finished on site to match the original style of finish used within each area of repair. Replacement stone copings can be produced off site at the masonry works.

The precise supplier and quarry of stone is to be agreed on site following the submission of samples to the Contract Administrator and his/her written approval.

Samples measuring at least 300mm x 300mm are to be provided from each of the following sources. The sample must be cut in the bedding plane proposed for the repair of replacement. Where several bedding planes are to be used samples must be provided to demonstrate the quality and appearance of each stone type in each bedding plane.

Preliminary Source believed to be the closest current match.

Coombefield or Perryfield Whitbed Portland stone

Available from
Bath & Portland Natural Stone Ltd
Head Office
Bunters Lane
Wakenham
Portland
Dorset
DT5 1HY

Contact: Colin Goble

Tel: 01305 820 207 Fax: 01305 860 275

OR

Bowers or Independent Whitbed Portland stone

Available from

Albion Stone Quarries Limited
1st Floor
27-33 Brighton Road
Redhill
Surrey RH1 6PP

Contact: Michael Poultney

Tel: 01737 771 772 Fax: 01737 771 776

C41.3b Repairing and Conserving Brickwork

C41.3b/100 Scope of the Repair Works

The scope of repair works is limited to terraced garden brickwork walls to Waterlow Park as described within the schedule of defects and recommendations section of this report.

The works are to be carried out to a high standard to ensure that the appearance of the existing walls is not adversely altered.

C41.3b/105 Standards and Codes of Practice

All works are to be carried out in accordance with current British Standards, published technical papers from recognised authorities and experts within the industry and manufacturers' and suppliers' recommendations.

C41.3b/110 Health and Safety Considerations

Prior to undertaking any repair works, detailed method statements must be provided describing the work process accompanied by a specific risk assessment identifying all known or reasonable anticipated risks, with procedures to maintain a safe working environment. COSHH assessments must be provided for all materials used within the repair process.

These details must take into consideration the requirements of the Health and Safety Plan and be submitted for approval by the Planning Supervisor prior to works commencing.

C41.3b/115 Type of Repair Technique

a) Decayed sections of the wall top on walls B and C are to be accurately recorded so that the location of each brick, brick slip, and tile is known together with the bonding pattern, layout, and joint widths. The wall top is to be recorded, taken down and rebuilt in short sections at a time to ensure that ach element is returned to its original position. This is to be achieved by tracing each wall section onto a sheet of heavy duty clear polythene that is held taught in a tracing frame. Once the wall top is recorded it is to be carefully taken down and each brick and tile numbered on the polythene record in permanent marker. This work is to be carried out in accordance with *Repair Technique RB-2.*

b) Sections of bulging, loose or detaching brickwork to the face of walls B and C are to be accurately recorded, and rebuilt in the same manner as the wall tops using *Repair Technique RB-2.*

c) The previously rebuilt wall top to wall A has been rebuilt using a hard cementitious mortar and a DPC course. The wall capping is starting to detach from the wall and is to be carefully removed and replaced with new brickwork using a hydraulic lime and sand mortar in accordance with *Repair Technique RB-1.*

d) Areas of bulging, loose and detaching brickwork to walls D and E are to be carefully taken down, salvaging all existing bricks, and rebuilt in accordance with *Repair Technique RB-4.* This repair method does not require the precise recording of every brick position as in method RB-2, but requires that wall sections are rebuilt using salvaged materials to follow the existing bonding and construction arrangement.

e) The collapsed section of wall C is to be rebuilt using new imperial sized bricks of varying sizes (generally as found on the original wall) to a design provided by the C.A. and conservation consultant. This work is to be carried out in accordance with *Repair Technique RB-3*

f) Heavily decayed and spalled or missing bricks are to be replaced in accordance with *Repair Technique BI-1.*

g) Previous brick replacements/repairs that are either poor in quality, or are visually unsatisfactory, are to be replaced in accordance with *Repair Technique BI-1.*

h) A small section of render has been applied to the end of wall A that faces into the park. The render is likely to be a later repair to the wall and is largely intact but with minor fractures that may allow water ingress and decay to the underlying brickwork. The fractures are to be cleaned out and filled with mortar in accordance with *Repair Technique F.*

C41.3b/120 Samples and Exemplar Work

Prior to undertaking the contract works the proposed specialist contractor is to provide a list of the craft people who will undertake the work together with a résumé for each person, describing the sites and type of work undertaken in the past two years, with contact phone numbers for reference.

Each craft person is to carry out sample repairs for each of the repair techniques specified to confirm that that the specification can be achieved and to verify the quality of the craft person's work. Samples must demonstrate all aspects of the specification. Samples of mortar colours, designs, and joint finishing can be undertaken off the wall using mortar tile samples and panels of sample brickwork.

Once each craft persons' work has been approved, the specialist contractor must ensure that these people are used for the contract works. In the event that personnel need to be changed all new personnel will need to carry out the trial procedure described above.

In the event that the craft person is known to the Contract Administrator (C.A.) and their work has been previously proven, the requirement for site trials may be reduced or omitted with the consent of the C.A.

C41.3b/125 Recording of Condition and Progress at the Commencement and Duration of the Repair Works

At the commencement of the contract works each wall section is to be recorded by colour photographs to confirm the condition and appearance of the wall before works commence. Photographs are to be taken 'face on' in short sections so that the wall height fills approximately two thirds of the photograph frame. Photographs are to be number and cross referenced to elevation drawings of each wall.

Each wall is to be photographed on both the 'terrace garden wall elevation' and the 'park elevation'.

Allow to take progress photographs at commencement and then at three times during the course of the work and produce 4 sets of 6" x 8" gloss finish colour prints at each stage.

C41.3b/130 Replacement of Spalled, Missing Bricks and Poorly matched Previous Repairs – *Repair Technique BR-1*

Carefully cut out the existing pointing to the perimeter of the decayed brick using a sharp tungsten tipped chisel quirk chisel taking care not to damage the surrounding bricks. Once the surrounding joint has been cut back to a minimum depth of 25mm the defective brick can be cut out using a combination of a small power drill and hand tools.

Once the spalled brick has been removed, carefully clean away any remaining mortar residue from the surrounding bricks to leave a clean aperture for the replacement brick.

Wash out the back of the aperture with clean cold water to remove any loose debris ensuring that the substrate is sufficiently wet to remain damp for a least 24 hours.

Soak the replacement brick in a bucket of clean water for a few minutes and leave to stand while the mortar is prepared. Butter each face of the brick with sufficient mortar to allow the brick to be pushed into the aperture with the mortar completely filling the joints. Lightly tap the brick flush with the surrounding brickwork ensuring that the joints are in line and the width of the joint is maintained. Fill any void in the mortar joints leaving the mortar slightly recessed from the face of the brick and surrounding brick arrisses.

The bricks are to be replaced using the mortar mix 4 in specification clause C41.3b/165 below.

Allow the mortar to harden slightly and finish the joint by tamping with a stiff bristle brush to expose the aggregates. Alternatively the mortar joints can be lightly finished by hand spraying with clean water to remove the surface fines and expose the mortar aggregates.

Brush away any mortar residue from the brick. No mortar smearing will be acceptable.

C41.3b/135 Careful Removal of Existing Brick Wall Top to Wall A and Replacement with New Brickwork in Hydraulic Lime and Sand Mortar – *Repair Technique RB-1*

The upper 3 courses of brickwork forming the wall capping are to be removed and disposed of. The present wall capping consists of a brick on edge coping course, a chamfered/moulded brick course, and a course of plain brickwork. To assist with the removal and to prevent damage to the wall, disc cutters and drills may be used, provided this work is undertaken by skill crafts people who can demonstrate that no damage will occur to the wall.

Once the wall capping is removed carefully clean off all mortar residue from the upper course of brickwork to the wall. Brush down the upper surface of the brickwork to remove all dust and debris and thoroughly wet down the substrate to help control suction and curing of the mortar.

Rebuild the wall capping using new bricks as specification clause C41.3b/165 ensuring that all bricks are laid on a full bed of mortar with each brick end buttered with mortar to ensure that all joints are completely filled with mortar. The brick frog is to face up on the first course. Lightly tamp down each brick to the correct level ensuring that the original joint width is maintained and replicated in the new work. To ensure that each course of brickwork is built to the correct line and level the ends of the capping course are to be built up first so that a string line can be used as a guide to the correct level. If the wall is found to be slightly out of horizontal or vertical alignment the existing lines must be followed to ensure that the new capping provides an unobtrusive repair.

The mortar joints are to be finished slightly recessed from the face of the brick and surrounding arrisses as the work proceeds. Ensure that all existing and new brickwork is kept free from mortar smearing during the course of the works. It is not intended to carry out any cleaning of new or existing brickwork. The wall capping is to be rebuilt using mortar mix 3 as specification clause C41.3b/165.

The use of a DPC course below the wall capping is not required.

The newly constructed wall capping is to be protected from rain and the heat of the sun and drying wind. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 3 days to control curing of the mortar. This work must not be carried out if the temperature is 7°C and falling.

C41.3b/140 Accurate Recording of the Wall top walls B and C, salvaging of existing Materials and Rebuilding to Existing Details – *Repair Technique RB-2*

Before taking down sections of loose and decaying wall capping, the wall top must be accurately recorded to identify the location of every element so that the capping can be rebuilt to the exact layout, construction, size and profile as found before work commenced.

The wall top is to be taken down and rebuilt in lengths not greater than 1.5Lm at any one time to avoid confusing the location of individual bricks and tiles and so that the existing line, level and sizes are not altered.

Using a tracing frame consisting of taut heavy duty clear polythene, accurately trace around each brick and tile that forms the wall capping course using a permanent marker pen recording each element. This procedure must be carried out for each face of the wall and both polythene tracing sheets numbered and cross referenced to each other.

The wall is to be photographed in accordance with specification clause C41.3b/125.

Once the wall is accurately recorded, carefully taken down the specified section, carefully cleaning each brick and tile to remove the existing mortar residue. Each brick and tile is to be permanently numbered on an unseen face and the number marked onto the polythene tracing sheet in the correct location. Working progressively as each element is removed from the wall, and cleaned and numbered, the brick/ tile is to be placed onto an open timber box/frame in the same arrangement as found on the wall. Suitable cushioning and protection is to be used to ensure that no damage or soiling occurs.

Commence rebuilding the wall top as soon as possible, bedded each element back into its original position, ensuring that existing joints sizes are maintained. The substrate and each brick/tile are to thoroughly pre-wetted to control suction and curing of the new mortar. Each brick/tile is to be bedded on a full mortar bed ensuring the perpend joints are completely filled with mortar. Ensure that no mortar is allowed to smear across the face. The mortar beds/joints are to be kept recessed back from the face and surround arris of the brick/tile. The face of the joint is to be finished by lightly tamping with a stiff bristle brush to expose the aggregates within the mortar.

Alternatively a hand spray can be used to finish the joint face by lightly washing away the surface laitance to expose the aggregates.

The use of a DPC course below the wall capping is not required.

The wall capping is to be rebuilt using mortar mix 3 as specification clause C41.3b/165.

The newly constructed wall capping is to be protected from rain and heat of the sun and drying wind. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 72 hours to control curing of the mortar. This work must not be carried out if the temperature is 7°C and falling.

C41.3b/145 **The take down of Collapsed and Unstable areas of Wall C and Rebuilding using New Brickwork** – *Repair Technique RB-3*

Install all necessary temporary supports/propping to remaining sections of the wall and install temporary earthwork supports in accordance with the structural engineer's proposals.

Carefully take down the specified wall sections and buttresses, salvaging and cleaning all existing bricks for use in the repair of remaining wall sections. All salvaged bricks are to be carefully stacked on pallets and stored and protected in an agreed area on site.

Rebuild the wall in accordance with the specified design using new bricks in accordance with specification clause C41.3b/170. Ensure that the bricks are thoroughly soaked in clean water to control such and curing of the mortars during the construction. Bricks are to be bedded on a full mortar bed with all perpend, bed joints and frogs completely filled with mortar. Bricks are to be laid with the frog uppermost unless otherwise specified. The wall is to be rebuilt using mortar mix 4 in accordance with specification clause C41.3b/165.

Mortar joints are to be finished flush as the work proceeds ensuring that mortar does not smear across the brick face. Once the mortar joints have stiffened slightly, and not

later than 4 hours after the mortar has been mixed, the face of the joint is to be lightly tamped with a stiff bristle brush to expose the aggregates within the mortar.

The wall is to be rebuilt in heights not greater than 13 brick courses each day to prevent compression of the mortar joints.

The newly constructed wall is to be protected from the rain and heat of the sun and drying wind. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 3 days to control curing of the mortar. This work must not be carried out if the temperature is 7°C and falling.

Allow the mortar within the wall to cure for a minimum of 28 days before removing any temporary propping and earthwork support. Back filling/soil strengthening is to be carried out in accordance with the structural engineer's design.

C41.3b/150 **Carefully Take Down and Rebuilding of Loose, Detaching and Bulging areas of brickwork to Walls B and C**

Sections of loose, detaching, and bulging brickwork are to be recorded, taken down and rebuilt using the same method used to rebuild the existing wall tops. See specification clause C41.3b/140.

C41.3b/155 **Carefully Take Down and Rebuilding of Loose, Detaching and Bulging areas of brickwork to Walls D and E** – *Repair Technique RB-4*

Before carrying out this work each wall section and buttress should be clearly photographed to record the appearance and bonding pattern of the wall, and each photograph cross referenced to a key plan and elevation drawing. The drawing should be a simple line drawing to a suitable scale to clearly record the dimensions of each wall panel and buttress in order to allow the walls to be rebuilt. Once this simple record has been completed the defective walls areas should be carefully dismantled, salvaging all existing bricks.

Wall areas scheduled for rebuilding can be taken down in one phase and then rebuilt in one continuous phase without the need to replace each brick back into its original place.

The work is to be undertaken using methods and materials described in clause C41.3b/145

As each wall section is rebuilt, all root growth must be removed to prevent plants re-establishing. If the subsoil behind the wall has moved or displaced preventing the wall being rebuilt back to its original line the soil should be excavated back to a suitable line.

It is recommended that the trench for the French drain and the level of adjacent footpath be excavated once the areas of wall have been taken down. This will avoid disturbance to the newly constructed walls and provide greater scope and flexibility to remove all unwanted plant roots.

C41.3b/160 **Repair of fractures in existing render finishes** – *Repair Technique F*

Any previous mortar repairs that have been applied to fractures should be removed by carefully cutting around the perimeter of the repair with sharp chisels or with hack saw blades. The loosened repair mortar and any other decayed and friable plaster should be removed. The fracture should be cut back through the full depth of the plaster to the masonry substrate, and the perimeter of the fracture cut back to sound plaster. The edges of the plaster should be undercut to achieve a sound bond between the new repair mortar and the existing plaster.

The prepared fracture should be brushed clean of all loose material and the substrate

wetted with a fine water spray to control suction on application of the lime repair mortar. The edges of the repair cavity should be painted with a solution of the lime mortar to be used in the repair. The mortar should be thinned with the addition of water until it reaches a creamy consistency suitable for brush application.

Once this mortar slurry has lost its wet appearance but before it has cured, the fracture should be filled with mortar mix 5 in specification clause C41.3b/165. The mortar should be well compacted into the fracture cavity using small plastering tools in layers not exceeding 10mm in thickness, allowing at least 24 hours before application of the subsequent layer. The repair should be protected from rapid drying subsequent to application using polythene protection and damp hessian hung across the surface of the repair to create a damp environment for at least 3 days.

The finish of the repair should match the existing render as closely as possible in texture.

C41.3b/165 Mortar Mix

a) Mortar mix 3: for rebuilding brick wall tops and repointing brick wall tops.

The mortar is to consist of 1 part natural hydraulic lime (NHL2) and 2½ parts well-graded sharp sand.

A suitable lime is St Astier NHL2 natural hydraulic lime available through the following supplier. The contractor can propose alternative materials with manufactures technical data sheets and Risk and COSHH assessments for approval by the C.A.

The sand is to be well-graded sharp, sand graded from 2.6mm down. Samples of the mortar to be used should be prepared and approved by the C.A. The mortar is to be mixed in a drum mixer for 10 to 15 minutes to ensure even and consistent mixing. Hand mixing of small quantities in a bucket or on a spot board can be undertaken provided accurate gauging and thorough mixing is achieved. Add a minimum amount of water to make a stiff but pliable mortar that can be placed into the joints without sliding off of the hawk or pointing key. All mortars are to be mixed and used in accordance with the supplier's recommendations.

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b) Mortar mix 4: for rebuilding general wall areas, piecing-in bricks and repointing brickwork to general wall areas.

The mortar is to consist of 1 part mature lime putty, ½ part brick dust pozzolan, and 2½ parts well graded sharp sand.

Mature lime putty, aged for a minimum of 6 months, un-sieved and containing some ash from the lime burning process is to be used for these works. The contractor can propose alternative materials with manufactures technical data sheets and Risk and COSHH assessments for approval by the C.A.

The brick dust is to be a cream coloured, low fired (900°C to 1000°C) crushed and graded aggregate, with particle sizes between 38microns to 75 microns.

The sand is to be well-graded sharp sand graded from 2.36mm down. Samples of the mortar to be used should be prepared and approved by the C.A. The mortar is to be mixed in a pan mixer for 10 to 15 minutes to ensure even and consistent mixing. Hand mixing of small quantities on a spot board can be undertaken provided accurate gauging and thorough mixing and beating is achieved. All mortars are to be mixed and used in accordance with the supplier's recommendations.

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c) Mortar mix 5: for filling fractures in render

The mortar is to consist of 1 part natural hydraulic lime (NHL2) and 2½ parts well-graded sharp sand.

A suitable lime is St Astier NHL2 natural hydraulic lime available through the following supplier. The contractor can propose alternative materials with manufactures technical data sheets and Risk and COSHH assessments for approval by the C.A.

The sand is to be well-graded sharp, sand graded from 1.18mm. Samples of the mortar to be used should be prepared and approved by the C.A. The mortar is to be mixed in a drum mixer for 10 to 15 minutes to ensure even and consistent mixing. Hand mixing of small quantities in a bucket or on a spot board can be undertaken provided accurate gauging and thorough mixing is achieved. Add a minimum amount of water to make a stiff but pliable mortar that can be placed into the joints without sliding off of the hawk or pointing key. All mortars are to be mixed and used in accordance with the supplier's recommendations.

Lime Suppliers

Supplier of St Astier Lime

Setra Marketing Ltd
16 Cavendish Drive
Claygate
Esher
Surrey KT10 0QE

Contact: - Ugo Spano

Tel: - 01372 465 779 Fax: - 01372 801 302

Supplier of mature lime putty

Bryn Gilby
17 Heol Mair
Litchard
Bridgend
Mid Glamorgan

Tel: 01656 659 040

Supplier of Brick Dust Pozzolan

The Bulmer Brick & Tile Co. Ltd
Bulmer
Nr. Subury
Suffolk
CO10 7EF

Contact: Mr Tony Minter

Tel: 01787 269 232 Fax: 01787 269 040

C41.3b/170 **Supplier of New Bricks**

The contractor is to provide samples of new bricks for use in the works. The bricks must match the existing materials as closely as possible in colour, appearance, texture and size.

The following categories/types of bricks are to be matched.

Wall A, B and C

1) Plain red brick for repairs and brick on edge wall capping, and for rebuilding of the collapsed section of wall C
2) Chamfered/ovolo moulded red brick for capping course (headers and stretches)
3) Red rubbed brick forming quoins to piers
4) Red rubbing block for site cutting/shaping
5) Multi coloured brick for repairs to buttressing to wall C

Wall D and E

6) Multi coloured facing bricks for repairs to the walls where existing bricks cannot be salvaged

Bricks are to be obtained from the following supplier.

The Bulmer Brick & Tile Co. Ltd
Bulmer
Nr. Subury
Suffolk
CO10 7EF

Contact: Mr Tony Minter

Tel: 01787 269 232 Fax: 01787 269 040

C40.4a Repointing Natural Stonemasonry

C40.4a/100 Scope of the Repointing Works

The scope of repointing works is limited to all open, cracked and defective joints in the natural Portland stone copings to the terraced garden walls in Waterlow Park as described within the schedule of works and recommendations section of this report.

C40.4a/105 Standards and Codes of Practice

All works are to be carried out in accordance with current British Standards, published technical papers from recognised authorities and experts within the industry, and manufacturer's and supplier's recommendations.

C40.4a/110 Health and Safety Considerations

Prior to undertaking any repair works detailed method statements must be provided describing the work process accompanied by a specific risk assessment identifying all known or reasonable anticipated risks with procedures to maintain a safe working environment. COSHH assessments must be provided for all materials used in the repointing process.

These details must take into consideration all the requirements of the Health and Safety Plan and be submitted for approval by the Planning Supervisor prior to works commencing.

C40.4a/115 Samples and Exemplar Work

Prior to undertaking the contract works the proposed specialist contractor is to provide a list of the craft people who will undertake the work together with a résumé for each person, describing the sites and type of work undertaken in the past two years, with contact phone numbers for reference.

Each craft person is to carry out sample repairs for each of the repair techniques specified to confirm that that the specification can be achieved and to verify the quality of the craft person's work. Samples must demonstrate all aspects of the specification. Samples of mortar colours, designs and joint finishing can be undertaken off the wall using mortar tile samples and panels of sample brickwork.

Once each craft person's work has been approved, the specialist contractor must ensure that these people are used for the contract works. In the event that personnel need to be changed all new personnel will need to carry out the trial procedure described above.

In the event that the craft person is known to the Contract Administrator (C.A.) and their work has been previously proven, the requirement for site trials may be reduced or omitted with the consent of the C.A.

C40.4a/120 Repointing of Existing Narrow Masonry Joints (less than 5mm in width)– *Repair Technique RP-2*

Carefully cut out existing joints using a hack saw blade by working down the joint to saw out the existing mortar to a minimum depth of 25mm or until sound mortar is found (whichever is the greater).

Apply a strip of heavy duty canvas backed tape running along the joint, and firmly tamp into place using a compact bristle brush to ensure the tape sticks in place. Using a sharp knife cut a slit through the tape down along the length of the joint. The tape is used to mask the stone and prevent smearing when filling the fine joints. Press the edges of the cut tape firmly into the incision.

Clean out the backs of the joint using a garden spray and clean water to remove all loose dust and debris. Ensure that the joint has been sufficiently wetted so that the back of the joint and surrounding masonry will remain damp for at least 24 hours to

control curing of the mortars.

Using a putty knife or narrow flexible scraper apply the stiff pointing mortar to the face of the tape and push very firmly into the joint. Using a narrow pointing key made from 1 to 3mm wide flat stainless steel wire push the mortar into the back of the joint to ensure the joint is completely filled. Where the surrounding masonry is heavily weathered the joint should be kept slightly back from the surface.

The joints are to be repointed using mortar mix type 2 in accordance with specification clause C41.4a/125.

Allow the mortar to stiffen and carefully pull the tape away from the joint using the pointing key or a narrow strip pressed onto the face of the joint to prevent the mortar pulling out.

Brush away any mortar residue from the face of the joint. No mortar smearing to the surround masonry will be accepted.

Ensure that the newly pointed joints are protected from the heat of the sun and any wind. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 3 days to control curing of the mortar.

C40.4a/125 Mortar Mixes

a) <u>Mortar mix 2:</u>

The mortar for all masonry repointing is to be made with a 1:2½ hydraulic lime to sand and stone dust mix.

A suitable lime is to be St Astier NHL 2 naturally hydraulic lime available through the following supplier. The contractor can propose alternative materials with manufactures technical data sheets and Risk and COSHH assessments for approval by the C.A.

Setra Marketing Ltd
16 Cavendish Drive
Claygate
Esher
Surrey KT10 0QE

Contact: - Ugo Spano

Tel: - 0800 783 9014

The sand and stone mix is to be made from 3 parts, well graded sharp, clear sand to 2 parts graded Portland stone aggregate with a maximum sieve size of 2.36mm. For narrow joints the aggregate size should be reduced to maximum of 1.18mm. For pointing to Portland stone a white silver sand and crushed Portland stone aggregate should be used. For pointing to the granite a fine sand may be used and a natural pigment to match the original colour of the grout/pointing to the joints.

The mortar aggregates are to be mixed dry in a drum mixer for 10 to 15 minutes to ensure even and consistent mixing. Hand mixing of small quantities in a bucket or on a spot board can be undertaken provided accurate gauging and thorough mixing is achieved. Add a minimum amount of water to make a stiff but pliable mortar that can be placed into the joints without sliding off of the hawk or pointing key. All mortars are to be mixed and used in accordance with the supplier's recommendations.

C41.4b Repointing Brickwork

C41.4b/100 Scope of the Repointing Works

The scope of repointing works is limited to all open and defective brickwork joints to the terraced garden walls in Waterlow Park as described in the schedule of defects and recommendations section of this report.

C41.4b/105 Standards and Codes of Practice

All works are to be carried out in accordance with current British Standards, published technical papers from recognised authorities and experts within the industry, and manufacturers and suppliers recommendations.

C41.4b/110 Health and Safety Considerations

Prior to undertaking any repair works detailed method statements must be provided describing the work process accompanied by a specific risk assessment identifying all known or reasonable anticipated risks with procedures to maintain a safe working environment. COSHH assessments must be provided for all materials used within the repointing process.

These details must take into consideration all the requirements of the Health and Safety Plan and be submitted for approval by the Planning Supervisor prior to works commencing.

C41.4b/115 Samples and Exemplar Work

Prior to undertaking the contract works the proposed specialist contractor is to provide a list of the craft people who will undertake the work together with a résumé for each person, describing the sites and type of work undertaken in the past two years, with contact phone numbers for reference.

Each craft person is to carry out sample repairs for each of the repair techniques specified to confirm that that the specification can be achieved and to verify the quality of the craft person's work. Samples must demonstrate all aspects of the specification. Samples of mortar colours, designs, and joint finishing can be undertaken off the wall using mortar tile samples and panels of sample brickwork.

Once each craft persons' work has been approved, the specialist contractor must ensure that these people are used for the contract works. In the event that personnel need to be changed all new personnel will need to carry out the trial procedure described above.

In the event that the craft person is known to the Contract Administrator (C.A.) and their work has been previously proven, the requirement for site trials may be reduced or omitted with the consent of the C.A.

C41.4b/120 Repointing of Brickwork Joints – *Repair Technique RP-1*

Carefully cut out existing pointing using a sharp tungsten tipped quirk chisel always cutting in into the void to minimise stress within the joint. Where previous cement based repointing mortar is found to be very hard and there is a risk of spalling the brick arrisses by using hand chisels, small disc cutters can be used. Disc cutters will only be permitted if each craft person can prove their competency by carrying out a sample on site. Disc cutters must be fitted with a purpose designed diamond blade for cutting out pointing with the blade width not exceeding 3mm. All blades must be maintained in good condition with no chips or distortion to the cutting edge.

The existing mortar is to be raked or cut back to a minimum depth of twice the face width of the joint or 25mm whichever is the greater. The pointing cavity is to be finished square and any mortar residue cleaned off from the sides of the joint ready to receive the new pointing mortar.

Clean out the back of the joint using clean water to remove all loose dust and debris. Ensure that the joint has been sufficiently wetted so that the back of the joint and surrounding brickwork will remain damp for at least 24 hours to control curing of the mortars.

Using a pointing key, place the mortar into the joint and press in firmly to ensure the mortar fills the back of the joint. Continue to pack the joint in layers to leave the joint slightly proud of mortar. Allow the mortar to stiffen and finish the joint to match the original style. The joints are to be repointed using the mortar mix in specification clause C41.4b/130 below. Where the surrounding masonry is heavily weathered the joint should be kept slightly back from the surface to avoid a spread of mortar which usually increases the size of the joint.

Brush away any mortar residue from the face of the joint. No mortar smearing to the surround brickwork will be accepted.

Ensure that the newly pointed joints are protected from the heat of the sun and drying wind. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 3 days to control curing of the mortar.

C41.4b/125 Deep Repointing of Fractured Brickwork Joints – *Repair Technique DRP-1*

Fractured and heavily decayed brick joints are to be cut out in short sections taking care not to loosen any bricks or undermine the structure. Once a section of the joint is removed it should be filled and repointed before adjacent sections of the joint are cut out.

Carefully cut out existing pointing using a sharp tungsten tipped quirk chisel always cutting in a backwards direction along the joint to minimise stress within the joint.

The existing mortar is to be raked out or cut back to a depth of 50mm. The pointing cavity is to be finished square and any mortar residue cleaned off from the sides of the joint ready to receive the new pointing mortar.

Clean out the back of the joint using clean water to remove all loose dust and debris. Ensure that the joint has been sufficiently wetted so that the back of the joint and surrounding masonry will remain damp for at least 24 hours to control curing of the mortars.

Using a pointing key, place the mortar into the joint and press in firmly to ensure the mortar fills the back of the joint. Continue to pack the joint in layers to leave the joint slightly recessed to the face of the brick and surrounding arrisses. Allow the mortar to stiffen and tamp the surface of the joint with a stiff bristle brush to expose the aggregates within the mortar. Alternatively the joint can be lightly sprayed using a small hand spray of clean cold to remove the fines from the surface of the mortar and leave the aggregate slightly exposed.

The joints are to be repointed using mortar mix 4 in accordance with specification clause C41.4b/130.

Brush away any mortar residue from the face of the joint. No mortar smearing to the surround masonry will be accepted.

Ensure that the newly pointed joints are protected from the heat of the sun and drying wind. In warm weather ensure that the surrounding masonry and face of the joint are kept damp for at least 3 days to control curing of the mortar.

C41.4b/130 Mortar Mix

a) Mortar mix 3: for rebuilding brick wall tops and repointing brick wall tops.

The mortar is to consist of 1 part natural hydraulic lime (NHL2) to 2½ parts well-graded sharp sand.

A suitable lime is to be St Astier NHL2 natural hydraulic lime available through the following supplier. The contractor can propose alternative materials with manufactures technical data sheets and Risk and COSHH assessments for approval by the C.A.

The sand is to be well-graded sharp, sand graded from 2.6mm down. Samples of the mortar to be used should be prepared and approved by the C.A. The mortar is to be mixed in a drum mixer for 10 to 15 minutes to ensure even and consistent mixing. Hand mixing of small quantities in a bucket or on a spot board can be undertaken provided accurate gauging and thorough mixing is achieved. Add a minimum amount of water to make a stiff but pliable mortar that can be placed into the joints without sliding off of the hawk or pointing key. All mortars are to be mixed and used in accordance with the supplier's recommendations.

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b) Mortar mix 4: for rebuilding general wall areas, piecing-in bricks and repointing brickwork to general wall areas.

The mortar is to consist of 1 part mature lime putty, to ½ part brick dust pozzolan, to 2½ parts well graded sharp sand.

Mature lime putty, aged for a minimum of 6 months, un-sieved and containing some ash deposits from the lime burning process is to be used for these works. The contractor can propose alternative materials with manufactures technical data sheets and Risk and COSHH assessments for approval by the C.A.

The brick dust is to be a cream coloured, low fired (900°C to 1000°C) crushed and graded aggregate, with particle sizes between 38microns to 75 microns.

The sand is to be well-graded sharp sand graded from 2.36mm down. Samples of the mortar to be used should be prepared and approved by the C.A. The mortar is to be mixed in a pan mixer for 10 to 15 minutes to ensure even and consistent mixing. Hand mixing of small quantities on a spot board can be undertaken provided accurate gauging and thorough mixing and beating is achieved. All mortars are to be mixed and used in accordance with the supplier's recommendations.

Lime Suppliers

Supplier of St Astier Lime

Setra Marketing Ltd
16 Cavendish Drive
Claygate
Esher
Surrey KT10 0QE

Contact: - Ugo Spano

Tel: - 01372 465 779 Fax: - 01372 801 302

Supplier of mature lime putty

Bryn Gilby
17 Heol Mair
Litchard
Bridgend
Mid Glamorgan

Tel: 01656 659 040

Supplier of Brick Dust Pozzolan

The Bulmer Brick & Tile Co. Ltd
Bulmer
Nr. Subury
Suffolk
CO10 7EF

Contact: Mr Tony Minter

Tel: 01787 269 232 Fax: 01787 269 040

M60 PAINTING/CLEAR FINISHING

To be read with Preliminaries/General conditions.

COATING SYSTEMS

GENERALLY

210 COATING MATERIALS: Inform the CA of selected manufacturer before commencement of any coating work.

215 HANDLING AND STORAGE:
- Coating materials must be delivered in sealed containers, each clearly labelled with the brand name, type of material and manufacturer's batch number.
- Wherever possible materials must be from one manufacturing batch. Inform the CA if materials from more than one batch are to be used, store separately and allocate to distinct parts or areas of the work.
- Store materials in accordance with manufacturer's recommendations. Use in order of delivery and before expiry of any shelf life date.

220 COMPATIBILITY:
- Check that all materials to be used are recommended by their manufacturers for the particular surface and conditions of exposure, and that they are compatible with each other.
- Where surfaces have been treated with preservatives or fire retardants, check with treatment manufacturer that coating materials are compatible with the treatment and do not inhibit its performance.
- Inform the CA of any discrepancy in specification of coatings and obtain instructions before proceeding with application.

230 ANCILLARY SURFACES: The descriptions of areas to be coated given in schedules, etc. are of necessity simplified. All ancillary exposed surfaces and features are to be coated to match similar or adjacent materials or areas except where a fair faced natural finish is required or items are completely prefinished. In cases of doubt obtain instructions before proceeding.

280 PROTECTION:
- Adequately protect internal and external surfaces, fixtures and fittings which are not to be coated, by covering with dust sheets, masking or other suitable materials.
- Exhibit 'Wet paint' signs and provide barriers where necessary to protect other operatives and the general public, and to prevent damage to freshly applied coatings.

290 TESTING OF VISCOSITY, ETC: The CA may, with discretion, take samples of materials from each manufacturing batch as follows:

- Unopened containers, or samples from previously unopened containers, for submission to manufacturer for comparison with manufacturer's own retained samples from the same batch.
- Unopened containers, or samples from previously unopened containers, as a control sample for assessment of samples taken from painters' kettles.
- Samples from painters' kettles for submission with control sample to manufacturer and/or independent testing laboratory for comparative testing.

300 CONTROL SAMPLE(S): Prepare sample areas of the finished work, including preparation, in advance of the remainder as set out below. Obtain approval of appearance before proceeding.

Type(s) of coating	Nature of sample
_____	All metalwork specified for painting

320 INSPECTION OF WORK: Permit coating manufacturers to inspect the work in progress and take samples of their products from site if requested.

PREPARATION

400 PREPARATION GENERALLY:
- To BS 6150, Section 4.
- Materials used in preparation must be types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.
- Prevent or control exposure of operatives to dust, vapour and fumes exceeding occupational exposure standards set in the current Health and Safety Executive (HSE) document EH40.
- Substrates must be sufficiently dry in depth to suit the coating to be applied.
- Remove efflorescence salts from surfaces. Repeat removal if efflorescence recurs.
- Clean off dirt, grease and oil from surfaces. If contamination of surfaces/substrates has occurred, obtain instructions before proceeding.
- Smooth surface irregularities. Fill joints, cracks, holes and other depressions with stoppers/fillers worked well in and finished off flush with surface. Abrade to a smooth finish.
- Apply oil based stoppers/fillers after priming. Apply water based stoppers/fillers before priming unless recommended otherwise by manufacturer. Patch prime water based stoppers/fillers when applied after priming.
- Remove dust and particles from dry abrasive preparation of surfaces.
- Remove residues from wet preparation of surfaces by rinsing with clean water, wiping and allowing to dry.
- Ensure that doors, opening windows, etc, are 'eased' as necessary before coating. Prime any resulting bare areas.

410 SUITABILITY OF SURFACES AND CONDITIONS: Application of coatings will be taken as joint acceptance by the Main Contractor and the Painting Contractor of the suitability of surfaces and conditions within any given area to receive the specified coatings.

420 FIXTURES: Before commencing work, remove the following fixtures and fittings, set aside and replace on completion:

_____

425 IRONMONGERY: Remove from surfaces to be coated and refix on completion. Do not remove hinges unless instructed to do so.

430 IRONMONGERY: Remove all old paint and varnish marks from existing ironmongery. Thoroughly clean and polish before refixing.

440 PREVIOUSLY COATED SURFACES GENERALLY:
- Prepare in accordance with BS 6150, Section 6.
- When removing or partially removing coatings, use methods which will not damage the substrate or adjacent surfaces or adversely affect subsequent coatings.
- Carefully remove all loose, flaking or otherwise defective areas to a firm edge.

- Completely remove alkali affected coatings.
- Where coatings are suspected of containing lead, obtain instructions before proceeding.
- Where substrates containing asbestos are revealed, obtain instructions before proceeding.
- Where significant rot, corrosion or other degradation of substrates is revealed, obtain instructions before proceeding.
- Thoroughly clean retained coatings with appropriate detergent solutions or solvents to remove all dirt, grease and contaminants. Abrade gloss coated surfaces when still wet to provide a key.
- Apply additional preparatory coats to areas of partial removal to restore original coating thicknesses. Abrade junctions to give a flush surface.
- Where coatings are completely removed, prepare surfaces as specified for uncoated surfaces.

451 PREVIOUSLY COATED SURFACES - BLAST CLEANING: To be carried out by specialists using abrasives and pressures appropriate to the substrate. Take all necessary precautions to minimise dust and nuisance.

461 PREVIOUSLY COATED TIMBER:
- Remove any degraded or weathered surface timber by abrading.
- Ensure that repairs to degraded substrate timber have been carried out with sound timber of the same species.
- Apply two coats of knotting to exposed resinous areas and knots and allow to dry.

471 PREPRIMED TIMBER: Abrade chalking, powdery and other defective primer back to bare timber, remove dust and reprime resulting bare areas.

481 UNCOATED TIMBER:
- Abrade to a smooth, even finish with arrises and moulding edges lightly rounded or eased.
- Ensure that heads of fasteners are countersunk sufficiently to hold stoppers/fillers.
- Apply two coats of knotting to resinous areas and knots and allow to dry.

490 PREVIOUSLY COATED STEEL:
- Abrade corrosion and loose scale back to bare metal.
- Treat any residual rust with a proprietary removal solution. Prime as soon as possible.

500 PREPRIMED STEEL: Abrade defective primer, corrosion and loose scale back to bare metal, remove dust and reprime resulting bare areas.

511 GALVANIZED, SHERARDIZED AND ELECTROPLATED STEEL to receive lead free primer: Pretreat with 'T wash'/mordant solution to achieve blackening of the whole surface or apply pretreatment etching primer where recommended by the coating system manufacturer.

521 UNCOATED STEEL - MANUAL CLEANING:
- Remove oil and grease.
- Abrade to remove corrosion, loose scale, welding slag and spatter.
- Treat any residual rust with a proprietary removal solution. Prime as soon as possible.

531 UNCOATED STEEL - BLAST CLEANING:
- Remove oil and grease.
- Blast clean in dry atmospheric conditions using abrasive of suitable type and size, free from fines, moisture and oil. Continue blasting until surface complies with BS 7079: Part

A1, preparation grade ___ Prime surface as soon as possible after blast cleaning and in any case within four hours.

541 UNCOATED ALUMINIUM/COPPER/LEAD: Remove any surface corrosion/oxidization and lightly abrade with fine abrasive paper and white spirit. Apply pretreatment etching primer where recommended by the coating system manufacturer.

560 UNCOATED CONCRETE: Remove release agents with detergent/emulsion solutions. Ensure that major surface defects are repaired.

570 UNCOATED MASONRY/RENDERING: Remove loose and flaking material with a stiff brush.

APPLICATION

700 UNSUITABLE CONDITIONS:

- Take all necessary precautions including restrictions on working hours, providing temporary protection and allowing extra drying time, to ensure that coatings are not adversely affected by climatic conditions during and after application.
- Prevent or control exposure of operatives to solvent vapour levels exceeding occupational exposure standards set in the current Health and Safety Executive (HSE) document EH40.
- Unless it is specifically permitted by the coating manufacturer, do not apply coatings:
  - To surfaces affect by moisture, frost or airborne dust.
  - When the air or substrate temperature is below 5 deg C.
  - When the relative humidity is above 80%.
  - When heat is likely to cause blistering or wrinkling.

711 COATING GENERALLY:

- To BS 6150, Section 5.
- Do not use materials which show any bittiness or other defects when applied. Do not thin or intermix unless specified or recommended otherwise.
- Apply priming coats as soon as possible on the same day as preparation is completed. They must be of adequate thickness and suit surface porosity.
- Apply coatings by brush or roller unless otherwise specified or approved.
- Keep brushes and equipment in a clean condition. Dispose safely of cleaning and waste materials, do not pour into sanitary appliances or drains.
- Subsequent coats of the same pigmented material must be of a different tint to ensure that each coat provides complete coverage.
- Apply coatings to clean, dry surfaces in accordance with the manufacturer's recommended intervals between coats.
- Apply coatings evenly to give a smooth finish of uniform colour, free from brush marks, sags, runs and other defects. Cut in neatly and cleanly. Do not splash or mark adjacent surfaces.
- Adequately protect drying and completed work from damage.

720 PRIMING JOINERY:

- Before priming preservative treated timber ensure that any cut surfaces have been retreated and that all preservatives are completely dry.
- Liberally coat all end grain, allow to soak in and then recoat.

751 STAINING TIMBER:

- Apply primer where recommended by the stain manufacturer.

- Apply stain in flowing coats. Brush out excess stain before set to produce uniform depth of colour.

760 VARNISHING: Thin first coat with white spirit in accordance with manufacturer's recommendations. Brush well in avoiding aeration and lay off. Apply further coats of varnish, rubbing down lightly between coats along the grain.

820 COMPLETION: Ensure that openings and other moving parts move freely. Remove all masking tape and temporary coverings.

2.00 STATUARY

2.01 SIR SYDNEY WATERLOW

Description

- Bronze statue on carved limestone plinth supported by sandstone base.
- Key missing from Sir Sydney's left hand.

Condition

- Bronze statue is in good condition apart from the missing key.
- Carved inscriptions and motifs are being eroded on the limestone plinth through weathering, especially to the front façade of the plinth.
- There is green staining on the limestone from the bronze statue.
- There are two minor cracks running from top right of the Plinth.
- Cracks in the rim at the top have been partially repaired with concrete mortar, as has the gap between the stone sections forming the bottom of the plinth.

Action

Statue to remain untouched. New key to be fabricated in bronze to fit as per reference photo, figure 8. Contractor to provide method statement and fabrication detail for key to be approved by CA.

Stonework to remain uncleaned. Inscription to be carefully reinstated. Contractor to submit method statement for undertaking re-etching of inscription works to incorporate protection of existing stonework during operations.

New inscribed plaque to be placed at base of statue, see attached sketch figure 9. Inscription wording to be agreed with London Borough of Camden.

2.02 JOHN VAN NOST SHEPHERD AND SHEPHERDESS UPPER TERRACE STEPS

Description

- Grade II Listed Portland stone statues of seated Shepherd and Shepherdess on ornate plinths.
- Height of figures approximately 1.0m on a 1.3m base.
- Total height from ground 2.3m.

Condition

- All stonework in moderate condition but needs cleaning.
- Shepherd is missing most of his right arm and fingers, as well as what he was holding (possibly bagpipes?) see figure 10.
- Sections missing from square base immediately below figure, see figure 11.
- Further small missing sections to Shepherd's plinth, see figure 12.
- Shepherdess is missing the lower half of her right arm, see figure 13.
- There is a small piece missing from her bonnet, see figure 14.
- There is damage to the 'rim' halfway down the plinth, see figure 15, and there are 2 no. small holes to the bottom of the base.

Action

Statues to be gently cleaned refer to section 1.2 and 1.5 of specification, see Appendix 1.

Stonework (to Plinths only) to be replaced with like as per figures 11,12 and 13. Refer to section 3.1 and 3.2 of specification, see Appendix 1.

Refer closely to Ingram Consultancy observations in their report on the terraced garden walls, November 2000, page 32 items 166 – 170 and page 57 and 58.

2.03 PINEAPPLE/URNS ON STEPS TO LOWER TERRACE SOUTH EAST BOUNDARY

Approach Step

Description

- Approach step consists of a landing stone and a single stone tread with a concrete render, see reference photo figure 16.
- Tread 360mm, riser 90mm.
- Retaining, curved stonework on either side of steps consists of three separate stones.
- Statuary detail/finials missing on plinths.

Condition

- Retaining stonework is generally in good condition but needs cleaning (moss and general grime).
- Stone step has been covered with concrete - a small section of which has broken off on the left-hand side.
- There is a small crack to the landing stone on the right hand side.

Action

Tread to be lifted and concrete removed.

Step to be reset on level mortar bed to tie in with new surfacing works to terrace gardens and Park. Contractor to consider resetting step on reverse side of tread for new level surfacing.

Contractor to provide method statement for removal of concrete treads to stone step.

Curved stone edge detail to be retained as is, lifted and reset on new mortar bed to marry in with new surfacing levels.

Main flight of steps with Pineapple/Urn

Description

- Main flight consists of 11 stone steps with 20-30mm layer of concrete on tread.
- Risers 130-140mm, treads 290-330mm. Top tread 380mm.
- 1 no Limestone Urn on stone base (total height from ground 800mm). Opposite matching Urn missing.
- 1 no pre-cast Pineapple feature and base (total height from ground 1.0m). Opposite matching Pineapple missing, apart from base and metal fixing rod.
- Stone retaining edges with iron 'handles' on both sides of the steps.

Condition

- Cracks in the concrete follow the natural coursing of stone steps.
- Urn is missing one handle, and may also be missing a feature at the top see reference photo figure 17.
- Pineapple has a section of 'leaf' missing at the bottom and there is a small crack around the entire base of the fruit, just above the 'leaves' see reference photo figure 18.

Action

Lift and relay steps after removing concrete treads. Contractor to investigate using reverse side of step for new tread surface. Steps to be relaid on new mortar base.

Pineapple

Contractor to take moulding for retention by London Borough of Camden. Contractor to source same feature either new or salvaged for replacement. If no salvaged feature can be obtained, a new special to be cast and reinstated. Missing section of leaf detail to be reinstated. Upper half of Pineapple to be secured by dowelling to lower half, refer to section 3.1 of specification, see Appendix I. Existing concrete to be repaired and cracks filled using matching mortar refer to sections 2.0, 3.1 and 3.2 of specification, see Appendix I.

Urn

Stone to be gently cleaned as per 1.5 of specification and mortar to be repointed as per section 2.1, see Appendix I. Missing handle to be replaced using existing handle as template, refer to section 2.0 and 3.0 of specification, see Appendix I. No historical detail reference available for missing urn upper section – to be left as is.

2.04 EAGLES ON STEPS TO LOWER TERRACE

Description

- Grade II Listed flight of 13 Yorkstone steps.
- The bottom 2 steps are constructed from 2 separate stones, with the joins set off-centre.
- The remaining 11 steps are each carved from one piece of stone.
- Treads 280mm (top tread 300mm), risers 140mm.
- Brick retaining edges with limestone capping.
- Brick piers (450x450mm) at top and bottom with limestone capping (570x570mm).
- Concrete Eagles standing on piers at bottom of steps.

Condition

- Eagle on left-hand side (looking up) is missing head, a section of left wing, and the tips of wings at the back, see reference photo, figure 19.
- Blue paint has been sprayed onto the front of the eagle's chest.
- Eagle on the right-hand side is also missing head as well as most of both wings, see reference photo, figure 20.
- Stone steps in generally good condition.
- Re-point the junction of several treads and risers.
- Stone capping on edge of steps is damaged in two places (by chestnut paling and by one of the metal bars where a further small piece of stone is also becoming dislodged).
- Concrete mortar has been used to infill a small hole by another metal bar.

Note: Old Portland Stone Eagle discovered during wall investigation, November 2000. Currently in storage. May have been original upon which these statues are

based. Old Eagle Statue indicated on photograph from Heal Collection at threshold between upper and lower terrace to north east of Lauderdale House, see figure 18.

Action

No action proposed for Steps. Brick wall to be repaired in accordance with Ingram Consultancy's specification for repairs to historic terrace walls dated November 2000 and as part of Wall Repair sub-contract, see Appendix III.

2.05 URN ON UPPER TERRACE

Description

- Portland stone Urn decorated with flowers and swags, see reference photo, figure 22.
- Fixed to narrow Portland stone pedestal.

Condition

- Generally in good condition although repairs and fixing to pedestal are poor.

Action

Ingram Consultancy's report recommends lifting urn during wall repair works to replace failing poor quality mortar repair to urn base pedestal refer items 193 and 194 in Schedule of Specific Defects, see Appendix III.

Any defects or missing pieces to be replaced prior to moulding.

Moulding to be taken of urn and narrow base to be repaired as per specification. Urn to be gently cleaned as per section 1.5 of specification, see Appendix I.

figure 8. Reference for new Key to Sir Sydney Waterlow Statue.
Key extends approximately 60mm from Sir Sydney's hand.

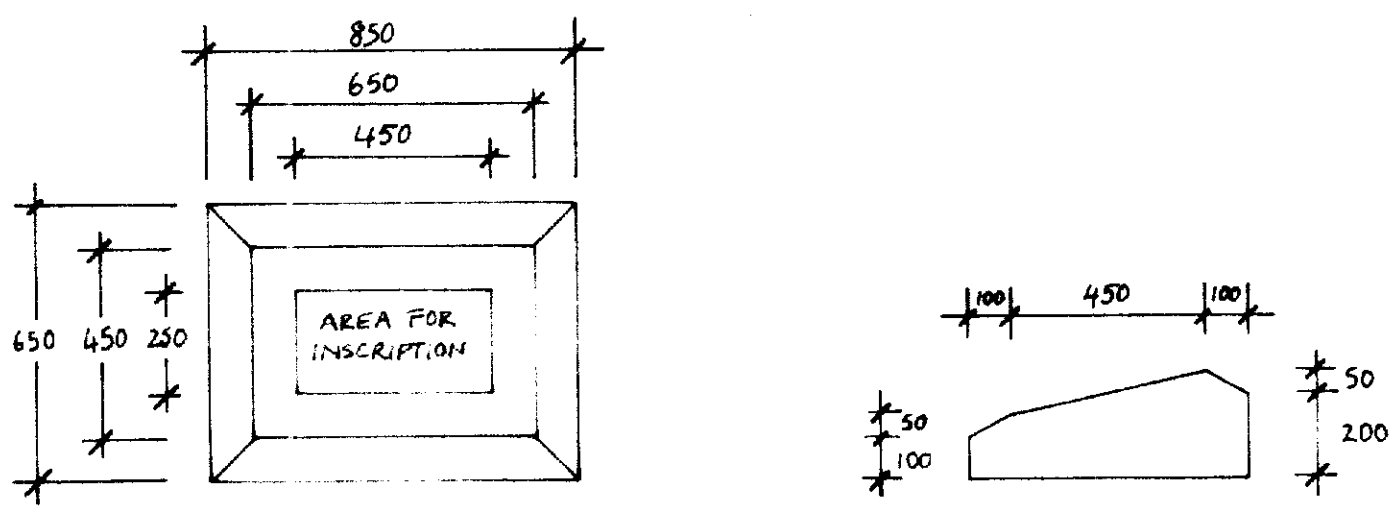


figure 9. Plan and Cross Section of Plaque to be placed at base of Statue

3.00 DRINKING FOUNTAINS

3.01 DRINKING FOUNTAIN BY PLAYGROUND / LOWER POND

Description

- Polished granite drinking fountain consisting of upper basin (interior 600mm/exterior 800mm), mid section, lower section and base.
- Overall height from ground approximately 1.20m.
- Upper spout feature missing from basin.

Condition

- Condition of the granite is good, see reference photo figure 23.
- Gaps in mortar joint between mid and lower section, and between lower section and base, see reference photo figure 24.
- Base needs pointing, see reference photo figure 25.

Action

Contractor to supply spout fitting to suit fountain for approval.

Joins to be infilled with new mortar. Refer to section 2.1 of specification, see Appendix 1.

Stone to be cleaned, refer to sections 1.4 and 1.5 of specification, see Appendix 1.

3.02 DRINKING FOUNTAIN BY TENNIS COURTS

Description

- Black cast iron drinking fountain set on concrete paving slabs.

Condition

- There is corrosion around the base of the drinking fountain, see reference photo, figure 26.
- Concrete slabs (600x600) are cracked and damaged, see reference photo, figure 27.
- Slabs have been used as retaining edges, see reference photo, figure 28.
- Broken brick on 110mm edge as riser.
  NB. A gulley at the bottom of the tarmac path is silted up, see reference photo 28.

Action

Refer to sketch for paving proposals to base of fountain, figure 29.

Sand blast metalwork on cast iron fountain and repaint in gunmetal grey (colour to be approved) insitu.

Unblock Water collection tray at base to ensure no future standing water.

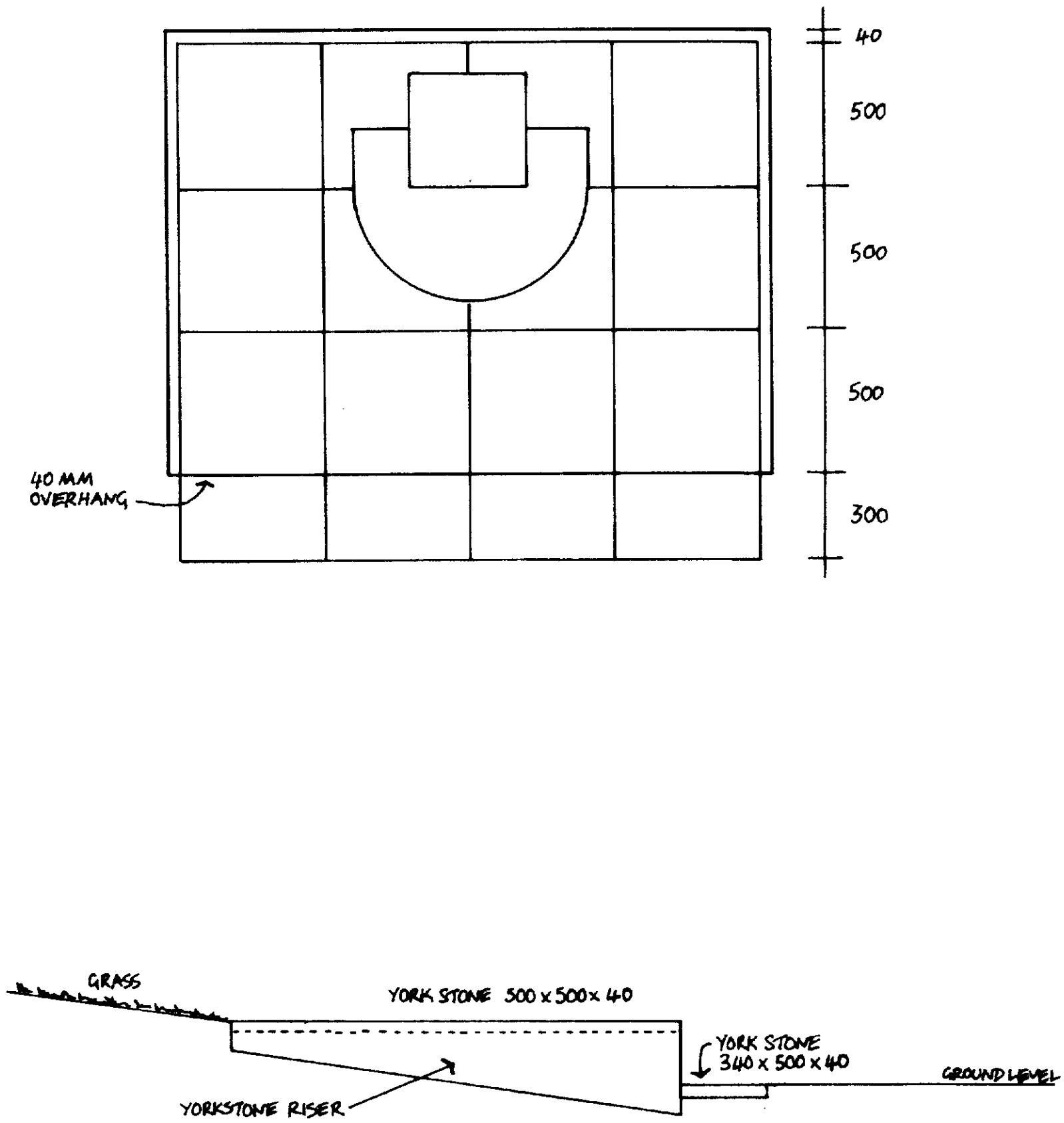


figure 29. Plan and Cross Section of paving proposals to base of cast iron drinking fountain

4.00 SUNDIALS

4.01 SMALL SUNDIAL BESIDE LAUDERDALE HOUSE

Description

- Grade II Listed Portland stone sundial base. 355x355x740mm overall height from ground with lead surface mounted fitting.

Condition

- Metal feature dial missing.
- Sundial has been poorly repaired with cement mortar.

Action

Contractor to provide method statement/s for the following works.

Sundial to be relocated to position as indicated on Drawing no. 605 - Terrace Garden General Arrangement based on position shown on London County Council Map 1888 – 1889.

Sundial base to be carefully dismantled into component pieces where feasible or moved in its entirety.

Stonework to be cleaned in accordance with Ingram Consultancy Specification for cleaning natural stone. See Appendix III.

Poor quality mortar repair to be replaced as per Ingram Consultancy specification, refer to Appendix III.

New Portland stone slab to be reinstated to match that shown on attached photograph, figure 30 and also sketch figure 31. Marble dial plate insert to be reinstated on top of Portland Stone Slab.

Bronze 'Dial' to be replaced on marble dial plate to match attached photograph, figure 30. Bronze inscription plate to be attached as indicated on attached photo, see figure 30 stating "This dial plate is on a level with the top of the dome of St Paul's Cathedral". Inscription wording to be agreed with LBC.

Current state of Sundial shown in figure 32.

4.02 LARGE SUNDIAL ON UPPER TERRACE

Description

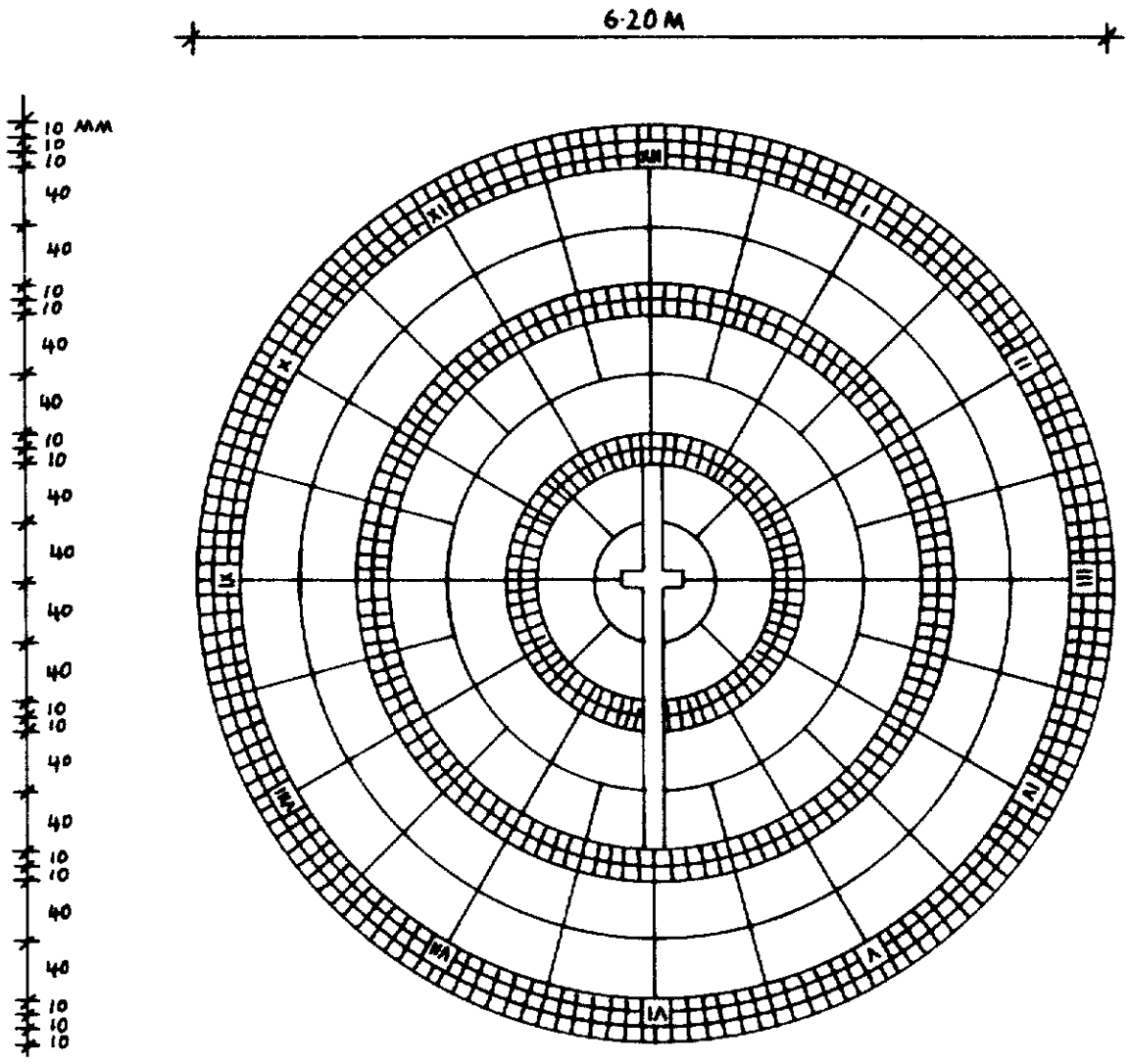
- Grade II Listed.
- Triangular shaped wrought iron sundial, painted black.
- Set in 20th century brick, cobble and York stone radial paving detail with quadrants of seasonal bedding. See reference photo figure 33.

- The Sundial is supposedly a surviving feature of Sir Sydney Waterlow's formal garden at Lauderdale House.
- Height approximately 2.5 – 3.0 m, width at base approximately 2.2m.

Action

Relocate metal sundial to new position as indicated on drawing no. 607 – Masterplan.

See sketch figure 34 for plan of indicative paving proposals to base of Sundial.



Yorkstone slabs and granite setts with carved detail.

Figure 34. Plan of suggested paving to base of Large Sundial. Detail to be agreed.

5.00 OTHER

5.01 INTERNAL GATEWAY

Description

- Ornate cast iron gateway with wrought iron detailing.
- Painted black (evidence of blue paint underneath).
- Brick piers and limestone capping. Brick piers approximately 700x700x 2.60m tall.

Condition

- Flaking and corrosion to Ironwork.
- Gateway originally supported on stone threshold, now hidden by present macadam surfacing see figure 35.
- Soil presently covers the base of the railings at both sides of the gateway, which are now bent and have become detached from the ground.

Action

All work to stone and brick piers to be dealt with as part of walls sub contract to Terrace Gardens.

Uncover base of railings and expose for sand blasting and repair.

Take paint scrape samples for colour matching. Remove railings from piers if possible for sand blasting and repair away from delicate brickwork.

Reinstate when brick piers have been repaired. Metal work to be painted blue (pending approval of colour sample) to specification for paintwork, see appendices.

Contractor to provide method statement for:-

1. Dismantling railings and metal work
2. Sand blasting and repair of corroded parts
3. Repainting
4. Reinstating on repaired piers.

5.02 INTERNAL STEPS BY HIGHGATE HILL ENTRANCE

Description

- 4 No. York stone steps 2.50m wide, see sketch figure 36.
- Treads 330-370mm (top tread angled from 450-780mm) 40mm depth.
- Treads constructed from two pieces of stone per step.
- Brick risers with concrete facing, 220mm height (including tread).
- Edging stones to right hand side only (looking up steps) 220x220x300mm.

Condition

- Steps in poor condition.
- Retaining wall at upper level (right-hand side looking up steps) is collapsing and the stone edging has been dislodged, see reference photo figure 37.
- Levels are difficult to assess as ground level falls away. In addition, a large shrub is rooted adjacent to the steps.
- On the opposite side, the retaining wall is a separate entity from the steps, and the steps run into a vertical wall of random stone.
- Cut stone slabs on edge form the step edging to this side.

Action

Remove adjacent shrub and roots. Dismantle steps, catalogue and store to one side. Salvage missing stone pieces from the locality. Make up damaged brick retaining wall, re set steps and retaining edges on new mortar bed. Infill missing stone pieces with new York stone replacements. Contractor to provide method statement for:-

1. Dismantling steps
2. Cleaning of stone in accordance with outline specification
3. Reinstatement of steps
4. Reinstatement of missing stone pieces.

5.03 ELECTRICITY BOX BY BANDSTAND

Description

- Cast iron box in grass.
- Approximately 100x70x50mm.

Condition

- General paint flaking and minor corrosion.
- Padlocked.
- 'Danger Electricity Box' sign (not very clear).

Action

Sand blast in situ and repaint in accordance with specification. Contractor to ensure all health and safety precautions are taken in relation to works with electrical supply.

CONTENTS

1. Removal of Organic Growth and Cleaning

1.1 Removal of Organic Growth - Severe

The following specification should be followed as and when a thorough clean of a stonework or iron is required. This will occur whenever the organic growth is causing detrimental damage or major reconstruction is requested.

Remove as much growth as possible in the form of plants and thick cushions of moss with knife blades, spatulas and stiff-bristled or non-ferrous soft wire brushes. If the surface below the growth is delicate, unstable or liable to be scoured in any way this preparation must be limited to lifting the moss only.

Prepare a solution of quaternary ammonium-based biocide to the manufacturer's specification.

Fill a pneumatic garden-type sprayer two thirds full with a diluted solution of biocide. Adjust the nozzle to a coarse spray setting. There should be sufficient pressure at the wand nozzle after pumping the container to saturate the surface of the masonry without causing excessive "bounce back" and spray drift.

Apply a flood coat. Commence at the top of a vertical surface to be treated and move across horizontally and slowly to allow approximately 100mm run down. The next horizontal pass should be made across the previous run down.

Leave the treated area for at least one week. Brush off as much dead growth as possible with bristle brushes.

Prepare a solution of propriety biocide based on a quaternary ammonium compound and incorporating tributyl tin oxide or other proven long-lasting biocide, to the manufacturer's instructions.

Fill a second pneumatic sprayer with diluted biocide and apply in the same manner as previously described.

Allow the surface to absorb, and then carry out a second application of proprietary biocide as described above.

1.2 Removal of Organic Growth - Moderate

The following specification will be required whenever only a moderate cleaning is requested. This type of treatment will generally only be considered for stonework and iron in a reasonable state of repair, where the aim is to retain the character of the feature.

Remove as much growth as possible in the form of plants and thick moss with knife blades, spatulas and stiff-bristled or non-ferrous soft wire brushes.

Prepare a weak solution of quaternary ammonium-based biocide, based on the manufacturer's instructions.

Using a pneumatic garden-type sprayer, soak the residue of organic growth, leave for a least 24 hours, and then lightly brush to remove.

1.3 Control of Ivy and Other Creepers

If it is found necessary to remove well-established ivy or shrubs like privet:

A length of the main stem of the plant should be cut out at a convenient height above ground level. Care should be taken to ensure that the plant has not rooted in other areas, in which case a further cut out will be further required.

After cutting, the parent stem should be cut to a frill girdle and the exposed surfaces coated with a paste made from ammonium sulphamate crystals. In this condition the root system may be left to absorb and die. The ammonium sulphamate must not be used on any masonry surfaces, where it would become a nitrogenous fertilizer if associated with lime.

1.4 Control of Weeds

For the selective control of broad-leaved annuals in turf and grass the phenoxy acid herbicides such as 2,4-D and MCPA should be used.

1.5 Cleaning

With regard to Waterlow Park, it is not intended to restore listed or other selected features to such an extent that they would stand out against their immediate neighbours. Cleaning should therefore generally be of a light nature. In some instances it may be necessary to clean heavily soiled stonework in order to allow proper restoration and repair.

Before any cleaning takes place on a type of stone a trial will be required and a test panel undertaken in a discreet area.

In general terms, the existing Portland stone, limestone, polished granite and dense brickwork will be cleaned by a washing method. A mechanical method of cleaning will usually required for sandstone and as a supplementary method of cleaning limestone and granite. Apart from the cleaning required to remove organic growth as described above, it is not proposed that chemical cleaning or poulticing should be employed.

With water washing, care should be taken to ensure that over saturation does not take place.

In the majority of cases cleaning should be undertaken by the method of *dry brushing* which should remove loosely bound dirt and organic growth.

2. Mortars and Renders

2.1 Mortars

In general the mortar mix should approximate to 1:2:9 or 1:1:6 (cement: lime putty: aggregate) in exposed areas, and modified by reduction of the cement gauging by a half in more sheltered areas, or where the core stone is of a moderate durability.

Where appropriate, a colour additive or white cement might be considered, in order to achieve as close a mix as originally used, appropriate to the core stonework.

Pointing should be slightly recessed, and before the mortar has gone off the surface should be stippled lightly with a stiff brush in order to give a slight ageing effect.

2.2 Bedding and Pointing

New or replacement stone should be bedded but not pointed until the work has settled and the mortar bed gone off. A pointing depth of 25mm should be left until all the bedding has settled.

2.3 Dampening of Stonework

Before any new or existing stone is placed it should be properly dampened to avoid the risk of dewatering the mortar.

2.4 Renders

Where a render has been employed to consolidate a brickwork or stonework finish, it should be carefully removed and an assessment on the condition and practicality of repair of the substrate undertaken.

New rendering will be a 1:1:6 (cement: white lime: sand) mix for the undercoat and a 1:2:9 mix for the topcoat.

In the repair of render, the contractor should look for compatibility of materials, colour matching and texture, and proper adhesion. The usual bonding agents that provide adhesion for rendering to dense substrates are polyvinyl acetate (PVA) or styrene butadiene rubber (SBR). Care is required in relying on such agents where the structure is likely to remain damp.

3. Replacement of Stonework and Brickwork

3.1 Replacement of Stonework

Where identified that it is deemed necessary to replace badly damaged sections of a plinth or pier, the replacement stone should be as close to the original as possible. Portland limestone is considered reasonably consistent, but colour-matching sandstone will require care. If thought prudent, the contractor should employ the services of a geologist familiar with building material, in order to ascertain the nature of replacement stone.

The profile of the existing stonework into which a replacement is to be set should be carefully matched.

Stones should be raised into position by hand or hoist depending on the weight and position on the feature.

New stones may be secured using polyester or epoxy adhesive but should also be doweled and resin anchored.

3.2 Stonework Repair

Where identified, the cracked sections of stonework should be repaired with a suitable repair mix, typically:

- Sandstone: 1:2:1 (Hydraulic lime: sharp sand: soft staining sand)
- Brick: 1:3.5:1.5 (Masonry cement: sharp sand: soft staining sand)
- Limestone: 1:2:10 (White cement: lime putty: aggregate)

3.3 Replacement Brickwork

Replacement brickwork to internal gates to be dealt with as part of walls sub-contract to Terrace Gardens.

Refer to the section on Mortars.

4. Sample Panels and Testing

Before any treatment is applied to stonework, brickwork, or mortar joints, a test area should be chosen, to provide satisfactory evidence of compatibility.

Replacement mortar joints, brickwork and repair filling mortars should be available in the form of a sample panel for the inspection and approval of the Borough of Camden Conservation Officer, English Heritage, and the Architect.

5. Consolidants

In the event of a surface requiring to be stabilised, the consolidant should be of an Alkoxysilane type such as Ethyl silicate, Triethoxymethylsilane or Trimethoxymethylsilane.

No consolidant should be applied in unfavourable conditions - such as on areas of major moisture movement, wet surfaces, or heavy surface concentrations of soluble salts.

6. Metalwork

6.1 Repair to Cast-iron Railings

The treatment to gates and railings will vary depending on their situation and condition. In most cases the railings are painted.

6.2 New Railings

Where specified, new pieces of cast-iron work should be made from the casting of an existing section or, if applicable, replaced by a standard design if still in production. Finials and similar details should only be replaced if the appropriate substitutes can be found or manufactured from existing pieces.

6.3 Treatment of existing cast-iron

Existing areas of cast-iron railings should be brushed clean with a stiff brush.

7. Approvals

Specifications for stone and brick cleaning to be submitted for approval prior to the works commencing

Details of any replacement of stone elements to be submitted for approval prior to the commencement of work.

Brick samples for all repairs to be approved prior to the commencement of work.

Detailed specifications of stabilisers and consolidants proposed for stone and brickwork to be submitted for approval.

Where stonework or ironwork has to be dismantled, full details of the rebuild construction to be submitted for approval prior to commencement of the work.

Details for replacement features will be indicate the nature and form of the original as far as the best available evidence will allow. Contractors will however be asked to produce final production drawing for approval, prior to any work being undertaken.

Repairs and repointing to the wall face and the reinstatement of missing and collapsed wall sections should be carried out using a mortar based upon mature lime putty blended with fine brick dust pozzolan to create a slightly hydraulic lime. The mortar should be mixed in the ratio of 1 part mature lime putty, to a ½ part cream coloured brick dust pozzolan, to 2½ parts wash sharp sand aggregate. The sharp sand aggregate should be well graded in accordance with BS1200 with a sieve size grading of 2.36mm down. To this basic sand aggregate, larger gravel pieces (both subangular and round in shape) should be added in a range of sizes from 3 to 6mm in size to match the aggregates used in the original construction of walls A, B and C. Where areas of finer original mortar are present, for example in the later seventeenth century brick piers to wall B and C and the general areas of walls D and E the larger aggregates should be left out.

The mortar should be placed and cured as described above for the wall cappings but the curing process must be managed for at least 5 days to ensure proper curing.

The Niche to Wall A

It is recommended that the arch and jambs be replaced due the poor quality and appearance of past repairs. The soffit and back wall of the niche should be plastered with a hydraulic lime and sand plaster to conceal the inappropriate use of modern 'fletton' bricks.

Conservation of the John van Nost and Griffon Sculptures

John van Nost Sculptures

Damaged and missing areas to the arms and fingers of each figure should not be repaired. The sculptures are in good condition and only require washing down with hot water and a masonry biocide to remove algae growth with one piecing in repair to the plinth of the male figure to replace a missing previous repair.

Paint Residues

Paint residues survive on the two John van Nost (d.1729) sculptures forming part of wall D. The sculptures are of Portland stone, now heavily colonised by lichens and other organic growth. Each sculpture consists of a seated figure on a pedestal. The paint is readily visible on the gadroons and is white to grey in colour with a network of fine cracks extending across its surface. The appearance of the paint, its texture and colour, is consistent with paint treatments on nineteenth century funerary monuments in Portland stone at Nunhead Cemetery in south east London. (see *Nunhead Cemetery, Peckham, London. The Chapel, boundary wall and selected monuments: mortar and paint analysis and recommendations for remedial works, mainly re-pointing*, Ingram Consultancy, June 2000) At Nunhead white lead based paint had been applied subsequent to erection of the monuments to cover soiling. It appears that the white lead carbonate in the paint is converted to grey (a combination of partially converted lead sulphide and calcium salts) and black lead sulphide. Multiple paint applications, as many as thirteen, were found on the Nunhead monuments, probably dating from the mid-nineteenth century to the first quarter of the twentieth century. A similar maintenance regime may have existed at Waterlow Park to combat soiling of the garden sculptures.

Cleaning and Conservation

Further analysis would be necessary to identify the paint layers on the sculptures; this is recommended as part of a programme of thorough recording and cleaning of the sculptures. The sculptures are important and valuable *in situ* survivals, meriting examination and cleaning to enhance their appearance and ensure they do not suffer unnecessary, accelerated decay. Most of the present soiling is grey to brown-green organic soiling with a few small, isolated areas of black soiling. Inspection at close range is necessary to confirm

surface condition, soiling types and suitable cleaning methods. Cleaning with low pressure steam delivered through a portable unit and gentle brushing is likely to be the best cleaning option for the organic soiling whilst the areas of black soiling may require other methods, such as poulticing. More specific recommendations need to be based depending on an examination of the sculpture surfaces. The extent and nature of paint residues will also have implications for any cleaning process. The presence of lead based paint in particular would be an important factor in any cleaning operation, particularly for health and safety policy on site.

The "Eagle" Sculpture

Following the discovery and removal of the sculpture from the undergrowth at the end of wall C the sculpture has been stored under a tarpaulin sheet in the gardens compound. When discovered the sculpture was very soft and friable due to the prolonged period of saturation. During the 3 to 4 weeks of storage the statue has become significantly dryer with the surface becoming firmer and less vulnerable to damage. Our initial inspection of the statue has identified loss and damage to the "eagle's" beak, claws and general minor loss and soiling to the surface of the stone.

It is recommend that the "eagle" is placed into secure storage as soon as possible and once a conservation specialist is appointed the sculpture should be transported to their workshops for conservation and repair. Ideally the statue should be cleaned and minor areas of loss to the feet repaired using mortar repairs and stone pieced into replaced the missing section of the beak.

Supply of New Bricks

It is recommended that isolated repairs to walls A, B and C be carried out using salvaged bricks from the collapsed section of wall C to ensure the closest possible match. The collapsed wall section should then be rebuilt using new bricks that are manufactured specially for this project. The new bricks should provide a close match with the original bricks in both size and appearance and manufacturing methods. It is desirable that the new bricks be manufactured without a frog to match the majority of the originals. New coping and moulded bricks will also need to be produced as new bricks to replaced decayed and missing areas of wall capping, pier quoins and plinth course.

Preliminary discussions with the Bulmer Brick & Tile Company have confirmed that new bricks can be produce from similar clays to the original. Samples of low fired and unburnt bricks from the core of the collapsed wall C were taken and fired at Bulmer's work to confirm the colour and firing characteristics of the original clay. These trials have confirmed that clays now discarded during modern brick production provide a very close match to the original bricks.

It is recommended that further discussions be held with Bulmer's following submission of this report to obtain samples bricks and production times and costs.

Landscaping around the Walls

It is recommended that the tarmac pavement surface be removed and the compacted gravel surfaces be reinstated. This would be historically correct[1] and would allow water to drain into the subsoil more effectively preventing excessive quantities of water washing across the paths and into the adjacent wall. It will be necessary to reduce the level of the path next to

[1] (a) Ballinderry de Pauillac Historical Consultants: report on the archaeology of the Lower terrace garden, June 1998, page 50 and: (b) the sale notice of 1728 "...laid out in Gravel Walks,...".