

HIGHGATE CEMETERY: THE COLONNADE

MARCH 2016

PART 2: SCHEDULE OF REPAIR WORKS

ROOF

1. Erect scaffold for edge protection to roof and to form temporary roof for the roofing repairs if required.
2. Cut asphalt roof surface 600mm from rear edge, and remove outer part exposing the substrate.
Carefully cut out the weak-mix cement concrete topping approximately 200mm thick to expose the rear wall DPC and capping stone. Remove rear brick kerb and clear away (5). Remove upper kerb stone (4) and set aside wherever it is loose.
3. Clean off inner face of kerb stones (3). Check condition of all of kerb and rebed any loose. Similarly reconstruct the kerb in 225mm brickwork as detailed on drawing 968/04, laid in NHL5 lime mortar.
Form new bituminous dpc bonded to asphalt dpc in back wall and dressed up the inside face of the kerb to the top.
4. Reinstate the lean-mix concrete infill.
5. Take up all of remainder of asphalt roof and clear away. Remove any loose substrate. This to include asphalt upstand to parapet to front and ends and to the parapet surrounding the steps.
6. Repair rear (steps) parapet as scheduled below including making good chase for existing asphalt kerb.
7. Remove all vegetation around outlets and strip out asphalt lining; leaving the lead spouts intact. Allow provisional sum of £250 for leadwork repairs.
8. Cut new chase for asphalt upstand to rear parapet one course above existing. Fix stainless steel eml securely to base of parapet walls to provide key to asphalt upstand, as shown on 968/04. Similarly fix stainless steel eml to rear brick kerb, and ensure deep chase for the edge of the asphalt on the rear face.
9. Check levels and falls to roof substrate. Make good and level existing substrate and adjust levels to ensure that there is a consistent fall to the outlets and no ponding.
10. Form new asphalt roof covering, with 'front' upstand 150mm as existing and 'rear' upstand up and over the new kerb. Dress and link asphalt to the lead spouts at the two outlets.

11. Form lead cover flashing to asphalt abutment to parapet walls, securely wedged and pointed into the deep chase.

FRONT PARAPET

12. Carefully form deep chase for flashing 1 course above the top of the existing roof kerb.
13. Repoint open joints only in the rear face of the front parapet and in the stone coping.

STEPS AND REAR PARAPET

14. Carefully rake out pointing to both sides of steps walls parapet, above the string course one side and above roof or ground on the other.
Deep-rake every other joint both sides for 900mm across the substantial crack at mid-point of both side-walls, and at the crack to abutment to one top pier, and install 10mm 'helibar' reinforcement to engineer's specification.
15. Repoint wall both sides, with deep packing to defects in damaged area above southern outlet and adjacent corner.
16. Point open joints only in parapet and string course.
17. To walls flanking the steps, carefully rake out all of the pointing. Deep rake every 3rd course across the mid-point crack each side for a length of 900mm, and insert 10mm 'helibar' reinforcement.
Repoint walls as specification following completion of the work to the steps.

Note: The arch at the back of the colonnade, including the spandrels below the string course, is NOT to be repointed.

STEPS REPAIRS OPTION A

18. Number and identify all step stones.
Carefully dismantle the whole flight of steps and set the stones aside for refixing.
Identify any defects requiring repair in the stones as they are removed.
19. Clear all loose material and rubbish from the substrate to the steps. With architect identify any repairs required to the sleeper walls.
Allow a provisional sum of £650 for masonry repairs to the sleeper walls.
Similarly clean out and prepare wall sockets for refixing steps.
20. Re-set the steps in their original positions, with stainless steel rigid dowels securing each unit to the two sleeper walls at every step in accordance with engineer's specification and sketch, but with the holes drilled from the back of the steps allowing the face to remain intact.

Build in step ends to walls at each side, reusing existing bricks and augmenting with matching replacement bricks only where absolutely necessary.

21. Point all of step joints in NHL5 Lime Mortar.

STEPS REPAIRS OPTION B

(Not to be included in total, but expressed as an optional reduction in cost.)

22. *Carefully dismantle, number and set aside only steps 10, 11, 12, 13 numbered from the bottom.*

23. *Locally repair the sleeper walls as item 17 with a provisional sum of £200*

24. *Reset steps 10-13 with alignment corrected as far as possible allowing for differentials in steps 9 and 14.*

25. *Fix all step units with dowels as engineers sketch detail, drilled from the face of the steps with great care, leaving a minimum sized hole in each position to be made good. Great care is to be taken to ensure that holes are regularly spaced and carefully aligned.*

26. *Rake out all open joints to all of the steps and repoint in NHL5 lime mortar.*

EITHER OPTION

27. Replace 2 broken plinth bricks at bottom of steps.

28. Supply and install wrought iron handrail to both sides of steps, as drawing 968/05 with fixing tangs set deep into wall and pointed round with lime mortar. Handrail offset 150mm to inside edge. Allow provisional sum of £400 for non-ferrous fixings into the wall to be discussed with architect.

29. Take down, overhaul, paint and re-erect rain water pipes.

REAR WALL OF COLONNADE

30. Carry out pinning repairs to central arch brickwork as engineers' specification and sketches and under on-site direction of engineer and architect.

31. Following repairs, repoint open joints *only* of arch in lime mortar. Only loose material is to be removed... no raking out.

32. Protect plaques on rear wall. Remove redundant iron fixings.

33. Carefully rake out all of cement pointing to rear wall including the careful removal of cement / plaster backing to lost plaques. Where pointing will not come out with hand tools without damage to bricks it may be allowed, on the express permission of the architect, to cut the centre of the pointing through using a small disc cutter.

34. Cut out and replace plinth-header chamfered bricks at base with matching yellow stock bricks sourced as noted in the specification:

Arch 1: 4 No;
Arch 2; 6 No;
Arch 6: 2 No;
Arch 7: 12 No including corner.
Arch 9: 1 No;
Arch 12 : 2 No;

Total: 27 No.

35. Cut out and replace defective or broken bricks to rear wall, and replace missing:

Arch 3: 1 header;
Arch 4: 1 stretcher;
Arch 5: 7 headers, 1 stretcher.
Arch 6: 4 headers, 4 stretchers;
Arch 9: 3 headers;
Arch 10 5 headers, 4 stretchers;
Arch 14: 1 stretcher.
Arch 15: 1 stretcher.

36. Repoint back wall complete in lime mortar of mix to match the original mortar analysis, see specification.

COLONNADE VAULTS

37. Remove loose material only and point open joints individually.

38. Remove pointing and mortar around sides and top of iron vaults supports where bearing in wall.

Carefully clean surface corrosion from iron beams by wire-brushing, taking great care not to damage brickwork adjacent.

Apply paint coatings as engineers specification, including penetration as far into bearing joints as is possible.

Repack bearing joints with corrosion-inhibiting grout eg Sika Injecto-cem – 190, as engineers specification.

FRONT WALL

39. Remove loose material only from open joints in brickwork and repoint individual defects.

SOUTH END WALL

40. Establish a block-bond line to the left of left-hand arch reveal as a limit for complete repointing. Rake out to the left of that line and re-point that area complete.

41. Above arch remove defective pointing only. Rake out behind each section and repoint locally.

PART 3: SPECIFICATION OF MATERIALS AND WORKMANSHIP

General note:

This specification and the Schedule of Works, Engineers Notes and drawings are to be read together. Any discrepancies are to be brought to the attention of the architect for resolution.

0. GENERAL CLAUSES

0.1 Quality of material and workmanship:

Goods, materials and workmanship are to be of the best quality of their respective kinds and to comply at a minimum with the respective British Standards and Codes of Practice. A high standard of workmanship is required and all work is to be carried out by qualified craftsmen. The Architect reserves the right to request the removal from the site of any operative failing to meet the required standard. All manufacturer's or supplier's instructions must be followed. All current regulations with regard to health and safety are to be adhered to, and the health and safety information for all products used are to be read and all recommendations implemented.

0.2 Plant tools and vehicles:

The contractor is to provide and use all plant tools and vehicles required for the proper and efficient execution and completion of the works. Allow for maintaining on site all plant, tools and vehicles required for the work. If generators, compressors or other mechanical plant are used on the site they should be well silenced and comply with noise legislation at an absolute minimum. Vehicles and plant are to be immobilised when the site is unattended.

0.3 Scaffolding and access:

The contractor is to provide all scaffolding and other access equipment for the proper and safe execution and completion of the works, including altering, shifting, adapting from time to time as necessary and clearing away and making good at completion. All scaffolding is to comply with current Health and Safety legislation.

1. DEMOLITION & PREPARATORY WORKS

1.1 General:

All demolition and deconstruction of parts of the building to be removed are to be carried out as necessary to carry out the new work and alterations. Demolition and removal works are to be carried out in a careful and orderly manner, maintaining the stability and integrity of the building at all times.

1.2 Temporary works:

Adequate propping is to be installed before, during and after demolition works are carried out, and at no time is the building or the adjoining buildings to be left in an unsafe condition.

The integrity of roof coverings and rain water disposal is to be maintained during and after demolitions. Any roofs and gutters affected by the works are to have temporary works carried out as instructed on site by the architect if details are required.

1.3 Rubbish:

All demolition rubbish is to be removed from site immediately.

1.4 Water services:

Water services are not affected by the works. Any supply to the building is to be maintained during the carrying out of the works.

1.5 Electrical services:

The electricity services to the building is to be maintained during the carrying out of the works.

1.6 Method Statements:

Method statements will be required for all demolition works, and the contractor is to allow both to provide these and for the programme time required for their submission to and approval by the Principal Designer.

1.7 Notices:

The contractor is to submit any statutory notices or other notifications required in respect of demolition or any other activity.

2. STONework AND BRICKWORK

2.1 Stone and brick:

2.1.1 General:

The repair and replacement of stonework covered by this specification is to be carried out in the areas indicated in the schedule of works. Except as otherwise indicated the new stonework is to match the existing adjacent work in all respects including:

1. Type of stone.
2. Size and shape of prepared stone.
3. Variation of stone sizes and shapes.
4. Arrangement /laying of stone with respect to quarry bed. This is not necessarily in the conventional fashion or in accordance with good practice. The new work is to match the existing regardless of this, unless specifically instructed otherwise, in order that matching weathering patterns are achieved. The existing work is therefore to be thoroughly examined prior to preparation of any new stone.
5. Width of mortar joint.

The requirement for samples to be approved before work progresses, described in the specification below, should be noted, and the work programmed to accommodate it.

2.1.2 Replacement of stone:

The intention is to replace as little of the stonework as possible, if any. Where practicable, stones which have only broken or eroded partially are to be repaired with mortar, or have only the defective parts replaced by piecing in smaller sections of new stone. In doing so great care is to be taken to respect and repeat the width and position of joints, and to repeat mouldings to their uneroded profiles.

The extent of cutting out and replacement of stone is to be agreed with the architect before any cutting is carried out. Minimal replacement stone is specified in the schedule of works.

2.1.3 Stone:

New stone is to match the existing to adjacent work in all respects, including colour, colour variation and texture. The architect reserves the right to reject any stone or stones failing in his opinion to achieve a satisfactory match or quality. The source of stones is to be approved in advance by the architect on the basis of a sample to be provided.

Samples of matching stone for replacement are to be provided by the contractor for discussion and approval before the works commence.

2.1.4 Workmanship:

The preparation and laying of stones is to be carried out by skilled and experienced operatives to a high standard. Carved stones are to be prepared to match uneroded profiles of the stones being replaced very accurately.

2.1.5 Cutting out of existing stones:

The existing stones are to be removed or worked only after all necessary temporary works have been carried out to ensure the stability of the structure.

2.1.6 Fixings:

All pins and other fixings are to be in stainless steel, to BS1449 pt4/BS970 pt4. They are to be purpose made for the fixing of stonework and are to be of suitable size, type and structural capacity for their application. The contractor is to be responsible for the performance of all such fixings. Pins and cramps are to be used in fixing new stones and indented repairs wherever an adequate fixing is not provided by the bedding and profile of the stone itself.

2.1.7 Finish:

Exposed faces of new stones are to be hand-finished to a lightly tooled surface, to match unweathered surfaces of original.

2.1.8 Face of new stones: The face of any new stone inserted as a repair into existing work is to be in the same position as the original face of the stone that it replaces. No compensation is to be made for adjoining stones which may have moved from their original positions or weathered excessively.

2.1.9 Bricks:

Bricks used for repairs are to be the closest available match to the existing, identified after an exhaustive consideration of samples and options. For tender the contractor is to allow for a high quality hand made brick, and is to state the price per hundred allowed. The brick is a soft, pale yellow stock considerably finer than a standard London stock.

2.1.10 Laying:

The laying of bricks and stones(repairs only) is to be carried out using an NHL2 hydraulic lime mortar, mix 1:2.5. See above for general clauses regarding lime mortar.

2.2 Lime mortar

2.2.1 General:

The mortar used for the laying of stonework and brickwork, for stonework repairs and (with variations of mix, see below) for repointing is to be a lime mortar made using natural hydraulic lime. A complete understanding of the preparation and use of hydraulic lime mortar is necessary on the part of the contractor, and the process is to be supervised by at least one operative experienced in it. The information incorporated into this specification is not exhaustive and should not be used as a substitute for knowledge and experience on the part of the contractor. Unless specifically stated as NHL 5 the lime used is to be NHL 2, and in either case a mix of 1:2.5.

The aggregate and mix specified here has been informed by a detailed scientific analysis of the original mortar.

2.2.2 Lime:

St Astier or Singleton Birch NHL2.5 and NHL5 hydraulic lime is to be obtained in bagged form from a recognised specialist supplier. It is to be in date, dry stored and ready for use.

2.2.3 Aggregate:

Aggregate for mortar is to be a pale yellow quartz sand with particle sizes as above, with a small addition of fine crushed red brick and crushed charcoal.

Aggregate is to be well graded with a full range of particle sizes from 1.18mm to dust

2.2.4 Mortar mix:

Mortar for all bedding and pointing of stonework is to be carefully gauged to mix 1:2.5 NHL 2 lime and aggregate as above. Very narrow joints which do not allow the use of sharp sand are to be pointed using a creamy mix of lime and a similar amount of soft sand/stone dust. Colour and texture of pointing mix is to be assessed by the preparation and consideration of a range of up to 10 samples in consultation with the architect, and the mortar is to be carefully gauged to maintain a colour kept as close to that of sample as possible. Allowance is to be made for preparation of samples for the approval of the architect, and the adjustment of the aggregate mix if necessary, before any pointing is carried out. 10 samples are to be allowed for, but they are to be prepared as required until approval is made.

2.2.5 Mixing: The materials are to be carefully gauged for mixing using gauge boxes, and thoroughly and correctly mixed.

The mortar may be premixed to the agreed mix by the lime supplier who is to ensure that the consistency of mix is maintained and the material sent to site correctly matured, prepared and ready to use. The addition of water for workability is to be kept to an absolute minimum, and must not be used as a substitute for thorough working.

2.3 Pointing:

2.3.1 General:

Pointing is to be carried out to all brickwork and stonework using the lime mortar mix described above. Pointing is generally to be flush with the stone surface, and dressed by beating with a bristle brush during the curing process to expose the aggregate.

2.3.2 Pointing:

Pointing is to be carried out to all brickwork defined in the Schedule of Works using the lime mortar mix described above. Pointing is generally to be flush with the brick surface, and dressed by beating with a bristle brush during the curing process to expose the aggregate and to set the surface back just behind the arris of the bricks.

2.3.3 Raking out:

Existing pointing is to be carefully raked out by hand, using a narrow chisel with a tip wider than shank, generally to a depth of min 30mm- taking great care not to damage the brick arrises. The back of the raked joint should be as square in shape. Where repointing or repair has been previously carried out using a strong cement mortar it is to be very carefully removed as far as is possible without damaging the brickwork further. (Where this is not possible it is to remain.) An area of raking out is to be prepared and approved before continuing, and is to be left as a standard to be pointed last.

2.3.4 Preparation:

The raked joint is to be flushed out with clean water, and thoroughly damped.

2.3.5 Placing and finishing:

The pointing generally is to be set just back from the face of the brickwork and generally flush with the face of the stonework. The mortar is to be placed and pressed into position using a pointing iron not wider than the joint. The mortar is to fully fill the joint and any voids behind the joint.

2.3.6 Drying and setting:

The drying rate of the lime mortar is to be carefully controlled to minimise shrinkage. The amount of wetting and protection will vary according to the weather conditions, but the contractor is to take all necessary steps to ensure that the drying rate is sufficiently slow by periodic spraying with water, thorough wetting of stonework before carrying out work, and protection with wet sacking.

The pointing is to be brushed back following its initial partial set using a stiff bristle brush. The technique to be adopted is to be finalised in discussion, following preparation of samples as specified above

2.3.7 Cleanliness:

The faces of all bricks and stones are to be kept clean of mortar and other matter at all times.

3. ASPHALT ROOFING

3.1 General:

Asphalt roofing is to be carried out in all respects in accordance with the recommendations of the Mastic Asphalt Council. Detailed guidance can be found at <http://www.masticasphaltpcouncil.co.uk/tech-guides/>

3.2 Details:

The roof is to be, as it is, waterproofed by a mastic asphalt membrane approx 19mm thick, laid direct onto a stable substrate of lime concrete. The surface of the substrate is to be adequately prepared and keyed for adhesion.

Abutments are to be made against the existing masonry surfaces, with joints raked out for edge keying, and stainless steel eml fixed for reinforcement and fixing to vertical elements.

Fillets are to be formed at all changes of angle

3.3 Flashings:

All abutment upstands are to be weathered with code 5 lead flashings, conventionally fixed into a brickwork chase and pointed.

4. IRONWORK:

4.1: General:

New ironwork is to be hand-forged in wrought iron by a traditional blacksmith using fire-welding and other traditional methods. Final details are to be agreed between the blacksmith and architect generally in accordance with the drawings. The contractor is to allow for ironwork by a supplier registered with the NHIG for conservation work.

5. DECORATIONS

5.1 General:

Decorations are limited to the redecoration of the rain water goods complete with any fixings and fittings and external metalwork

5.1.1 Materials and workmanship

Materials and workmanship are to be compliant with BS 8000-12:1989, BS 6150:2006 and other relevant British Standards.

5.2 Preparation

5.2.1 General regarding preparation:

Preparation is to be carried out to a high standard, with initial rubbing down and filling using high quality appropriate materials, and rubbing down with fine grade paper between coats.

Preparation of existing finishes is to be carried out with due regard to the Health and Safety aspects of dust and dust inhalation, working with lead based products, the possibility of existing coatings containing asbestos, and the legislation controlling these and any other aspects of the work.

Dust and debris are to be removed from surfaces prior to decorating by the use of vacuum cleaners and tack-rags.

5.2.2 Removal of existing paint coatings:

There is to be a general presumption against burning off, in favour of the use of chemical strippers.

5.2.3 Paint strippers:

Chemical strippers are to be used fully in accordance with manufacturers recommendations and health and safety advice. In general stripping of paint is to be carried out using the least aggressive stripping agent adequate to the task. All products of paint stripping are to be collected and disposed of strictly in accordance with legislation and good practice. Strippers are to be comprehensively neutralized before works proceed.

5.2.4 Burning off:

In the event of any burning off paint is to be tested for lead content before burning off or rubbing down and necessary and appropriate precautions taken. If necessary the specification for preparation is to be varied as agreed with the architect. Existing paint is to be burnt off as described in the schedule of works, and elsewhere as required to achieve the desired quality. Burning off in situ is to be strictly controlled, water and fire extinguishers are to be kept to hand, and all areas are to be checked 30, 60 and 90 minutes after work has ceased. No burning off is to be carried out within 2 hours of the end of the working day, and all such work is to be checked by the foreman in charge before he leaves the site. Where burning off is carried out in conjunction with other works the contractor is to ensure that the correct sequence is followed. All products of burning off are to be collected and disposed of strictly in accordance with legislation and good practice.

5.3 External Decorations

Metalwork including pipes and gutters not pre-finished:

Clean, prepare, prime bare metal with zinc oxide primer, decorate 2 undercoat, 1 gloss oil paint black, exterior paint system to be approved in writing by architect.

5.4 Iron vault beams:

After removal of all of the surface corrosion and full preparation, apply Sherwin-Williams 2-pack epoxy system:

Epigrip M902 epoxy aluminium primer, stippled by brush, @125 microns dft

Epigrip M905 epoxy intermediate coat, applied by brush, @ 100 microns dft

Resistex K651 polyurethane finish, applied by brush @ 30 microns dft. Colour 'stone' to match brick colour as closely as possible, to be agreed with architect.

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