HIGHGATE CEMETERY: THE FUNERARY STRUCTURES, MAUSOLEA AND SUNDRY LISTED BUILDINGS
RIBA STAGE 3 SCHEDULE OF WORKS

WEST SCOTT ARCHITECTS

Issue Preliminary 5: October 2024. Includes changes to content, format and inclusions with regard to Schedule of Works

CONTENTS:

PROPOSALS

Background information

A LOCATION
B SURVEY DRAWINGS

Documents contained in proposals documentation issued separately as Design and Access Statement Vol 4

C SCOPE, BRIEF, PHILOSOPHY AND ENVIRONMENT
C1 Scope
C2 Brief
C3 Philosophy
C4 Environmental strategy

D ACCESS

Schedule of Works: Sections repeated for each building

E PROPOSALS COMMENTARY
E1 Research and proposals
E2 Materials analysis

F PROPOSALS
F1 Drawings register
F2 Schedule of Works

G SPECIFICATION AND MATERIALS
G1 Specification notes

APPENDICES

Appendix 2: Condition Survey report Vol 1
Appendix 3: Materials analysis
Appendix 4: Condition Survey report Vols 2 and 3
Appendix 5: Conisbee Structural Consultant's report
Appendix 6: Baxter Conservation Philosophy

PROPOSALS:
Proposals are defined here for each building in turn

Building 3a: NORTH LODGE

A: LOCATION
Plan of cemetery with building highlighted. Drawing Number 1066-9-3a-00

B: SURVEY DRAWINGS
Drawings 'as existing' from Digital Inc survey
1066-9-3a-10 Plan and elevations 'as existing' 1:50
From Digital Inc survey with additional information

C AND D: SEE DAS VOL 4

E: PROPOSALS COMMENTARY

E1: Research
No expansive research has been required for the North Lodge proposals beyond personal communications with the architect for the late 20th Century works.

E2: Materials analysis and selection
Materials affecting external appearance are limited to bricks and render:

Render appears to be a cementacious material with a sharp sand aggregate. This predates the late 20th Century works but may well not be the original. A dissolution analysis will be carried out to inform any areas requiring renewal, but as the works proposed only involve localised repairs (to cracks etc) these can be specified in a hydraulic lime mortar with confidence.

Bricks are only exposed as a finish to the street-facing wall, where repairs will be carried out using reclaimed bricks to the closest match possible. The bricks used in the historic wall are London Stocks of a typically mid-19th Century yellow colour, and can only be sourced at the time of implementation from available stocks. They are less adequately replicated by new commercially available bricks, to be selected only if required.

New brickwork will be laid and pointed in lime mortar, and the affected section of wall is to be repointed for beneficial maintenance and longevity. The wall is continuous from much of its (very extensive) length and there is no convenient section to be addressed. Historic repointing has been patchy and it is proposed to continue this pattern by pointing only the section of wall that needs it, and making as inconspicuous a transition to the existing weathered finish as is practically possible.
Internal materials will avoid the use of synthetic insulations and finishes:

- Lime plasters (no gypsum products)
- Lime-crete floor slab
- Clay or stone floor tiles
- Rockwool mineral insulation

F: PROPOSALS

F1: Proposals drawings

1066-9-3a-21 Plan as proposed 1:20
1066-9-3a-22 Roof plan as proposed 1:20
1066-9-3a-23 Front and side elevations as proposed 1:20
1066-9-3a-24 Street and rear elevations as proposed 1:20

F2: Outline schedule: scope of works

Note:

Attention has been given to the options for roofing. The existing mastic asphalt has localised defects and weaknesses and is considered problematic for the long term, but the viable options are limited. Consideration has been given to:

- *Replacing the asphalt*
- *Single ply membrane*

The particular problems with the existing roof are associated with the rear eaves detail, where an eaves upstand controls discharge of water through a small outlet prone to blockage, and the wall-head to the street which is unresolved and unsightly as well as having problematic weathering details. Modification has been adopted with an external gutter that is easier to maintain, and this is resolved along with the proposed extension abutment.

A modest additional insulation layer can be applied externally without adversely or significantly affecting the appearance and this is recommended (compliance with Building Regulations performance cannot be achieved within acceptable limits in respect of the character and appearance of the heritage asset so the appropriate Part L exemption will apply).

Consequently a roof-covering is recommended that performs well on an insulation substrate), and the chosen generic solution is a modern single-ply roofing product with lead flashings to the parapet abutments.

Schedule:

ROOFS

1. Clean and prepare existing asphalt roof coverings for retention as a vapour barrier.
2. Remedial works to substrate including assessment of structural capacity by engineer.
3. Adapt perimeter coping detail to remove upstand at eaves of rear parts.
4. Construct new eaves detail to rear elevation, with eaves gutter and facia.
5. Prepare the roof substrate and adjust falls, finished with adhered vapour control membrane.
6. Insulate the flat roof with 50mm insulation suitable for single ply roofing membrane.
7. New single ply roof membrane.
8. New lead flashings all round.
9. New lead weatherings to street-facing wall head and chimney base.

WALLS

10. Removal and renewal of render to chimney.
11. New levelling courses in brick and stone copings to street-facing wall head.
12. Lead cappings to rendered parapet tops.
13. Minor repairs to wall render and consideration of shelter coat or other decorative surface to unify differing render surfaces and repairs.
14. Overhaul of windows and doors. Replacement like for like of degraded units where repair in not viable. Replacement of glazing with slim double glazed units which will reduce condensation risks, and weatherstripping of casements. Provision of trickle ventilation for Building Regulations compliance.
15. Reversal of front door swing to enhance usable space.
16. Overhaul and redecoration of rainwater goods.

EXTENSION

17. Construction of a small external addition to the rear to provide equipment storage. This to be in traditionally detailed joinery with a lead roof.

INTERIOR

18. Strip out existing finishes from late 20th century refurbishment.
19. Removal of internal wall separating WC and kitchen facilities from habitable room.
20. Excavation and removal of concrete floor.
21. New internal partition with foundation, relocated to enhance WC accessibility.
22. New floor structure, in limecrete with foamed glass substrate.
23. New internal finishes, with breathable materials including insulating lime plaster used for external wall finishes.
24. New floor and wall finishes, with robust detailing and no timber trim. Traditional tiled floors with electric underfloor heating.
25. New WC and kitchen units.
26. Renewal of services installations. These do not have an impact on significant fabric or finishes.

Building 4: THE COLONNADE

A: LOCATION

Plan of cemetery with building highlighted. Drawing number 1066-10-4-00-P1

B: SURVEY DRAWINGS

Drawings ‘as existing’ from Digital Inc survey
1066-10-4-10 Plan at courtyard level 1:50
1066-10-4-11 Reflected ceiling plan 1:50
1066-10-4-12 Elevations 1:50
1066-10-4-13 Roof plan 1:50
All from Digital Inc survey with additional information

C AND D: SEE DAS VOL 4

E: PROPOSALS COMMENTARY

E1: Research

Research has included the study of archive images and personal communications with the architect for the late 20th Century works. It has also included the excavation of a trial pit to establish historic floor levels and construction.

Design has been coordinated with the landscape proposals for the Courtyard.

E2: Materials analysis and selection

The excavation of the floor may or may not reveal threshold stones in usable condition. If so they will be conserved as appropriate. If not they will be replaced in matching Portland stone to the original profiles and at the original level. It is intended that the courtyard surface (in Breedon gravel) should be only minimally below the level of the thresholds… just enough to deter loose aggregate from migrating onto it.

The original floor surface within the Colonnade was in mastic asphalt. This is not considered an appropriate material to the new works, and it is proposed to lay a new floor at the original level in York stone paving, laid with tight joints.

The base of the brick wall at the rear will be exposed by lowering the floor. This will be repointed in lime mortar to match the work carried out in 2017. The original mortar was analysed for repairs in 2016 (see Appendix 1) and a matching lime mortar will be specified in RIBA Stage 4.

F: PROPOSALS

F1: Proposals drawings

1066-9-4-20 Plan as proposed 1:50
1066-9-4-21 Reflected ceiling plan as proposed 1:50
1066-9-4-22 Front and side elevations as proposed 1:50
1066-9-4-23 Roof plan and upper level as proposed 1:50

F2: Outline schedule: scope of works

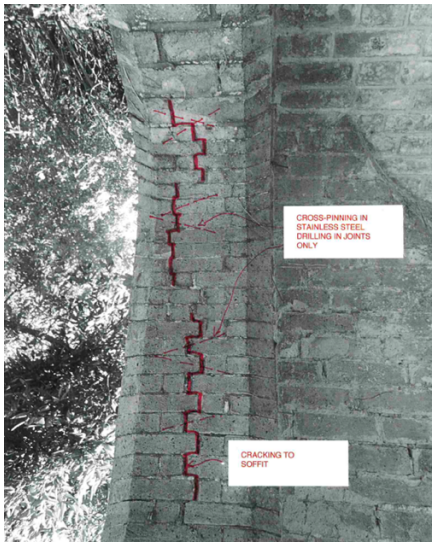
Note:

The colonnade was the subject of extensive repairs in 2017, which addressed the subsidence of the central steps and the repointing of the rear wall in lime mortar. Further repairs to sustain it in good condition are therefore relatively light.
Interventions are associated with the extensive resurfacing of the courtyard, and involve returning the ground/floor to the original level.

Schedule:

BRICKWORK

1. Install helical bar repairs to stepped cracking either side of central steps as recommended by Conservation Engineer. Repoint to match work carried out in 2017.
2. Carry out cross pinning to address delamination of the brickwork skins above the two end arches. Rake out and point affected joints in the arch soffits.
3. Rake out and repoint brick plint to rear wall exposed by reduction in floor level, to match work carried out in 2017. Replace isolated defective bricks using reclaimed Cambridge Gault facings.
4. Carry out general overhaul of brickwork including pointing isolated open joints in parapet coping.



Delamination of arch soffits see item 2

FLOOR

5. Excavate and clear away raised floor build-up down to original strata.
6. Establish whether original threshold stones remain between arches. If they do exist in serviceable condition they are to be conserved in situ and new finishes to butt up to them. If they do not they are to be replaced in Portland stone to proifiles matching the originals.
7. Excavate colonnade floor for 150mm type 1 subbase below rediced floor level, and install and compact subbase.
8. Install new floor in York stone paving cut to radial pattern integrated with the colonnade geometry, set to original level approx 160mm below existing. If discrepancies are found the level is to be dictated at the central steps by the exposure of a single additional riser to the stairs dimensionally identical to the rest of the flight.

VISITOR CONTROL

9. Install gated enclosure at top of central steps as drawings, together with York stone paving within the enclosed area with runoff controlled by slot drainage at path abutment.

Building 5: THE CUTTINGS CATACOMBS

A: LOCATION

Plan of cemetery with building highlighted. Drawing number 1066-10-5-00-P1

B: SURVEY DRAWINGS

Drawing numbers
1066-10-5-10 Plan1:50
1066-10-5-11 Roof plan 1:50
1066-10-5-12 Elevation 1:50
All from Digital Inc survey with additional information

C AND D: SEE DAS VOL 4

E: PROPOSALS COMMENTARY

E1: Research

Research has included personal communications with the architect for the late 20th Century works.
Design has been coordinated with the landscape proposals, particularly in respect of the replanting of the bank behind the buildings.

E2: Materials analysis and selection

Materials affecting external appearance are limited to bricks and render:

Render varies but appears largely to be a cementacious material with a sharp sand aggregate. This is substantially from the late 20th Century works but we do not have details of mortar mixes etc so a dissolution analysis will be carried out in RIBA Stage 4 to inform any areas requiring renewal. A pilot analysis (see Appendix 3) of just the render to Vault 11 (Baxter) indicates a probably early 20th century Portland cement render with an aggregate of quartz sand <3.35mm in size. Works proposed which only involve making good of cracks only involve localised repairs can be specified in a hydraulic lime mortar with confidence. In order to achieve the aesthetic objectives of the Conservation Philosophy it is proposed to shelter coat rendered units that are subject to substantial and patchy repairs.

Bricks are also exposed as a finish to some units, and also to the exposed retaining wall and buttresses in the gaps at CC8 and CC10. Here repairs will be carried out using reclaimed bricks to the closest match possible. The bricks used in the historic walls are London Stocks of a dark colour, and can only be sourced at the time of implementation from available stocks. They are less adequately replicated by new commercially available bricks, to be selected only if required.

New brickwork will be laid and pointed in lime mortar, and the affected sections of wall are to be repointed for beneficial maintenance and longevity. Maximum water porosity is an absolute requirement in these locations so here we propose the use of a putty lime mortar, with a controlled pozzolanic additive to provide some set. Some water management will be achieved by the introduction of more controlled weepholes and drainage.

F: PROPOSALS

F1: Proposals drawings

Drawing numbers
1066-10-5-20, Plan as proposed 1:50
1066-10-5-21, Roof plan as proposed 1:50
1066-10-5-22, Elevations as proposed 1:50 with details

F2: Outline schedule: scope of works

Note:

Discussion with Robert George (project architect for works in 2008) on site has clarified the extent of works then and has allowed a further review.
Drainage: There is (new in 2008) drainage in the form of the land drain behind the rear retaining wall. This discharges into the main cemetery drainage network at lower ground level at both ends of the Catacombs. The drain is at a depth not more than 0.6m below the top of the retaining wall and only carries away surface and sub-surface run-off. Deeper excavation than this was impracticable in 2008 due to the condition of the high ground behind and is not expected to be any better now.
There was always substantial water penetration through the rear retaining wall at the 'gaps' at Nos 8 and 10. The only works in 2008 to control this were the insertion of weephole pipes at No 10.
The proposals address the need to improve the drainage and landscaping at the upper level to the rear of the Cuttings Catacombs and the management of water draining from the rear wall at the lower level.

Roofs: The pitched roofs to Nos 1-3 were substantially reconstructed in 2008. There is no provision for collecting run-off at the low points between the roofs, and only the pointed joints prevent leakage at that point. The joints are now extensively voided. Other pitched roofs drain onto the adjacent flats, and these were relevelled in 2008 to discharge to the front. There the run-off is not handled in any formal sense and to vault No 4 (Hanges) and others the run-off points are small and prone to choking. Proposals mitigate the problems associated with these historic defects

Landscaping:
The ground above the Cuttings Catacombs was excavated back and retained in place in 2008 with ground anchors and steel mesh. This is partially successful but the slope has once again encroached on the rear retaining wall and has made maintenance of the drainage and ground at the back of the roofs very difficult. Discussions have been progressed in RIBA Stage 3 with Landscape Consultant , and it is resolved to address this problem further by removing the laurel trees that occupy the bank and carryoing out works to control the other trees, followed by replanting with ground cover that offers supportive root growth. These proposals for the buildings assume that as being done.

Schedule:

ROOFS

1. Cut back vegetation behind the Cuttings Catacombs
2. Clear the catacombs roofs of all vegetation and debris and make a detailed examination for defects. Repoint all open joints in the stonework of pitched roofs and localised repairs to the asphalt of flat roofs to minimise (but not eliminate) the potential for water penetration.
3. Remove the cement render coating to the roof of No 13 and review substrate. Consider whether the stone roof can be retained untreated. If not, a new roof finish in one of a) render, b) sheet metal, c) a proprietory tanking render system, d) mastic asphalt.
4. Review the numerous different conditions for water discharge between and off the roofs. Enhance discharge from flat roofs to rear drain by enhanced discharge openings and details to minimise risk of blockage.
5. To valleys between CC1 and CC2, CC2 and CC3, CC3 and CC4, CC4 and CC5, cut chases in roof stone slabs and install lead channels to discharge into rear drainage. The front edge of the channels is to be neatly dressed to the stonework with sufficient upstand to prevent run-off to the front

DRAINAGE

6. Re-excavate the drainage channel behind the rear retaining wall, to a depth of up to 1m.
7. Check the installation and enhance it where possible to maximise function. Reinstate the free-draining material on top of it.
8. The valleys between pitched roofs of Nos 1, 2 and 3 are to be fitted with a lead channel, fitted into new chases cut in the stone roof slabs each side. Each is to have a flat welted joint at the mid-point and both are to allow water discharge at both front and rear.

9. Enhanced and organised weepholes are to be provided in the exposed retaining wall sections between catacomb units… the gaps at Nos 8 and 10. A shallow land-drain is to be installed at the foot of the wall in each case, bedded and covered with free draining material and connected to the drainage in the path in front of the catacombs.
10. It is noted that vaults CC2, CC11, CC12 are extremely wet, with water running out of the base of the rear retaining wall and pooling on the floor. In each affected vault the floor is to be excavated and a 100mm slot drain installed against the rear wall, with a connection through the centre of the vault to the surface water in the path in front.
11. Further interventions to control the encroachment of the landscape and vegetation at the rear of the Catacombs are to be agreed for inclusion in the Landscaping proposals.

BRICKWORK

12. Rake out all pointing from the exposed brickwork of the retaining wall to gaps at 8 and 10. Remove all vegetation and control regrowth with herbicide.
13. Remove ad-hoc brickwork from buttress offsets at No 8. Reconstruct a weathered detail in brick, neatly detailed without water traps.
14. Repoint brickwork complete in lime mortar, finished with a slightly recessed joint.
15. Rake out and carefully repoint localised defects only in brickwork to facades of Nos 12 and 14.

RENDER

1. Carry out localised repairs to render of facades to Nos 11 and 13. Note that analysis indicates the existing render is cement based.
2. Shelter coat the render finishes to units CC7, CC11, CC13, and possibly CC5 depending on appearance after making good of cracked render.

IRONWORK

3. Establish access to all vaults and repair locks and doors following any forced entry.
4. Remove iron doors to Nos 11, 12 and 13 for repairs to steel frames. Remove frames to workshop for removal of all corrosion, repairs and treatment with corrosion inhibitor. Consider galvanising and etching for paint coatings.
5. Treat frames to the rest in situ with corrosion inhibitor.
6. Paint all of the frames with an epoxy paint coating (TBC)
7. Prepare and decorate all the iron doors and gates with paint specification TBC in authentic colours TBC.

INTERIORS

It is not proposed to carry out other works to interiors unless they are found, in the course of other works, to have defects consequent to the roof and drainage issues.

LANDSCAPE

8. Agree with Landscape consultants whether there is potential for substantial clearance of vegetation (including trees) behind the Cuttings Catacombs, and the re-levelling of the sloping site to give more clearance to the rear retaining wall. This is likely to be subject to the presence or otherwise of unmarked graves within the sloped area.
9. If opportunity presents the existing land drainage to the rear of the Catacombs is to be protected by a further land drain some 2m further back, installed in conjunction with resculpting of the slope.

Building 6. THE EGYPTIAN AVENUE

A: LOCATION

Plan of cemetery with buildings highlighted. Drawing Number 1066-10-6-00

B: SURVEY DRAWINGS

Drawings ‘as existing’
1066-10-6-10 Plan 1:50
1066-10-6-11 Avenue elevation 2 1:20
1066-10-6-12 Avenue elevation 1 1:20
1066-10-6-13 Elevation upper portal 1:20
1066-10-6-14 Elevation lower portal 1:20

All from Digital Inc survey with additional information
Significant defects and issues are annotated on the drawings.

C AND D: SEE DAS VOL 4

E: PROPOSALS COMMENTARY

E1: Research

Research has included personal communications with the architect for the late 20th Century works, and review of the Conservation Reports from Nimbus Conservation prepared on completion.
Design has been coordinated with the landscape proposals, particularly in respect of the introduction of drainage above the vault doors.
The structures have been reviewed by the Conservation Engineers, and their recommendations incorporated.

E2: Materials analysis and selection

Materials affecting external appearance are limited to bricks and render:

Render varies where repaired in the past but the original has been chemically analysed (see Appendix 1) and found to be ‘Roman Cement’, a lime material with an hydraulic set created by a method patented in 1796 as “Parker’s Roman Cement” which involves the burning of septaria

nodules. Whilst of considerable historic interest and significance this is not a material now available and repairs will be specified from the equivalent suite of hydraulic lime materials now produced. Parker's Roman Cement is a harder material even than NHL5 hydraulic lime mortar so the underlying principle that the repair material should be sacrificial to the original can be adhered to. These and the grouts to be used will follow the successful precedent of the 1990s work (the grout used was Pozament St Pauls Mix).
Substantial areas of the Roman Cement render have fallen from the lower portal obelisks in recent times but none in a condition which can be retrieved and refixed. Any areas of detached render still in place can be refixed using stainless steel pins and grouting.
New render to rebuilt parapets will be in an equivalent hydraulic lime mortar.
Bricks are also exposed as a finish in some areas where render is lost, and will be rebuilt in the course of parapet works.
New brickwork will be laid and pointed in lime mortar, and affected sections of wall are to be repointed for beneficial maintenance and longevity.
We propose the use of a hydraulic lime mortar, with due reference to the specifications used in 1990-98.

Leadwork will be carried out using milled lead of appropriate code (thickness) with jointing and workmanship in accordance with the current guidance of the Lead Sheet Training Academy.

Steel door frames will be descaled and repaired, followed by treatment with a rust converter and epoxy paint. It is not intended to disrupt the present finish (controlled corrosion) of the cast iron doors.

F: PROPOSALS

F1: Proposals drawings

Drawing numbers
1066-10-6-21-P1 Avenue elevation 1 with parapet drain detail
1066-10-6-22-P1 Avenue elevation 2
1066-10-6-23-P1 Upper portal elevation
1066-10-6-24-P1 Lower portal elevation

F2: Outline schedule: scope of works

Note:

Initial inspection by the Conservation Engineer of the Egyptian Avenue fabric indicates no need for substantial intervention, although not all are yet accessible and some need for structural repair and/or reinforcement may emerge as a result of further investigation.
One vault (No 12, Dummett) with marble lining and decoration has now been further inspected, and repars are scheduled below.

The extent to which the contents of other vaults are 'tidied up' will be a matter for HGC management. It is not a consideration for the fabric repairs other than where it is required to facilitate the carrying out of works, including Health and Safety considerations.

Works to effectively drain the wall head have been considered with the Landscape Consultant, concluding that the retention of the yew trees forming the green 'roof' to the avenue tunnel is more significant than non-intervention to the modest fabric of the parapet. The detail therefore shows the removal of the parapet in order to install the drain, and subsequent reconstruction. The only visible fabric changes will be the intrioduction of weepholes from the drain over a lead covering to the projecting cornice… a detail similar to that which has prevailed in the Circle of Lebanon since the 1990s work.

It will be necessary to fully overhaul and redecorate the steel door frames installed in 1990-98. This will certainly involve removal and reinstallation and in some cases might involve replacement. A conservative allowance would be for replacement of 4 no frames.

The other cause of water penetration is at low level, where the sloping path surface has been allowed to rise above the door thresholds, and run-off flows into the vaults. The reduction of the ground level by 100 – 150mm included in the landscape proposals will ensure that this does not happen.

It should be noted that the ongoing sustainability of the Egyptian Avenue structures will be dependent of management of the landscape and vegetation AND general care of the structures including regular removal of vegetation from roofs, wall heads AND clearing of drains and channels. Beyond the preparation of a maintenance plan this falls outside the scope of Project 3, but will be critical to its success in the long term.

Ecology: The ecology of the vault interiors throughout the Cemetery is known to be significant, providing habitat for bats, rare cave spiders and other species. The ecology may have a profound influence on what can be achieved in the way of fabric repairs and this should be addressed from RIBA Stage 4 onwards.

Schedule:

DRAINAGE

1. Agree parameters for long term control of vegetation above the Egyptian Avenue with Landscape Consultants
2. Carefully dismantle the parapet walls, numbering and retaining the coping stones for reinstatement and retaining the bricks for the reconstruction. Any clean and uncontaminated lime mortar can be retained for use as aggregate in new mortar.
3. Excavate behind the parapet position and under the surface root growth, line the excavation with geotextile membrane and install clay barrier, land drain and free-draining granular backfill for drainage of the critical areas behind the wall head, all as detailed
4. Similarly install land drainage in substrate of upper path crossing the upper portal, to mitigate water ingress to the arch structure below

WALLS

5. Reconstruct parapet walls using reclaimed materials augmented to match as required. Connect land drain outlets to weepholes positioned between door positions as detailed.
6. Install new lead weatherings to projecting cornices both sides of Egyptian Avenue, with angled welted joints relating to weephole positions as detailed, and render the external face of the parapets in lime render.
7. Fit lead weatherings to lower portal pylon heads, wall heads and exposed offsets, replacing fibreglass trays fitted in 1988-96 works.
8. Reconstruct missing top section of LH obelisk in brickwork, matching the original construction in all relevant characteristics. The conservation engineer has conformed that no special works will be required to form connection with the remaining historic brickwork and the bricks and mortar should be a close match to the originals.
9. Carry out localised repairs to exposed brickwork, all in lime mortar, and point exposed areas.
10. Repair, reattach and conserve degraded render to all external walls and portal arch soffits, including the remaining render to the obelisks; pointing and grouting cracks, re-attaching loose panels of render with stainless steel pins and grout, protecting exposed render edges and generally continuing the philosophy and specification of the successful works carried out between 1988 and 1993.
11. Render the exposed brick areas of the two lower portal obelisks using a hydraulic lime mortar designed to best match the original Roman Cement in colour, texture and physical properties.
12. Following the adjustment of ground level within the Avenue, inspect and carry out render and brickwork repairs to the bottom of walls previously concealed.

IRONWORK

13. Overhaul of all iron doors and frames. This will involve removal, repair off site, possible galvanising of frames, enhanced decoration of frames with epoxy coatings. This will involve removal, repair off site, possible galvanising of frames and enhanced decoration of frames with epoxy coatings such as Sherwin-Williams (ex Leighs Paints) 2 pack epoxy system.
    - Epigrip M902 Epoxy Aluminium Primer (stippled by brush) @ 125 microns dft
    - Epigrip M905 Epoxy Intermediate Coat (brush / roller) @ 100 microns dft
    - Resistex K651 Polyurethane Finish * (brush / roller) @ 30 microns dft
14. It is not proposed to decorate the cast iron doors, but to maintain them in their partially corroded/patinated condition, where appropriate by cleaning off and reapplying the Fertan rust converter used in 1990-98. Fittings and locks to be replaced with robust items more resilient to the exposed conditions. Renewal of all collar joints to frames
15. Remove iron gates to lower portal. Carefully extract embedded iron hinges and fittings and make good the rust-jacking damage to the masonry. Replace the hinges with stainless steel alternatives, fixed into drilled sockets with polyester resin. Point around them with lime mortar.
16. Clean the iron gates by vapour blasting and treat as before with Fertan rust inhibitor for a patinated finish that does not corrode deeply.

17. Install railings to guard drop from path crossing upper portal into the Egyptian Avenue. These are shown on the drawings in indicative form and the design will be developed in collaboration with the Landscape Consultant who is setting the pattern for handrails to the whole site.

VAULT INTERIORS

18. The engineer has identified no structural defects as in need of intervention. Some brickwork repairs will be required around the vault door frames following reinstallation, and these will include the brick repairs needed to damage caused by *previous* removal of door frames.
19. Control of roots ingress and sealing of holes
20. To vault EA12 (Dummett) carry out specialist conservation works to stabilise the marble lining and protect it against progressive damage from corrosion in the supporting iron frame. It is intended and expected that this can be done with the lining in situ but some dismantling is to be anticipated in the worst case scenario. A methodology will be established when the works are to be implemented and the full method statement will be generated by and agreed with the conservator appointed to the work. An allowance at this stage would be for the removal of one supporting rail and one ceiling panel to allow a robust assessment of the ironwork, followed by reassembly, minor repair and cleaning.

Building 7. CIRCLE OF LEBANON

A: LOCATION

Plan of cemetery with buildings highlighted. Drawing number 1066-10-7-00

B: SURVEY DRAWINGS

Drawings ‘as existing’ using data from Digital Inc survey
1066-10-7-10 Plan at lower ground level 1:100
1066-10-7-11 Plan of inner circle at upper ground level 1:50
1066-10-7-12 Plan of outer circle at roof level 1:50
1066-10-7-13 Inner circle elevation 1:20
1066-10-7-14 Outer circle elevation 1:20

All from Digital Inc survey with additional information

C AND D: SEE DAS VOL 4

E: PROPOSALS COMMENTARY

E1: Research

Research has included personal communications with the architect for the late 20th Century works, and review of the Conservation Reports from Nimbus Conservation prepared on completion.
The structures have been reviewed by the Conservation Engineers, and their recommendations incorporated. At the time of writing (July 2024) this work is ongoing with access planned to a number of vaults hitherto inaccessible. The proposals will be updated in due course.

E2: Materials analysis and selection

Materials affecting external appearance are limited to bricks and render:

Render varies where repaired in the past but the original has been chemically analysed (see Appendix 1) and like the Egyptian Avenue found to be ‘Roman Cement’, a lime material with an hydraulic set created by a method patented in 1796 as “Parker’s Roman Cement” which involves the burning of septaria nodules. Whilst of considerable historic interest and significance this is not a material now available and repairs will be

specified from the equivalent suite of hydraulic lime materials now produced. Parker's Roman Cement is a harder material even than NHL5 hydraulic lime mortar so the underlying principle that the repair material should be sacrificial to the original can be adhered to. These and the grouts to be used will follow the successful precedent of the 1990s work (The grout used was Pozament St Pauls Mix).
New render to rebuilt parapets will be in an equivalent hydraulic lime mortar, with mix and aggregate designed to mathe the Roman Cement as far as possible in colour, texture and physical properties.
Bricks are also exposed as a finish in some areas where render is lost, and walls will be rebuilt in the course of parapet works.
New brickwork will be laid and pointed in lime mortar, and affected sections of wall with exposed brickwork are to be repointed for beneficial maintenance and longevity. We propose the use of a hydraulic lime mortar, with due reference to the specifications used in 1990-98.

Leadwork will be carried out using milled lead of appropriate code (thickness) with jointing and workmanship in accordance with the current guidance of the Lead Sheet Training Academy.

Steel door frames will be descaled and repaired, followed by treatment with a rust converter and epoxy paint. It is not intended to disrupt the present finish (controlled corrosion) of the cast iron doors, other than by cleaning and the reapplication of the Fertan corrosion inhibitor used in the earlier works.

F: PROPOSALS

F1: Proposals drawings

1066-10-7-21 Plan inner circle at upper ground level 1:50
1066-10-7-24 Roof plan outer circle 1:50
1066-10-7-23 Inner circle elevation 1:20 with inset details
1066-10-7-24 Outer circle elevation 1:20 with inset details
1066-10-7-25 Handrail details

F2: Outline schedule: scope of works

Note:

Initial inspection by the Conservation Engineer of the Circle of Lebanon fabric indicates some potential for substantial intervention, although not all of the vaults are yet accessible and inspection of some has only been by boroscope. An initial boroscope inspection identified vaults of concern the the structural engineer and those have been opened for inspection. Notwithstanding, even those inspected do not give a full picture

and some unknowns have to be allowed for. Some need for structural repair and/or reinforcement may emerge as a result of further investigation. Where requirements are known they are included in the Schedule and drawings.

The extent to which the contents of vaults are 'tidied up' will be a matter for HGC management. It is not a consideration for the fabric repairs other than where it is required to facilitate the carrying out of works, including Health and Safety considerations.

It will be necessary to fully overhaul and redecorate the steel door frames installed in 1990-98. This will certainly involve removal and reinstallation of those to the inner circle and in some cases might involve replacement.

It should be noted that as with the Egyptian Avenue the ongoing sustainability of the structures will be dependent of management of the landscape and vegetation AND general care of the structures, including regular removal of vegetation from roofs, wall heads and clearing of drains and channels. Beyond the preparation of a maintenance plan this falls outside the scope of Project 3, but will be critical to its success in the long term.

Ecology: The ecology of the vault interiors throughout the Cemetery is known to be significant, providing habitat for bats, rare cave spiders and other species. The ecology may have a profound influence on what can be achieved in the way of fabric repairs and this should be addressed from RIBA Stage 4 onwards.

G2: Schedule:

INNER CIRCLE

ROOF AND PARAPET

1. Remove vegetation from margin of roof all round, and remove brick capping from ventilation duct. Clear any debris from the duct and connecting channels.
2. Thoroughly check the integrity and functionality of the ventilation duct, with repairs to brickwork as necessary.
3. Overhaul the lead drainage channel. There are several locations where leadwork repairs will be needed and outlets to RWPs are to be carefully cleared and checked.
4. Install new lead flashing to the inside upstand of the drain channel, to be securely held in place by the new duct capping.
5. Install new stone capping to the ventilation duct, with joints carefully formed and pointed. The new slabs are to be laid to a fall discharging the water from them into the drainage channel.
6. Remove the render from the inside, outside and top of the parapet all round. Remove the embedded bitumen dpc and the top course of brickwork.

7. Take down the sections of the parapet that are displaced, misaligned or of inconsistent thickness. Set aside the sound bricks for reuse. Reconstruct the parapet wall to consistent plan alignment, consistent height and thickness, and without inherent cracks and defects.
8. Cut new level chase (or raked brick joint) for flashing to inside leadwork all round. Install lead flashing.
9. Construct new stone parapet coping with lead dpc under, all to the enhanced details shown on the drawings. New hydraulic lime render to all of the external and internal faces of the parapet.
10. Replace the broken section of cast iron vent pipe.
11. Approx 10 of the 20 Inner Circle vaults have minor longitudinal cracking to the vault crown.
    A conservative allowance at this stage would be for these works to 8 of the vaults. Conisbee drawing 240323-XX-SK-S-4002 shows details of the reinforcement work, following which the brick joints affected by either the cracking or the remedial works are to be repointed and deep-packed in lime mortar. Note that these are to be localised, and will not involve wholesale repointing of either vaults or walls inside the vaults.

WALLS: INNER CIRCLE FACADE

12. Brickwork repairs to cornice between IC20 and IC1as recommended by engineer. Grout voids created by mortar washout between IC8, IC9, IC10. Localised repairs to exposed brickwork as noted on the drawings, including the removal of all embedded vegetation and making good of all holes. Repair the degraded render to all external walls and vault entrance surrounds, pointing and grouting cracks, re-attaching loose panels of render, protecting exposed render edges and generally continuing the philosophy and specification of the successful works carried out between 1988 and 1993.
13. Form rodding access with cast iron fittings at base of walls to allow maintenance of the pipes embedded in walls and the below-ground drains. Make good disturbed finishes around drain access points and fill any voids that could encourage plant growth.
14. Number, label and carefully open and remove all iron doors and frames. Repair frames off site, including welding sections badly corroded and possible galvanising of frames, followed by enhanced decoration of frames with epoxy coatings, refixing of frames with stainless steel embedded fixings and brickwork repairs as necessary to return the internal face of the door surrounds to good condition. Reinstate the doors; it is not proposed to decorate the cast iron doors, but to maintain them in their partially corroded/patinated condition, where appropriate by cleaning off and reapplying the Fertan rust converter used in 1990-98. Fittings and locks to be replaced with robust items more resilient to the conditions.
    Suitable epoxy coatings such as Sherwin-Williams (ex Leighs Paints) 2 pack epoxy system.
    • Epigrip M902 Epoxy Aluminium Primer (stippled by brush) @ 125 microns dft
    • Epigrip M905 Epoxy Intermediate Coat (brush / roller) @ 100 microns dft
    • Resistex K651 Polyurethane Finish * (brush / roller) @ 30 microns dft
15. The removal and reinstatement of the doorframes will disturb the already fragile and degraded render and pointing around the frames. Renew all collar joints to frames and carry out more extensive making good as required.

INNER CIRCLE VAULTS

Structural repairs to cracks in vaults as identified by structural engineer. Any substantial works inside the vaults will in most cases require the decanting of the human remains from the affected vaults and their return on completion. This is not considered to be part of the construction work and it is expected that it will be carried out by the HGC team prior to the works, including Health and Safety considerations and any legal process.

16. See external vault repairs in item 11 above, and Conisbee drawing 240323-XX-SK-S-4002.
17. In addition IC9 (Drew) and IC15 (Dalziel) have been found on further inspection to have substantial cracks in the top of the vault extending down the rear wall. These are to be repaired, also by helical bar and stainless steel pin stitching in bed joints, in this case followed by deep packing and repointing the cracks in lime mortar.
18. Other minor defects to brickwork inside vaults are to be pointed in lime mortar.

OUTER CIRCLE

ROOFS AND PARAPETS

19. Cut the render to the outside face of the front facade parapet straight and true at the level of the first bed joint in the brickwork below the top course. Remove the render capping and top course of brickwork from the front parapet to all of the vault facades in the outer Circle.
20. Prepare the wall head with a lime mortar bed and lay lead dpc under all of the new coping, and set the new coping stones in lime mortar with close fitting joints fully filled and pointed, as detailed on the drawings. Dress the edge of the lead dpc and point the render edge to it.
21. Identify the faulty areas of asphalt roof and repair, including the re-forming of upstands with a stainless steel eml backing support, and the provision of a lead cover flashing to the abutment all round (including the rear parapet).
22. Asphalt roof repairs over vaults OC1 – OC16, including enhanced details for upstands with stainless steel eml backing and/or lead flashings
23. Remove vegetation from parapet render and carry out consequential repairs including replacement of some defective render and pointing of all holes and joints.

WALLS INCLUDING OUTER CIRCLE VAULT FACADES AND RETAINING WALLS

24. Point open joints in stone door surrounds
25. Remove the additional ventilation grilles added to vaults OC4, OC6, OC11, OC12, OC16, Infill the holes to their full depth with bricks laid in lime mortar. Where the holes are in areas already missing the render the brickwork is to be left exposed and pointed. Where it is in areas pf sound render the new infill is to be rendered over to match.
26. Localised repairs to exposed brickwork and degraded render to all external walls and vault entrance surrounds, pointing and grouting cracks, re-attaching loose panels of render, protecting exposed render edges and generally continuing the philosophy and specification of the successful works carried out between 1988 and 1993. Specific repairs are detailed on the drawings

27. Repair of Steps (1) by localised resetting of the displaced top steps (only) and and indent repairs to 2 No damaged step edges below. Point open holes and cracks and carry out mortar repairs to stone defects that are not on exposed nosings.
28. Reinforcement of displaced cracks in retaining walls subject to monitoring and in accordance with conservation engineer's advice, followed by consequential render repairs
29. Localised replacement of render panels to rustication of retaining walls where exceptionally degraded (some 5-10 panels). These are to be prepared by removing render coats back to either a sound backing coat or the brickwork, and building up in coats with hydraulic lime render compatible to the existing material (be it Roman Cement or Portland cement render).
30. To the forecourt to the Beer Mausoleum undercroft rake out and repoint all of the brickwork to the retaining walls on all four sides. Cut out and replace approx. 50 defective bricks and replace missing vent grille to OC8 with a suitable cast iron grille.
31. To the Beer forecourt remove the two rain water pipes before pointing. Install new pipes 100mm diam with cast iron hoppers. These are to drop straight (ie without the existing offsets) from the outlets to the gullies, and the gullies are to be repositioned if necessary to achieve it.
21. The the Beer forecourt remove iron gates to mausoleum entrance. Carefully extract embedded iron hinges and fittings and make good the holes and any rust-jacking damage to the masonry. Replace the hinges with stainless steel alternatives, fixed into drilled sockets with polyester resin. Point around them with lime mortar.
22. Clean the iron gates by vapour blasting and treat with Fertan rust inhibitor for a patinated finish that does not corrode deeply.
23. In the floor of the upper part of the Beer Mausoleum, very carefully lift the central stone and expose the supporting bars of corroding iron. Remove these and replace with bronze (better colour than stainless steel) before relaying the stone. Alternatively replace the bars from below without disrupting the floor.
24. Overhaul all of the iron doors, gates and frames to the outer circle. This will involve removal of some, repair on or off site, possible galvanising of frames, enhanced decoration of frames with epoxy coatings (see details above), reinstatement of doors with finishes as noted above, and decoration of gates with paint to authentic colours TBD. Fittings and locks to be replaced with robust items more resilient to the exposed conditions. Renewal of all collar joints to frames and some making good of disturbed brickwork inside the vault entrances.
25. Provide new handrails to one side only of both Steps (1) and Steps (2) as detailed on the drawings.

OUTER CIRCLE VAULT INTERIORS

26. Minor repairs only to cracks and defects, to be made good in lime mortar.

Building 8. THE TERRACE CATACOMBS

A: LOCATION:

Plan of cemetery with building highlighted. Drawing number 1066-10-8-00

B: SURVEY DRAWINGS

Drawing numbers
1066-10-8-10 Floor plan 1:50
1066-10-8-11 Reflected ceiling plan 1:50
1066-10-8-12 Terrace plan 1:50
1066-10-8-13 Elevations and sectons 1:50
Drawings ‘as existing’ from Digital Inc survey data with additional information

C AND D: SEE DAS VOL 4

E: PROPOSALS COMMENTARY

E1: Research

Research has included personal communications with the architect for the late 20th Century works, and review of the Conservation Reports from Nimbus Conservation prepared on completion.
The structures have been reviewed by the Conservation Engineers, and their recommendations incorporated. At the time of writing (Updated August 2024) this work is ongoing with access achieved to a number of vaults hitherto inaccessible, but not to all of them. Further investigation can only be carried out in the contexts of invasive works so these will remain provisional (although well-informed by the general picture) until the works are implemented.

E2: Materials analysis and selection

Materials affecting external appearance are limited to terrace finishes, stone and render, ironwork:

Terrace finishes are discussed above. Breedon self binding gravel will be punctuated by paving in York sandstone.

Stone for the dressings to the building are in a Portland limestone. The new stonework to kerbs etc will be in matching material. Noew stonework will be laid and pointed in hydraulic lime mortar of suitable mix and aggregate defined in RIBA Stage 4.

Render varies where repaired in the past and that to the bulk of the façade is known to be a cementacious material. This will be analysed for strength and aggregate in RIBA Stage 4 and replicated for repair. The older render to the two wing retaiing walls has been chemically analysed and found to be a cemetacious material, probably from an ealier programme of repairs. This will be disrupted by structural repairs but it is intended to retain it as far as possible as a record of the history of the structure. Repairs carried out in a hydraulic lime mortar will be sacrificial to the original material and represent good conservation practice.

Steel door frames will be descaled and repaired, followed by treatment with a rust converter and epoxy paint. Cast iron elements - vents, balustrades, vault doors will be descaled, cleaned and painted to authentic colours TBD.
New gates will be traditionally forged using mild steel assembled by fire-welding for an exact match to the historic orginals. The new and existing gates will be finished in a robust paint specification in authentic colours TBD.

Conservation of interior decorative plaster will be carried out using lime materials in the hands of specialist conservators. Works will include reattachment by liquid grouting using hydraulic lime slurry, edge consolidation and pointing of edge voids with a feebly hydraulic or putty lime, ensuring that new materials are less strong than the historic elements. No new plastering is intended, but some shelter coating using puttly lime mix may be applied at the conservator's discretion.

E3: The proposals:

E3.1: The terrace and steps:

Development of proposals for the terrace and steps have involved collaboration with the landscape consultants, their drainage engineers, the conservation structural engineers and the access consultants. The objectives are:

- To minimise water ingress through the catacombs vault.
- To provide an attractive external space as part of the visitor experience, including a surface closely aligned with the original appearance.
- To provide safe access that is as inclusive as possible.

The proposals have been informed by archive study (by the landscape consultants) concluding that the original surface was of hoggin or gravel, and by trial pits excavated in the terrace which have determined the depth and nature of the build-up over the brick vaults. This is recorded in the 'as existing' 1:20 section of the terrace among the drawings herewith.

The design for the terrace incorporates three basic principles:

- The introduction of a robust waterproof membrane under the gravel surface. This is proposed as asphalt. It should be noted that the objectives of the project do not include the unrealistic ambition of eliminating water ingress completely.
- Avoidance of drainage that requires penetration of the membrane. Instead the whole terrace is designed to fall to a continuous drain channel along the back edge.

- Lowering the level of the terrace at the front edge so that the existing balustrade provides compliant guarding 1100mm high without alteration
- Edge details which retain the gravel surface, and silt traps which mitigate any wash-out into the drainage system

The use of the terrace substrate to provide attenuation of outflow into the drainage system was considered but found to be impracticable.

It is essential to reconstruct the steps, both to introduce a robust waterproof membrane as noted above and to address the effects of structural movement in the past. The two sets of steps offer different challenges:
The west end steps retain their historic stonework, and are in poor condition. It is proposed that they are dismantled and reconstructed on new substructure and waterproof membrane. The historic stonework does not lend itself to improvement from an inclusivity point of view with contrasting nosings, but it meets access criteria in other respects (pitch, no nosings). The width of the steps lends itself to a central handrail, minimising impact on historic fabric while making a significant contribution to inclusivity.
The east end steps are not historic, and have been both reduced in width and reduced in pitch in the recent past. The stone finishes renewed in the 1990s have been covered over with asphalt in an attempt to mitigate water ingress below. Here it is proposed to renew the steps over a new substrate and membrane, and at the same time to revert to the original width and a steeper but still gradual pitch, matching the west end arrangement much more closely. This together allows improvement by the application of contrasting strips to the step edges and a central handrail offering support to both the left and right handed. It is fully expected that the east end steps will be adopted as the primary public route to the terrace.
To both sets of steps the there will be matching stone paving above and below, forming an apron to retain the edges of gravel surfaces in each case. The low outer kerb to the steps, with a badly displaced pier at the west end and a new kerb and pier in revised position at the east end, will be rebuilt with details that terminate the waterproofing adequately.

E3.2: The front façade:
It is proposed to carry out continued cyclical repair to the walls to address emerging defects and maintain the building, presenting once more as a building maintained in essentially good repair but displaying honestly the irreversible ravages of time. To the wall surfaces this will involve the removal of vegetation taking hold in the masonry, making good of holes, repair of small areas of failed render to facades and retaining walls. The later will be caried out by cutting back to cut lines following the faux-ashlar incised marking, respecting the architectural articulation of the façade.
The central private vaults have localised but serious problems with rust-jacking from door frames. These will be addressed by modification and refinishing of the frames to minimise the risk, and the repair by indents only of defects that have structural implications.

Cyclical maintenance of ironwork such as gates, grilles and vault doors will be included. The original wrought iron gates to the primary central opening and the secondary side entrances require overhaul and the replacement of embedded ironwork that is damaging the rendered surrounds. The gates to the tertiary openings on the diagonal faces were replaced in recent times with substandard metalwork and it is proposed to return these to scholarly replicas of the originals.

The ventilation grilles have failed in that the fixings are disturbing render by rust-jacking, and the mesh grilles have failed. It is proposed to remove these with minimum impact on render, overhaul and renew mesh guards and reinstate.
In accordance with the CMP 6.16 the works should include repainting of ironwork to authentic colours informed by analysis, records or comparison with contemporary sites.

It is proposed that the iron doors to the 8 private vaults (in the central block and the wings) are all overhauled and repaired. It will be appropriate here (unlike in the Circle and Avenue) for these to be returned to painted finishes in authentic colours, although that will bring with it a maintenance responsibility.

E3.3: The interior

It is conversely proposed that internal works are treated on a 'conserve as found' basis, with any essential renewal or interventions conceived as 'honest repair'. Historic surfaces include very degraded decorative plasterwork, and these will be conserved as far as possible to prevent or limit ongoing decay without any attempt at reinstatement. Broken features such as cast iron grilles will be treated to minimise the rate of decay and reinstated to their original positions but not improved.
The conservation structural engineers have recommended that damage caused historically to the vault to facilitate the placing of coffins in upper shelves is not reversed, so repairs are limited to the pointing and packing of voided joints and small cracks.
Cracks in the retaining walls at the end light wells are identified as the result of corroding embedded pipework. The pipes themselves are assessed as having little or no intrinsic significance so it is proposed to removed them and make good the wall and surface in each case.
The catacombs floor is of gravel, with stone paved sections at the three entrance bays. These are uneven from wear, but in the central bay it has also been compromised by the collapse of the drain culvert below, and in the eastern side entrance bay the paving is incomplete. Both are to be addressed by lifting and relaying the existing paving in the course of renewal of the drainage, and by augmentation with matching reclaimed material for a seamless reinstatement of any loss.
Any ecxcavation of the gravel floor will be followed by reinstatement and recompaction of the original material.

It should be noted that the ongoing sustainability of the Catacombs structures will be dependent of management of the landscape AND general care of the structures including regular removal of vegetation from roofs and clearing of drains and channels. This falls outside the scope of this project, but will be critical to its success in the long term.

E3.4: Services

The proposals include the installation of electrics to allow the servicing of events and specific activities in and on the Terrace Catacombs.
These will be neatly but honestly expressed, with surface-fixed containment in galvanised or non-ferrous metal and discreet positioning.
Electrics to the terrace will be located on a bollard or bollards situated off the terrace itself.

F: PROPOSALS

F1: Proposals drawings

Drawing numbers
1066-10-8-20 Plan at catacombs level 1:50
1066-10-8-21 Reflected ceiling plan 1:50
1066-10-8-22 Plan at terrace level 1:50
1066-10-8-23 Elevations and sections 1:50
1066-10-8-31 Detail section of terrace build-up as existing 1:20
1066-10-8-32 Detail section of terrace build-up as proposed 1:20
1066-10-8-33 Detail of west steps and handrails 1:20
1066-10-8-34 Detail of east steps and handrails 1:20

F2: Outline schedule: scope of works

Note:
Initial inspection by the Conservation Engineer of the Terrace Catacombs fabric indicates the need for stabilisation of the retaining walls to ramps at each end, but no needs for substantial intervention in the main building structure. Although a number of the vaults are as yet inaccessible and inspection has only been by boroscope the risk of these resulting in extensive works is considered to be low.
This schedule has been updated following vault access works. Some need for structural repair and/or reinforcement as a result of further investigation cannot be ruled out.
The conservation structural engineer's recommendations are included in the schedule and drawings.

Discussions with Robert George informed us that the tarmac surface (which is not waterproof) is laid without any underlying slab over the prepared and levelled surface of the granular fill (of unknown constituent) above the vault. This information has now been supplemented by the results of trial excavations on the terrace, summarised on drawing 1066-10-8-31.

Similarly these discussions have clarified that the drainage network from the gullies in the terrace asphalt, installed in 2010, is directed to an original brick backdrop chamber behind the rear retaining wall at the central point. This connects to the general drainage system below the lower ground floor level, but there is no access to the drainage other than at the top of the backdrop chamber.
A CCTV survey of the backdrop recommended in RIBA Stage 2 has been carried out but has yielded little more information.

The extent to which the contents of vaults are 'tidied up' will be a matter for HGC management. It is not a consideration for the fabric repairs other than where it is required to facilitate the carrying out of works. Even then this is not considered to be part of the construction work and it is expected that it will be carried out by the HGC team prior to the works, including Health and Safety considerations and any legal process.

It should be noted that as with the othere structures the ongoing sustainability of the structures will be dependent of management of the landscape and vegetation AND general care of the structures, including regular removal of vegetation from roofs, wall heads and clearing of drains and channels. Beyond the preparation of a maintenance plan this falls outside the scope of Project 3, but will be critical to its success in the long term.

Ecology: The ecology of the vault interiors throughout the Cemetery is known to be significant, providing habitat for bats, rare cave spiders and other species. The ecology may have a profound influence on what can be achieved in the way of fabric repairs and this should be addressed from RIBA Stage 4 onwards.

G2: Schedule:

TERRACE:

1. Remove all of the tarmac surface from the terrace, and the substrate down to the limecrete surface at a depth of approx. 550mm, including removal of the drainage back to the original backdrop chamber.
2. At the back wall and end walls excavate down to the top surface of the vault, exposing it and the rear retaining wall head.
3. Construct a new rear wall 600mm thick in brickwork laid in lime mortar, built off the top of the retaining wall and vault for the full length of the rear retaining wall, and similarly raise the end walls to ground level to their full thickness (probably 440mm). Construct the edge wall and kerb as detailed within which the new terrace finish and drainage channel will be constructed. Add matching stone kerb to the head of the brick walls forming the lightwells at both ends.
4. Line the excavation behind the new retaining wall head with geotextile membrane and install a land drain at the level of the bottom of the excavation. Backfill with clean free-draining stone to within 300mm of ground level, close the textile wrapper and relay soil and turf surface
5. Over the whole terrace area lay a new min 150mm limecrete slab graded to fall of 1:50 to the rear over the whole terrace, with the rear edge shuttered to form a drainage channel as shown on the drawings.
6. Screed the bottom of the drainage channel to fall to the outlets.
7. Establish a continuous asphalt waterproof membrane over the whole terrace area with rear drainage channel and front wall upstand as detailed all integrated to it.
8. Construct the rear channel grating and permaeabl edge retention of the gravel. Lay the stone aprons at the top of the steps at each end, form and install the kerb and glazing to the oculus rooflights. All of these provide edge retention to the gravel surface.

9. Form the new terrace surface in compacted Breedon gravel laid to thickness of min 50mm over a 150mm subbase of free-draining type 1 MOT. The finish level of this is defined by the build-up from the existing limecrete base layer and vault extrados, and should result in a balustrade height of not less than the existing 950mm.
10. Fit a code 4 lead flashing to the asphalt abutment to the front wall.
11. Overhaul the cast iron balustrade units and parapet copings including review of fixings and weathering infill of the sockets in the copings that retain water.
12. Carry out minor repairs to parapet render.
13. Install new terrace drainage including silt traps from the rear drainage channel into the central backdrop chamber.

STEPS

14. Carefully dismantle the west steps and set aside the steps and the copings from the kerb. Excavate down to the extrados of the vaults (or sound limecrete fill if any).
15. Similarly dismantle the east steps, discarding the stone and the kerb materials
16. To both construct rear kerb wall off the existing structure up to the level and profile of the underside of the new steps.
17. Construct 5 No 225mm brick sleeper walls to the profile of the underside of the steps, dividing the span of the steps into three equal compartments. Infill between the stepped sleeper walls in limecrete, and apply an asphalt waterproof membrane over the profiled subbase contiguous with that of the terrace and extending to the outside of the structures forming vaults EV4 and WV4. See Conisbee drawings 240323-XX-SK-S-4001.
18. Reconstruct the west steps using the original stonework and the east steps using new material. The east steps to include contrasting edge strips to the stone steps. Similarly install new stone paving to the lower apron of both steps, extending to the outside of the structures forming vaults EV4 and WV4.
19. Complete the piers, kerb walls, copings and cappings to the outside of the steps all to match the original finishes. Note that this is to some extent contingent on tree removals in the landscape proposals
20. Install new steel handrails centrally to both sets of steps as detailed on the drawings.

FACADE

21. Remove all vegetation growing in the building structure. As far as possible remove root structures invading the fabric and *if essential* treat the remaininas specification nortes
22. Carefully remove the 20No iron ventilation grilles with minimum disturbance of the render around them. Where woody plant growth has invaded the locations of iron grilles and other features the finishes are to be removed for full access and removal.
23. Prepare and paint the iron fittings off-site and remove the mesh inserts which have extensively failed. The grilles are to be painted (in an authentic colour TBD) to full specification prior to reinstallation.
24. Establish a detail for an internal mesh grille in galvanised steel to be fitted immediately behind the cast iron fittings, and install them into the inner reveals of the vent openings from the outside. Reinstall the iron grilles.

25. To vaults WV3, WV4, EV3 and EV4 remove the iron doors and the associated steel frames. Assess the frames for integrity and carry out repairs. Galvanise the completed frames and paint to full specification with an epoxy paint coating (see above) before reinstalling them and the doors. Treat cast ironwork with ‘Fertan’ corrosion convertor and paint the doors in authentic colour TBD. Overhaul the locking arrangements as for the Circle of Lebanon and elsewhere.
26. To central and secondary entrances to the Catacombs (a total of 3 locations) remove the iron gates and all of the hinges/lock fittings embedded in the masonry. Overhaul and paint the gates and overhaul or replace the mesh backing. Infill and make good the masonry and finishes affected by rust jacking and replace the hinges etc (or their embedded parts) in stainless steel, also to be painted. Rehang the gates and ensure correct operation and security. To the two tertiary opeings on the diagonal walls the existing modern gates are to be discarded and new forged iron gates to match the original (not the present) details are to be installed with new fixings in the same way.
27. To vaults WV1, WV2, EV1 and EV2 remove the iron doors and the associated iron/steel frames whose corrosion is disrupting the stonework. Assess the frames for integrity and carry out repairs. Remove the projecting ears from the corners of all the frames. Galvanise the completed frames if in steel. Paint to full specification with an epoxy paint coating before reinstalling the frames and the doors, refix ing them with non-ferrous fixings into the masonry. Treat cast ironwork with ‘Fertan’ corrosion convertor and paint the doors in authentic colour TBD.
28. Repair the fractured stone surrounds to doors to vaults WV1, WV2, EV1 and EV2 with indented sections of matching stone to restore the structural integrity of the surrounds without disguising every historic fault… a specific exception is the fractured section low down on the RH reveal of the door to EV2. Repoint all open and cracked joints to the stone facings to central vault entrances in lime mortar, carefully dressed to eliminate water traps.
29. Defrass eroded render in areas shown on the drawings and any other emerging defects, and review for repairs. Cut back surface of areas for repair to the incised lines of faux-ashlar in the render. Renew surface render in a cement mix to closest match achievable to the existing analysed for the purpose.
30. Similarly carry out carefully matched repairs to any render damaged by the removal or reinstatement of the cast iron grilles and vault doors.
31. Carry out lime mortar repairs to restore the line and moulding profiles of Catacombs entrance gate surrounds damaged by corrosion of ironwork.
32. To the retaining walls to east and west ramps carry out ground anchor and helical bar stitching to complete structural repairs recommended by conservation structural engineer and shown on their drawing 240323-XX-SK-S-4000. Note that this is contingent on tree removals in the landscape proposals.
33. In the same areas carry out conservation of existing render coatings retaiing as much of the existing material and patina as possible.

INTERIOR

34. Thorough inspect vault and with engineer identify areas requiring pointing repairs, for which an estimate of 25 linear m of pointing is offered, to pack and fill voided joints in the vaulting.
35. Following reinstatement of terrace waterproofing and some drying out of the internal fabric carry out consolidation of detaching fragments of remaining internal plaster decoration at the central and wing transepts by conservation specialists. Works to include the filling of voids

and reattachment of plaster using injected hydraulic lime grouts, the application of nanolime coatings to consolidate friable surfaces and the pointing of exposed and friable edges. It is intended that no existing fragments are removed, but that no missing elements are reinstated.

36. Lift the floor surface as required to carry out drainage works as specified by the drainage engineers in the landscape package and the electrical ducting as shown on the drawings. Assess the floor surface with access policy and carry out the minimum levelling and repair to meet requirements for public access. It is anticipated that this will include the lifting, levelling and relaying of 75% of the paving to the central entrance transept and 15% of the paving to the two wing transepts. Augment the paving to the east side entrance to reinstate the missing area and eliminate trip hazards.
37. Carefully remove and set aside the broken cast iron grilles, and clear out the two ventilation/light wells at the extreme ends of the Catacombs. Retrieve any detached grille fragments.
38. Carefully cut out and remove embedded cast itron pipes in retaining walls of lightwells. Make good brickwork and render finish.
39. Reinstall both the existing grilles and any detached fragments that can be adequately secured, without any further decorative treatment or repair.
40. In common vaults WV3 and WV4 remove the cast iron T section bearers for coffins that span the vault space, and replace them in stainless steel to the encgineer's specicfication. See Conisbee drawing 240323-XX-SK-S-4003

SERVICES

41. Carry out making good following installation of underground electrical service to interior of Terrace Catacombs. Estbalish new ssupply with distribution board in the LH angled external compartment of the central façade projection.
42. Run supplies from the distribution board position through a hole drilled at low level into the lowest coffin shelves to bay W3 into the central catacombs avenue. Exact location for this is to be agreed but it is to be as discreet as possible, ideally within an unused burial unit at one end or other.
43. Install duct under the edge of the gravel floor as detailed drawing to run the full length of the catacombs. Provide access boxes at up to 6 positions with cast metal covers flush with the floor level.
44. Install galvanised or stainless steel conduit to cable risers at the two ends, rising to the cill level of the end openings to lightwells and including a double switched 13 A socket at each location. The cables are to pass through a drilled hole into the corner of the lightwells to rise to upper ground level behind the opening reveal nib where it cannot be seen. Fixings to be into mortar joints only.
45. Establish a concealed route for cable from the lightlwell riser to the bollard positions at each end of the upper terrace, and install outlets as required on a bollard set in a discreet position outside the terrace area.
46. Clad each of the service bollards with a timber cover allowing access to the socket outlets only.

Building 9 - 2 MAUSOLEA:

Note:
Ecology: The ecology of the vault interiors throughout the Cemetery is known to be significant, providing habitat for bats, rare cave spiders and other species. The relevant surveys and preparation of method statements are to be caried out in advance of commencement of any works.

MAUSOLEA I. THOSE IN GOOD CONDITION

9a. CORY WRIGHT MAUSOLEUM
9b. BEER MAUSOLEUM (upper parts)
9c CHEYLESMORE MAUSOLEUM
19. DALZIEL MAUSOLEUM
20. STRATHCONA MAUSOLEUM
21. POCKLINGTON MAUSOLEUM

A: LOCATION:
Plan of cemetery with buildings highlighted. Drawing number 1066-10-9-00

B: SURVEY DRAWINGS
Drawing numbers
Cory-Wright mausoleum
1066-10-9a-10 Plan and elevations 1:50
Beer mausoleum (upper parts)
1066-10-9b-10 Plan and elevations 1:50
Beer mausoleum (lower parts)
1066-10-7-10 Plan at lower ground level 1:100 included in Circle of Lebanon
Cheylesmore mausoleum
1066-10-9c-10 Plan and elevations 1:50
Dalziel mausoleum
1066-10-19-10 Plan and elevations 1:50
Strathcona mausoleum
1066-10-20-10 Plan and elevations 1:50

Pocklington mausoleum
1066-10-21-10 Plan and elevations 1:50

Drawings ‘as existing’ are derived from Digital Inc survey data with additional information

C AND D: SEE DAS VOL 4

E: PROPOSALS COMMENTARY

E1: Research

Research has included personal communications with the architect for the late 20th Century works.
The structures have been reviewed by the Conservation Engineers, and their recommendations incorporated.

E2: Materials analysis and selection

Conservation of interior decorative plaster will be carried out using lime materials in the hands of specialist conservators. Works will include reattachment of tiles and finishes by liquid grouting using hydraulic lime slurry, and ensuring that new materials are less strong than the historic elements. Some shelter coating using putty lime mix may be applied.

E3: The proposals:

E3.1: Cory-Wright mausoleum: Minor pointing works and reconstruction of degraded drainage channels will have no impact on the appearance or historic fabric of the building.
E3.2: Beer mausoleum (upper parts): The conservation challenges posed by the magnificent Beer mausoleum derive from the management of rain water and the absence of any rain water goods. This, compounded by the effects of the two evergreen oak trees that cloak the rear coners of the building and reduce/delay drying out, results in accellerated effects of raised moisture levels in the corners of the building at high level, where the water from the roof concentrates, and at low level where it splashes on the plinth.
External effects are little more than pattern staining, but inside the fine surfaces of carved stonework and the applied finishes of pate-de-verre tiles are degrading due to salts action, including the separation of individual tiles which have fallen and broken. This loss alone justified=s some intervention to mitigate water ingress at these critical points.
The introduction of any kind of rain water goods is considered to be aesthetically unacceptable, so it it proposed to introduce lead cladding to thea of concentrated run-off, directing the collected water at all four corners into a spout which will throw it clear. The removal of the trees is also in hand under a separate planning process.

Inside it is proposed to conserve, repair and reinstate the damaged decoration as far as is possible without introducing any new material. The fallen pate-de-verre tiles have been collected for refixing. Damaged stone surfaces will be decontaminated by poulticing and stabilised by shelter coating.

E3.3: Cheylesmore mausoleum

The minor pointing and external repairs are all superficial and carefully specified and represent straightforward care of the fabric. Roof enhancement is all associated with fabric replaced in the 1990s when the roof covering and the ceiling below it were both entirely replaced. The biggest challenge is the rain water disposal, where the only roof outlet is directed into a pipe buried in the wall. That will be retained, repaired as necessary using techniques as uninvasive as possible and the roof provided with a robust overflow system that allows for a temporary blockage.

E3.4: Dalziel mausoleum, E3.5: Strathcona mausoleum, E3.6: Pocklington mausoleum

Proposed repairs constitute little more than routine cyclical maintenance. In the case of plinths, paving and retaining walls this involves repointing, some reassembly and realignment of original material that has been dislodged by plant growth and some structural repairs with the introduction of helical bar joint reinforcement. None will have a detrimental impact on the appearance or performance of the historic fabric.

Building 9a. CORY WRIGHT MAUSOLEUM

F: PROPOSALS

F1: Drawings

Drawing numbers
1066-10-9a-20 Plans, elevations and annotated photos

F2: Outline schedule: scope of works

Schedule:

ROOFS

1. Agree better management of vegetation behind the mausoleum and implement initial clearance and pruning (by others, see landscape proposals).
2. Clear the roof and walls of all vegetation and debris and make a detailed examination for defects. Point any cracks using lime mortar and address any other defects as further detailed.

WALLS

3. Point displacement crack at RH side of entrance, and open joints in low entrance walls. Inspect all walls following removal of vegetation and point any further cracks identified in lime mortar.

DRAINAGE

4. Clear drainage channels to each side of the building of vegetation and remove any rooted growth. Lift stone channel sections and set aside. Excavate to a depth of 300mm below the underside of the stone channels and install a subbase of Type 1 MOT, well compacted using a plate vibrator. Re-set channels on the subbase in lime mortar and point the joints.
5. At discharge point from each drainage channel excavate a soakaway 600 x 600mm to a depth not more than that of the mausoleum fondations and to a maximum of 900mm. Line with geotextile membrane and backfill with clean free-draining stone to 100mm below ground level. Dress surface with free draining gravel.

Building 9b. BEER MAUSOLEUM: UPPER PARTS

Note that lower parts are included in Circle of Lebanon

F: PROPOSALS

F1: Drawings

Drawing numbers
1066-10-9b-20, 1066-10-9b-21 Plans, elevations and details

F2: Outline schedule: scope of works

Note:
Damage from the action of salts and frost, both internally and externally, is concentrated in the corners, both at high level and low level. Analysis is that the water run-off from the spire concentrates at the corners, and penetrates the stone where it is slowed up by the eaves features including the akroterion. Discharge from the roof splashes onto the plinth at low level, saturating the stonework at that level as well.

The internal implications include staining and loss of the stone surface and the (recent) detachment of fragments of the pate-de-verre tiles due to the actions of frost and mobilised salts.

Schedule:

ROOFS

1. Clear the roof of all vegetation and debris including in the corner crevices and make a detailed examination for defects. The general principle for vegetation is to avoid the use of herbicides so the root structures are to be removed as far as possible from crevices in the fabric mechanically, and assessed for the likelihood of damaging regrowth. Where essential (principally where woody growth has had to remin) the locaised treatment of any remaining roots is to be undertaken on a plan of work agreed with HGC in advance and using injection, brush application to eliminate risk of overspray.
2. Detach and set aside each corner akroterion and base.
3. Form code 3 lead detail as drawn, fixed into enhanced joints in the roof stonework, with a welted upstand and spout to each.
4. Reset the akroterion with a stainless steel pin through the lead detail and a lime mortar bed.
5. Point any other open joints including those to entrance steps and plinths.

INTERNAL

6. Carefully detach, clean and reset the detached and semi-detached fragments of pate de verre tiles.
7. Brush, defrass and poultice clean the worst affected areas of internal stone finishes at high and low level to remove salts and adherent surface coatings.
8. Shelter coat the worst affected stones individually.

Building 9C. CHEYLESMORE MAUSOLEUM

F: PROPOSALS

F1: Drawings

Drawing numbers
1066-10-9C-20 Plans, elevations and annotated photos

F2: Outline schedule: scope of works

Note:
The roof appears to be generally sound (although it and the single outlet completely choked with moss and vegetation debris). The top surface of the stone cornice slopes inwards and is drained onto the roof through a drain hole in the middle of each side.
There are some open joints in the cornice and parapet, which correspond to the water penetration seen to the soffit from below. Water staining to the interior is related to the perimeter detail and is thought to indicate ponding on the roof that overtops the asphalt upstand.

Schedule:

ROOF

1. Remove any vegetation on or impinging on the building, including small weeds in the stonework of cornice and parapet, and debris on the flat roof.
2. Check and flush the rain water system.
3. Drill and form an overflow from the roof at the rear LH corner, with a lead spout outlet through the external cornice in the least conspicuous location as shown on drawing. The outlet from the roof is to be just above the roof surface at its highest point, and below the level of the lowest abutment upstand to prevent any ponding on the roof to a depth that will overwhelm the abutment detail.
4. Carry out any works to the roof necessary to maintain complete confidence in the performance of the asphalt roof covering and parapet abutments. Recoat the roof with solar reflective paint.
5. Enhance the chase above the asphalt abutment and install a code 4 lead cover flashing all round , wedged and pointed into the chase.
6. Install anchor points for fall arrest lanyards to be used for maintenance.

WALLS AND PARAPETS

7. Carry out minor repairs, pointing to open joints etc to inner faces and otherwise hidden parts of parapets and cornice.

8. Carry out in situ repair to cracked concrete base at front RH corner. Render exposed face of concrete foundation where ground levels have reduced since construction.
9. Point and grout hairline cracks in stonework to entrance steps.
10. Remove doors for overhaul. Strip paint to bare metal and treat with corrosion inhibitor. Repaint to appropriate colours.
11. Excavate around base of rainwater pipe visible at ground level in front RH corner. Establish that the underground section of the drain is clear, and provide an access point and cast metal cover for future maintenance.

Internal:

12. Very carefully remove any loose material from the crack across the stone tiled floor. Point resulting holes with lime mortar flush with ceramic tiles and monitor for further movement.
13. Enhance ventilation by adaptation of window and door glazing details with permanent open grilles.
14. Form a small inspection hole at the margin of the ceiling in 4 places as directed by the architect. Using an endoscope examine within the ceiling void for timber decay at the margin of the roof structure. Make good holes with plaster on completion. Allow at this stage for some minor and localised repairs. Redecorate ceiling complete.
15. Clean internal features of algae.

Building 19. DALZIEL MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-19-20
1066-10-19-21

F2: Outline schedule: scope of works

Note:

The roof appears to be generally sound (although the outlets can be seen to be choked with moss and vegetation debris).
The perimeter detail of the asphalt roof is far from robust, and whilst it is not entirely clear that water penetration to the interior is ongoing it is considered essential that this is addressed by works now. There are some open joints in the cornice and parapet, which correspond to the water penetration seen to the soffit from below.

The other defects are principally in the stonework of the plinth, which includes rusticated granite retaining walls with significant cracking due to structural movement in the past.

Schedule:

External:

1. Access roof and clear rainwater outlets.
2. Fully inspect internal and otherwise hidden parts of parapets and roof and carry out minor repairs, pointing to open joints etc.
3. Cut back the abutment fillet to the parapet. Very carefully cut and enhance the chase in the rear face of the granite parapet stones to receive a higher asphalt upstand, as shown on the drawing. Create new asphalt upstand all round, fully bonded to the existing roof membrane and dressed into the deep chase at the top of the upstand.
4. Remove any vegetation on or impinging on the building, and more particularly on the plinth retaining wall.
9. Identify displaced cracks in south and west sides of retaining wall for reinforcement. Deep rake joints and at the same time clear out any woody plant growth. The general principle for vegetation is to avoid the use of herbicides so the root structures are to be removed as far as possible from crevices in the fabric mechanically, and assessed for the likelihood of damaging regrowth. Where essential (principally where

woody growth has had to remin) the locaised treatment of any remaining roots is to be undertaken on a plan of work agreed with HGC in advance and using injection, brush application to eliminate risk of overspray.

5. Reinforce stonework across cracks with helibar reinforcement and repoint in lime mortar.
6. Deep rake open joints and cracking in the entrance steps and walls each side. Similarly remove and treat plant growth and repoint. Review on site for any helibar repairs after raking out.
7. Point open joints in marble paving to plinth.

Internal:

8. Conservator to clean marble mosaic floor of historic water and iron staining.
9. Carefully remove loose slabs from central sarcophagus. Remove mortar bed to clean surface and reset slabs in new mortar and point joints.
10. Clean internal features of algal staining.

Building 20. STRATHCONA MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-20-20

F2: Outline schedule: scope of works

Note:
The defects are principally in the stonework of the plinth.

Schedule:

External:
1. Remove any vegetation on or impinging on the building, specifically from the paved plinth around it.
2. Lift displaced and loose stones to external plinth paving and steps, identify and set aside.
3. Review the substrate and carry out repairs to achieve a stable base for reinstated stone facing. Reset stones. Point and grout open joints in stonework.
4. Remove the rusted steel channels remaining from previous shutters on rear wall and fill holes.
5. Repair minor damage to leaded light window.
6. Remove doors for overhaul. Carry out minor joinery repairs to earlier surgery at bottom rails and apply preservative treatment to the oak that does not affect its appearance or patina.
7. Clean off lime deposits leached from stonework joints prior to roof repairs.

Internal:
8. Conservation clean the marble mosaic floor.
9. Clean off lime deposits leached from stonework joints prior to roof repairs.
10. Remove temporary electrical installation with loosely clipped surface cabling. Review needs depending on future use. Install new electrics with cables neatly installed using bare copper MI cabling discreetly positioned to architect's satisfaction.

Building 21. POCKLINGTON MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-21-20

F2: Outline schedule: scope of works

Note:
The defects are principally in the stonework of the plinth.

Schedule:

External:

1. Remove any vegetation on or impinging on the building. Substantially this relates to the paving forming the perimeter plinth, which is being invaded by weeds and will be disrupted if these become established.
2. Lift displaced and loose stones to external plinth paving and steps, identify and set aside.
3. Review the substrate and carry out repairs to achieve a stable base for reinstated stone facing. Reset stones. Point and grout open joints in stonework.
4. Stabilise other stonework that is still subject to movement and point open joints. Point and grout hairline cracks in stonework to entrance steps.
5. Minor works to improve previous repairs to bottom panels of bronze doors.

Internal:

6. Monitor and review hairline cracks in floor mosaic. If there is any assessed risk of tesserae detaching the cracks are to be pointed with lime mortar flush with stone tiles and monitored for further movement going forward.
7. Minor cyclical repairs to window glazing.

MAUSOLEA II. THOSE IN MODERATE/POOR CONDITION

Note:
Ecology: The ecology of the vault interiors throughout the Cemetery is known to be significant, providing habitat for bats, rare cave spiders and other species. The relevant surveys and preparation of method statements are to be caried out in advance of commencement of any works.

10. HARTLEY MAUSOLEUM
12. JANKOVICH MAUSOLEUM
13. KELMAN MAUSOLEUM
14. ROSA MAUSOLEUM
15. OTWAY MAUSOLEUM
17. GUERRIER MAUSOLEUM
18. FOSTER MAUSOLEUM

A: LOCATION:
Plan of cemetery with buildings highlighted. Drawing number 1066-10-9-00

B: SURVEY DRAWINGS
Drawing numbers
Hartley mausoleum
1066-10-10-10 Plan and elevations 1:50
Jankovich mausoleum
1066-10-12-10 Plan and elevations 1:50
Kelman mausoleum
1066-10-13-10 Plan and elevations 1:50
Rosa mausoleum
1066-10-14-10 Plan and elevations 1:50
Otway mausoleum
1066-10-15-10 Plan and elevations 1:50
Guerrier mausoleum
1066-10-17-10 Plan and elevations 1:50
Foster mausoleum
1066-10-18-10 Plan and elevations 1:50

Drawings ‘as existing’ are derived from Digital Inc survey data with additional information

C AND D: SEE DAS VOL 4

E: PROPOSALS COMMENTARY

E1: Research

Research has included personal communications with the architect for the late 20th Century works.
The structures have been reviewed by the Conservation Engineers, and their recommendations incorporated.

E2: Materials analysis and selection

The stone of the Kelman mausoleum has been identified by the British Geological Survey as being Jurassic limestone from the Portland ‘basebed’ deposits from the Isle of Portland in Dorset.

E3: The proposals:

E3.2: Jankovich mausoleum:
The fabric is essentially sound, but affected by neglect in that vegetative material has been allowed to build up, and as a result weeds are rooting in the stonework. A very crude infill has been done in the past to the rear window, and it is proposed to reverse that and install a grille of design derived from the entrance gate, which will enhance the appearance, architectural legibility and the authenticity of the building.

E3.3: Kelman mausoleum:
Whilst structurally stable, the stonework of the Kelman mausoleum has open joints and cracked elements in need of securing and pointing to prevent more damaging, if not catastrophic, development, and eroding carved features where shelter-coating is recommended to delay and mitigate surface loss. Some recent loss of broken stones at plinth level can be reversed by reassembly of retained material and some new.
Roof gutter channels do not drain effectively and this, in conjunction with the lack of any gutter lining, ensures the saturation of masonry. Lead gutter linings and enhanced outlets discharging clear of the building are to be provided for added protection of the masonry, and the visual impact of these, seen from the upper walk of the Circle of Lebanon above the retaining wall, is considered justified by the need for climate change resilience.
The iron door is corroded, but not in a way that results in characterful patination. Conservation overhaul and painting in an authentic colour will be part of the overall scheme for the Circle of Lebanon.

E3.4: Rosa mausoleum:
Cracks in masonry, displaced and open joints, loose inscription panels etc are to be secured, conserved and pointed without realignment. Unsatisfactory discharge of water from the stone roof is to be addressed with lead gutter linings and enhanced outlets discharging clear of the building which are to be provided for added protection of the masonry, and the visual impact of these, seen from the upper walk of the Circle of Lebanon above the retaining wall, is once again considered justified by the need for climate change resilience.

E3.5: Otway mausoleum:
The Otway Mausoleum was the subject of extensive works in 2000-2015 for which Robert George only had some limited involvement. These have no doubt dramatically improved the condition of the building but they have left some ongoing issues which are causing continued deteriorations, some of it with serious implications.

Of the external fabric there are issues with asphalt roof abutments, particularly to the relatively recent rooflight kerbs, which are potentially allowing some water ingress, but not on the scale of moisture problems internally. There the building is periodically very wet, and the overall conditions are promoting rapid corrosion of the primary steel roof structure, to the point that there are now serious concerns for the structural integrity. This we consider to be primarily down to condensation, and we believe that the repair of the fabric as it is should be accompanied by a significant improvement in ventilation and environmental management of the vault interior. We propose additional ventilation through the door and the rooflight kerbs, but if this cannot in fact be achieved by natural air circulation is may be necessary to install some kind of air-handling system to ensure constant and thorough air circulation.

The structural works proposed are both necessary and justified, and whilst they will disturb and replace existing and historic fabric in the form of the steel beams they will have no impact on the appearance of the building as they will be exchanged like for like. The other interventions will have no impact on historic material as the roof and rooflights are all of relatively recent construction. Canges to the appearance will be minimal in impact, but following these interventions and a period of environmental stabilising it may be possible to substantially improve the internal presentation and decoration of the Otway Mausoleum, which is one to which occasional public access is presently allowed.

E3.6: Guerrier mausoleum:
The fabric defects are relatively slight, but ongoing neglect will lead to exponential rate of decay. The proposals are for non-invasive repairs to maintain the status quo.
The door is original, in cast iron and severely plain, and painting in an authentic colour will be highly beneficial to the appearance, character and authenticity of the mausoleum.
It can be presumed that the interior is in need of housekeeping, but no access is possible for inspection so these are described generically.

E3.7: Foster mausoleum:

The Foster mausoleum is almost identical in design to the Rosa mausoleum described above. Unsatisfactory discharge of water from the stone roof is accentuated by build-up of plant growth and debris in the parapet gutters. As for the Rosa mausoleum this is proposed to be addressed with a lead gutter lining and enlarged spout outlets discharging clear of the building.

The door, replaced in the past, is distinctly sub-standard and replacement and painting in an authentic colour will be highly beneficial to the appearance, character and authenticity of the mausoleum. The details of a cast iron door are drawn from the other mausoleum of similar design. A simple grille will be set inside the oculus window to exclude vermin.

The exterior railings and kerbs were broken and dislodged in the mid-20th century period of dereliction, but the components largely survive either sealed inside the building or lying where they fell outside. These being sufficiently complete it is proposed to reinstate them and to replicate any missing sections.

The interior has been crudely sealed with blockwork and is in a chaotic state. It is proposed to repair the shelves and to reorder the burials in a dignified manner without any cosmetic repair or re-finishing.

Building 10. HARTLEY MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-10-20

F2: Outline schedule: scope of works

Note:

There is at present no way of accessing the interior of the Hartley mausoleum, if indeed any internal space exists. The works include the reactivation of the door mechanism, and when that is done inspection will be possible. Some allowance needs to be made for repairs unknown.

Schedule:

External:

1. Remove any vegetation on or impinging on the building. Substantially this relates to the pruning and ongoing maintenance of substantial adjacent trees, and the control of ground cover around the perimeter plinth.
2. Remove single displaced stone from face of the plinth. Prepare socket and refix with stainless steel pins, grout and pointing.
3. Repoint all the joints in the perimeter steps that are voided.
4. Discuss with HCT sexton and hear direct from him what is/is not known about the door opening method. Further investigate with great care to establish an opening sequence that does not damage the inscription slab in particular and the iron frame if possible. Open the entrance door and set aside the inscription slab. Carefully remove the iron frame and any associated mechanism, overhaul and treat with corrosion converter if possible - repair or replace if not, using wrought iron forged by hand. Prime and paint the frame using epoxy paint system as noted above. Re-assemble the door components and adjust to working order.
5. Carry out internal inspection and address any urgent issues.

Building 12. JANKOVICH MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-12-20
1066-10-12-30 grille details

F2: Outline schedule: scope of works

Schedule:

External:

1. Remove plant debris and growth from all stone surfaces. The general principle for vegetation is to avoid the use of herbicides so the root structures are to be removed as far as possible from crevices in the fabric mechanically, and assessed for the likelihood of damaging regrowth. Where essential (principally where woody growth has had to remin) the locaised treatment of any remaining roots is to be undertaken on a plan of work agreed with HGC in advance and using injection, brush application to eliminate risk of overspray.
2. Clean and point all open joints with lime mortar.
3. Remove crude blocking from rear window opening, repair jambs. Supply and install new purpose-made cast iron grille including mesh bird-guard. See drawing 1066-10-12-30
4. Remove loose render from entrance step riser and renew.
5. Remove gate to workshop, clean of corrosions deposits and treat with corrosion inhibitor. Remove crude sheet steel backing from gate and replace with close-woven wore mesh panel with edge detail, in galvanised steel.
6. Treat all embedded gate fittings with corrosion convertor/inhibitor and paint in situ.
7. Paint all the gate and fittings in authentic colour.
8. Reinstall gate and secure.

Internal:

9. Strip, treat and paint internal steel roof support.
10. Clean cement slurry from mosaic floor.

Building 13. KELMAN MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-13-20

F2: Outline schedule: scope of works

Note:

To date no access has been achieved to the Kelman mausoleum. Some allowance should be made for internal repairs found to be essential when access is possible.

Schedule:

1. Clear roof channels of vegetation and debris.
2. Install new code 3 lead linings to the parapet gutter each side. On the roof slope the lead is to be inserted into the a chase formed by easing the lowest transverse joint in the stone roofing, to achieve an insertion depth of 10mm. Cut chases in the parpate for cover flashings and drill holes for outlets. See detail on drawing.
3. Pin, grout and point 3 No detached plinth sections at front RH corner.
4. Rake out loose mortar from displaced and eroded joints to stonework throughout. Grout any voids and point open joints.
5. Open, ease, adjust, treat and paint iron door to an authentic colour TBD.
6. Shelter coat eroding carved decoration to door surround (only). Only affected stones are to be shelter coated, but all of any selected stone is to be treated.

Building 14. ROSA MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-14-20

F2: Outline schedule: scope of works

Note:

No access can been achieved to the Rosa mausoleum, which has a sealed slate door. It is not considered that the risk of essential internal repairs justifies the damage that would be caused by forcing entry.

Schedule:

1. Clear roof channels of vegetation and debris.
2. Install new code 3 lead linings to the parapet gutter each side. On the roof slope the lead is to be inserted into the a chase formed by easing the lowest transverse joint in the stone roofing, to achieve an insertion depth of 10mm. Cut chases in the parapet for cover flashings and drill holes for outlets. See detail on drawing.
3. Pin, grout and point displaced crack to rear RH corner.
4. Pin and grout and point other open and displaced joints.
5. Pin and secure loose inscription panels.
6. Point open parts of door collar joint.

Building 15. OTWAY MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-15-20
1066-10-15-21

F2: Outline schedule: scope of works

Note:

The works to the Otway mausoleum address some minor defects to the roof covering, but the main concern is the corrosion of structural steelwork that is accelerated by damp internal conditions as a result of condensation.
The works proposed are the result of collaboration with conservation structural consultants Conisbee following their inspection.

Schedule:

External:

1. Minor repointing works to open joints in perimeter parapet and rooflight kerbs.
2. Lift 3 No rooflight frames, and remove the sections of asphalt abutment upstand that has detached from the kerbs. Extend the asphalt roof upstand over the kerb in each case to form a horizontal dpc.
3. To two of the rooflights install a stainless steel frame with an open ventilation slot all round and a weathering cowl to the vent as detailed on the drawing onto the kerb, with new lead cover flashing captured in the joint when the rooflights are re-set. Re-dress asphalt upstands around rooflight kerbs and entrance pavilion.
4. Reset the rooflight frame adjacent to the entrance pavilion onto the kerb without a ventilation frame.
5. To all asphalt abutments to perimeter and pavilion enhance the detail with a neatly cut chase and a lead cover flashing.
6. Investigate drainage from roof and ensure connection to drain system.
7. Ensure free ventilation through upper panels to doors fitted with open grilles. Remove iron panels from the two bottom panels to the doors and replace with perforated grilles of matching design to further enhance ventilation.
8. Decorate doors and railings in authentic colour.

Internal

9. To three corroded steel beams around base of entrance pavilion prop structures supported and and carefully remove the existing beams. Remove loose material around bearings (disturbed by corrosion jacking) and form new padstones. Install new steelwork to matching or equivalent sizes, hot-dip galvaninsed and finished in epoxy paint system (as above) before installation. Make good masonry structures following installation of beams and removal of propping.
10. To remainder of beams, descale and review corrosion. Repair with welded sections into defective areas as identified by engineer. Re-finish steels with corrosion inhibitor and epoxy paint coating.
11. Repairs to masonry and concrete structures affected by rust jacking.
12. Redecoration of vault interior using permeable paint system.
13. Clean mosaic floor by conservator.

Building 17. GUERRIER MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-17-20 plans elevations and annotated photographs

F2: Outline schedule: scope of works

Schedule:

External:
1. Remove vegetation and debris from roof and roots from joints and cracks.
2. Point open joints including those to roof slabs and cornice overhangs.
3. Open the plain cast iron door, by forced entry if necessary.
4. Overhaul the door. Fit new stainless steel lock mechanism and review hinges for any corrosion-jacking risk to stonework. The doors are to be painted with epoxy paint in authentic colour TBD.

Internal:
5. Assess scope following access works. Assume that some tidying up and rearrangement will be needed.

Building 18. FOSTER MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-18-20 plans elevations and annotated photographs
1066-10-18-30 door details

F2: Outline schedule: scope of works

Schedule:

External:

1. Clear roof channels of vegetation and debris. Cut chases and outlets. New gutter linings in lead with spout outlets and flashings. See Rosa and Kelman above.
2. Point and cracks and defects with particular reference to roof slabs.
3. Remove modern sheet steel door and blockwork behind it.
4. New door in cast iron and frame in galvanised steel as drawing 1066-10-18-30. Paint frame with epoxy paint and decorate door in authentic colour
5. Construct internal steel frame and 25mm grid welded mesh panel for bird-proofing, finished with epoxy paint coating, and mount inside oculus window in rear wall.
6. Retrieve and review broken railings and stone kerbs from each side of and inside mausoleum. Excavate on line of kerbs, form 300mm deep subbase in type 1 MOT and reset kerbs in lime mortar. Repair railings as far as possible using the intact and viable components remaining on the site, and refix into the kerbs with lead.

Internal:

7. Assess scope following access works. Removal of broken coffins and human remains by others.
8. Reinstate collapsed coffin shelf and faciliate reinstatement of coffin to it. Clear debris and carry out general repairs to render interior sound and tidy.

MAUSOLEA III. THOSE IN VERY POOR/ RUINOUS CONDITION

Note:
Ecology: The ecology of the vault interiors throughout the Cemetery is known to be significant, providing habitat for bats, rare cave spiders and other species. The relevant surveys and preparation of method statements are to be caried out in advance of commencement of any works.

11. MORGAN MAUSOLEUM
16. DA SILVA MAUSOLEUM

A: LOCATION:
Plan of cemetery with buildings highlighted. Drawing number 1066-10-9-00

B: SURVEY DRAWINGS
Drawing numbers
Morgan mausoleum
1066-10-11-10 Plan and elevations 1:50
Da Silva mausoleum
1066-10-16-10 Plan and elevations 1:50

Drawings ‘as existing’ are derived from Digital Inc survey data with additional information

C AND D: SEE DAS VOL 4

E: PROPOSALS COMMENTARY

E1: Research
The structures have been reviewed by the Conservation Engineers, and their recommendations incorporated. In the case of the Da Silva mausoleum the works to the roof and front corner are considered essential for the ongoing structural performance of the building.

E2: Materials analysis and selection
The stone of the Da Silva mausoleum has been identified by the British Geological Survey as being Jurassic limestone from the Portland deposits from the Isle of Portland in Dorset, probably from the ‘whitbed’ strata.

E3: The proposals:

E3.1: Morgan mausoleum:

The very simple building presents as being in good repair, being constructed of a particularly resilient stone, and the essential preventative C:
The fabric defects appear relatively slight, but they are at a critical point where ongoing neglect will lead to exponential rate of decay.
Ventilation grilles are so decayed as to be useless for bird protection and at imminent risk of total loss. Replication will ensure the retention of this important detail and contribute to the exclusion of vermin.
Stbilisation of the roof stonework will involve some dismantling in order rto remove the woody growth of plant roots. Reassembly will be to the original positions but without the replacement of degraded elements.

Although not accessible for inspection it can be presumed that the interior is in need of housekeeping and it is reported that the floor is missing, exposing a significant and unsafe void.

E3.3: Da Silva mausoleum:

The Da Silva Mausoleum is in the most precarious condition.
Ivy growth rooted in the stone structure has displaced and loosened stone sections almost to the point of collapse. The front right hand pilaster has been affected by tree growth (now removed) and has rotated on its base, at risk of losing connectivity with adjacent construction,
Loose stone elements are poised to fall off and be broken or lost.
The interior is sealed and condition unknown.

It is proposed to dismantle the loose roof and cornice elements in order to remove plant growth and reassemble them with stainless steel fixings to ensure stability even where stone sections have been lost and broken. It is not proposed to replicate and reinstate missing elements, as these do not undermine the legibility of the architectural piece, but rather the effect is one of picturesque decay which can be maintained to a degree with the building in a stable condition.

The interior of the building is inaccessible as there is no door. However this wil be exposed when the roof is removed, and it will be necessary to review the state of the interior and carry out any works that are essential to its safety.

Building 11. MORGAN MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-11-20 plans elevations and annotated photographs

F2: Outline schedule: scope of works

Schedule:

External:

6. Remove vegetation and debris from roof and roots from joints and cracks.
7. Review roof construction for any stones displaced by woody plant growth. These will certainly include the two rear corner cornice stones.
8. Remove two rear corner cornice stones and any others affected and clear woody growth from joints. Reset stones in correct positions with liome mortars and any pinning and cramps in stainless steel to ensure stability.
9. Point open joints including those to roof slabs and cornice overhangs.
10. Retain and conserve one section of original ventilation grille. Cast new grilles as replicas from the remaining fragments and fit to all the ventilation openings.
11. Conserve plinth stonework including delaminating inscription slab.
12. Adjust door and ensure operation of locks.

Internal:

13. Assess scope following access works. Assume that some tidying up and rearrangement will be needed of coffinsnand remains (by HGC) and repair coffin shelves and basis construction without restoring decorative finishes.
14. Reinstate floor: Clear remains of collapsed floor, agree new construction with architect and engineer. Provisionally allow to construct new floor in precast concrete planks spanning the small space without intermiediate support and lay stone flagstones in lime mortar.

Building 16. DA SILVA MAUSOLEUM

F: PROPOSALS

F1: Drawings

1066-10-16-20 plans elevations and annotated photographs
1066-10-16-30 door details

F2: Outline schedule: scope of works

Note:

The stone of the Da Silva mausoleum has been analysed as Portland 'whitbed' limestone.
The repair of the Da Silva mausoleum has been coordinated with the conservation structural engineers following their inspection.

Schedule:

External:

1. Clear plant growth and debris from the building including roof and the plinth to the east side.
2. Carefully remove detached and loose stone elements to safe keeping. Lift and set aside the stone slabs forming the roof to de-load the walls during repairs.
3. Open up the doorway by removal of the masonry infill.
4. Review and clear any debris from the interior. Coffins and human remains to be decanted by HGC for works.
5. Carry out detailed assessment from inside and outside and establish the cause of rotational movement of the front RH corner pilaster. If this can be returned to its original position it is to be done, if not the structure is to be pinned and secured in its displaced position.
6. Point the large open joints and any other disturbed by these works.
7. Remove all of the rear pediment and cornice, comprising a single stone to the pediment now fractured in two, and 3 stones for the cornice, one fractured in three. Pin the fractured stones and clear out any remaining woody growth. The pediment and cornice are then to be reassembled and the joints formed with recessed pointing.
8. Install two stainless steel tie rods to prevent roof spread, to details provided by structural engineer. Rod ends are to be secured into new drilled sockets in the top surface of wall slabs.
9. Reassemble the roof slab construction and point all joints.

10. Assess the concealed plinth stonework and carry out minor repairs.
11. Reset the detached stone ‘rolls’ from the roof and secure in position with stainless steel pins. Point joints.
12. Supply and install new door in cast iron with integral ventilation grille and frame in galvanised steel. Paint frame with epoxy paint and decorate door in authentic colour. See drawing 1066-10-16-30.

Internal

13. Assess interior for repairs when access has been established.

SPECIFICATION AND MATERIALS

G: SPECIFICATION

G1: Specification notes

Limitations:

This is not a specification for construction purposes and should not be read as such. The Specification Notes to RIBA Stage 3 are intended to communicate the palette of materials, the underlying standards for workmanship and the definition of materials that affect the character, appearance or behaviour of the fabric and construction of the buildings.

Specification notes

PITCHED ROOFS
All slate pitched roofing to BS 5534
Slate roofs in new Welsh Cwt-y-Bugail grey slate, fixed with copper roofing nails to treated softwood battens.
Ridges in blue terracotta angled ridges, bedded and pointed using a lime mortar with NHL5 hydraulic lime.
Lead parapet gutters, abutment flashings and other details in milled lead of appropriate thickness, with all details compliant with BS???? And the current guidance of the Lead Sheet Training Academy.
Pointing in association to be carried out using a lime mortar with NHL3.5 hydraulic lime.
Insulation at roof slopes to be wood fibre vapour-open insulation typically from the suite of products by Pavatex or similar.
In all cases unless otherwise noted roofing felt is to be breathable vapour-open material from a recognised provider. It is noted that this can be incompatible with bat activity and if in the implementation stages this is an issue a product is to be selected that meets the criteria set by the ecology consultant. It is noted that a the time of writing products meeting both criteria are coming onto the market.
Rooflights in pitched roofs are to be type ‘Neo’ by The Rooflight Company, to purpose-made sizes.

FLAT ROOFS
Mastic asphalt compliant in all respects with the guidance and recommendations of the Mastic Asphalt Council and BS8218:1998 Code of Practice for mastic asphalt roofing.
Abutment flashings and other details in milled lead of appropriate thickness, with all details compliant with the current guidance of the Lead Sheet Training Academy.
Flat roofs that cannot be seen from publicly accessible areas are to be coated with a solar reflective coating.

Pyramid and plateau rooflights as produced by The Rooflight Company

LEADWORK
Workmanship: The work described in this specification shall include all jointing material, copper nails, lead wedges, wall hooks, tacks, lead collars, felt underlays, etc., necessary to make the construction complete in accordance with the guidance published by the Leadsheet Training Academy which sets a benchmark of good practice.
Sheet lead shall be best milled lead as noted in the Schedule of Works and on the drawings, to comply with BS EN 12588:2006 and laid in accordance with BS6915 Code of Practice.

STONEWORK
Stone to be as defined in the individual buildings, generally either oolitic limestone of the Bath deposits, provisionally from the Hartham Park (Lovell Stone) quarry, base bed to approved sample, or Portland Whitbed.
All stonework to be laid and pointed in lime putty mortar.
Stone conservation with mortar repairs in hydraulic lime mortar NHL2.
Shelter coating in putty lime mix to detailed specification by architects and using aggregated from the host stone type for a matching colour.
Cramps and fixings in Grade 316 marine stainless steel.
Profiles, decorative features and finishes are to be faithfully replicated from originals without allowance for weathering.
The repair and replacement of stonework is to be carried out in the areas indicated in the schedule of works. Except as otherwise indicated any new stonework is to match the existing adjacent work in all respects.

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.

All joints for repointing are to be raked out using only hand tools to a depth of minimum 40mm, or twice the face width of the joint. The joint is to be cleaned of dust using a vcuum cleaner and flushed with clean water prior to placing new mortar.

The mortar used for stonework repairs and (with variations of mix) for repointing is to be a traditional lime mortar made using natural putty lime or hydraulic lime as directed. A complete understanding of the preparation and use of hboth types of 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.
Hydraulic lime: Natural hydraulic lime from St Astier or other recognised and equivalent supplier is to be used where specified. This is to be obtained in bagged form, well within its declared shelf-life and stored in dry and suitable conditions. No opened bags are to be brought to site and the material is to be used promptly when bags have been opened. The natural hydraulic lime is supplied to grade NHL2. The choice of grade is important, and the type specified should be adhered to in all cases.

Aggregate for the mortar shall comprise a mixture of Quartz sand and Limestone sand used in the proportions set out in A3.3.1 below.
Quartz sand shall be yellow-brown in colour with a particle size evenly graded varying from 3.35mm to dust. It shall be washed to be clean, hard and free from adherent coatings. It shall comply with BS1200 1955.
Limestone sand shall be yellow-brown in colour with a particle size evenly graded varying from 4.10mm to dust.

Mortar for all bedding and pointing of stonework is to be carefully gauged to a typical mix of:

1 part	Natural Hydraulic Lime (NHL2)
2 parts	Yellow-brown Quartz sand <3.35mm
0.5 parts	Yellow-brown limestone sand <4.10mm

Very narrow joints which do not allow the use of sharp sand are to be pointed using a creamy mix of lime and a small amount of soft sand/stone dust.

The raked joint is to be flushed out with clean water, and thoroughly damped. New pointing in the mix specified below is to be carefully placed and fully compacted and pressed home to fill right to the back of the joint using an appropriate pointing iron. The joint is to be filled flush allowed to take an initial set, and then cut back to a slightly recessed joint that defines the edges of the stones. The finish to the pointing is to be created by dressing using a bristle brush to expose the aggregate and leave a textured finish.
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.

Stone conservation works are to be carried out by a qualified and knowledgeable stone conservator, with specific experience of the techniques specified, or other experienced and suitable personnel approved by the architect.

Where required a shelter coat mix of lime putty and finely sieved stone dust is to be prepared by mixing and adding water for 20 mins until a consistency of thick cream is reached. A sample area is to be applied and allowed to dry to ascertain colour and a colour matching that of the stone is to be achieved.
Shelter coat is to be applied to the lime watered stone by laying on with a soft brush and working into the surface of the stone with a short bristle brush. The surface may be compacted by rubbing with washed hessian. Drying is to be carefully controlled by mist spraying and polythene or damp sacking shrouding. A powdery coating will not be acceptable.

Where stone has eroded and pitted, or where breakages and damage have occurred, repairs are to be carried out in lime mortar, to fill holes, repair the surface or to restore previous profiles. The colour is to be carefully controlled to match the stone colour precisely.

BRICKWORK
Reclaimed or new bricks of matching colour and character. Selection remains a work in progress and is described in the Design and Access Statement:
Visual comparison is ongoing to identify suitable available bricks as required to match existing work, and likely candidates have been identified: Bulmer Brick and Tile "Cambridge Gault buff facing" and York Handmade "Byland". Reclaimed bricks (if any) can only be assessed from sources available at the time when works are planned, but it is noted that a successful match to the similar bricks in the Colonnade has been achieved in the past.

All brickwork to be laid and pointed in lime putty mortar generally as noted for the stonework but independently formulated for texture and colour. Pointing is to be a fully filled joint dressed back as an initial set is taken to expose the aggregate of the mortar and reveal the arrises of the bricks.

RAIN WATER GOODS
Sand cast and diecast iron rain water goods from J & J W Longbottom and Sons foundry, or equivalent approved.
All to be painted to full specification before assembly and fixing using Dacrylate paint system SPEC, and touched up after.
All fixings are to allow for removal and reassembly without disturbing masontry fixings; typically by the use of resin fixed stainless steel threaded bar with spacers, washers and nuts.

STRUCTURAL WOODWORK
All new structure is to be constructed as detailed on the drawings using sawn softwood framing, blocking and boarding. The existing structure and boarding to be retained is not to be moved during the construction process.

Boarding to receive leadwork is to be constructed using sawn softwood, fixed with 4mm gaps between boards. All timber boarding is to be treated with preservative. Plywood, hardwoods or synthetic boards are not acceptable.

All new framing and roof/gutter boarding is to be in sawn softwood grade SC4, free from knots and defects and complying with BS4978 and BS EN 14081-1. The moisture content of the existing roof structure is to be measured at a location remote from any ingress of water and new timber is to be supplied and installed at similar moisture content.

Fixings are to made in suitable manner, using nails, bolts or screws of appropriate size and length. All fixings to new or existing oak are to be in non-ferrous metal, stainless steel or other approved by architect. All boarding is to be fixed with stainless steel screws.

Treatment: New softwood is to be treated with a clear preservative of approved type by a vacuum impregnation process. New timber for gutter bed in locations where it is not visible is to be tanalised. Cut ends to be brush treated with preservative.

JOINERY INCLUDING CUPOLA FINISHES
All external joinery is to be constructed using a durable and stable hardwood from renewed sources and ethically sourced. Timber is to meet the requirements of BS EN 942 at a minimum. All joinery is to be constructed and assembled using only stainless steel fixings and in a manner that avoids water traps, water retention etc.

DECORATIONS
All external joinery is to be painted using a durable and high quality paint system avoiding high gloss finishes.

All masonry finishes to be painted are to be stripped to the underlying substrate for repair and neutralised. New paint coatings are to be in breathable exterior paints with durable characteristics and a consistently flat matt finish.

USE OF HERBICIDES
The general principle for vegetation is to avoid the use of herbicides, so the root structures are to be removed as far as possible from crevices in the fabric mechanically, and assessed for the likelihood of damaging regrowth. Where essential (principally where woody growth has had to remin) the locaised treatment of any remaining roots is to be undertaken on a plan of work agreed with HGC in advance and using injection, brush application to eliminate risk of overspray.

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