

## Wall Painting Condition Survey

**Site: ROCHESTER CATHEDRAL**

**Project: The Crypt Vaulting  
Bay 13**

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## 1. INTRODUCTION

### 1.1 BACKGROUND

Following our preliminary inspection of the vaulting in the Crypt and survey proposals of 19 December 2001 we were instructed to proceed with a survey of Bay 13 (the kitchen area in the north-east corner of the Crypt). The on-site survey work was carried out on 2 May 2002 by Richard Lithgow and Mark Perry.

The Perry Lithgow Partnership has been involved in the conservation of other areas of the Crypt vaulting and wall paintings elsewhere in Rochester Cathedral since 1983. A list of the works carried out and associated documentation together with a plan of the Crypt is appended to this report. Marked on the plan are the areas still requiring treatment.

### 1.2 METHODS OF EXAMINATION AND DOCUMENTATION.

The painted decoration was examined visually in normal light, an illuminated hand lens and with raking light to identify areas of bulging plaster, displaced levels, plaster repair, flaking of paint etc..

*Photographic Record* – Overall colour prints of the paintings and detailed photography of specific examples of damage or deterioration and test locations are included in the report to be set alongside the graphic record for interpretation of the paintings' condition and comparative study over time. A written description of each photograph accompanies the photographic record.

*Graphic Record* –Photographs of each area were scanned and printed out as scaled images so that categories of damage and deterioration could be plotted onto these printouts during the on-site survey. This hand-plotted information was then scanned into the computer and converted into a multi-layered vector graphic using Corel Draw software. In this form, categories of information can be superimposed onto the original, digitised photographs and may be printed out in any combination, scale or format. The resulting graphics can be presented alongside the original colour photographs of each area of painting. This enables direct comparison between the photographs, drawings and the painting itself, to interpret and monitor the condition of the paintings over time.

## 2. THE CRYPT

### 2.1 Description

The whole Crypt has quadripartite ribbed vaults and lancet windows (a few windows have been replaced later in the perpendicular style). The following is an extract from D Park and D Perry, 'Rochester Cathedral: conservation of the crypt vault paintings', *Preprints of the IIC 11th International Congress, Bologna, 1986: Case Studies in the Conservation of Stone and Wall Paintings* (London 1986), 182-5:

'The large crypt at Rochester, which extends under the presbytery, eastern transept and east end of the choir, dates from two periods: the western two bays from c. 1080-1100, the remainder from between 1195 and 1227. Still covering the vaults of many of the thirteenth-century bays are remains of painting, most of it simple decoration, but with some areas of figure-subjects.....

It appears that the vaulting of the whole of the thirteenth-century part of the crypt was decorated with a masonry pattern, much of which survives. In some bays this was enriched with ornamental devices such as rosettes or stars. Superimposed on the masonry pattern in several places are figure subjects either in roundels or in square, cusped frames. Much of the final painting in these areas has fallen away, giving the impression that the figure subjects are actually combined with the masonry pattern..... However, close examination shows that at least some of this final painting is on a limewash ground carried over the masonry pattern, which would thus have obscured it, even though the preliminary drawing in red for the subjects and their frames is executed on the same ground as the pattern. Stylistically, the figure-subjects can be dated as early fourteenth century, and none of the other decoration is inconsistent with such a dating. It is therefore unclear whether the figure-subjects are later in date than the masonry pattern, or whether all the painting belongs to a single campaign in which the entire vaulting was decorated with masonry pattern, and then certain areas - doubtless associated with altars - were chosen for more significant figurative decoration, and painted over again. On balance, the latter seems more likely.....'

The most significant surviving areas of figure subjects, on the vault and adjacent arch soffits of the south-eastern bay beneath the north-east transept (18, G and F respectively on the appended plan of the Crypt), was conserved in 1984-85 by the Perry Lithgow Partnership with further treatment in 1986/7 by the Partnership in collaboration with the Courtauld Institute of Art, Conservation of Wall Paintings Department. This work led to the re-identification of several of the subjects, including one which evidently shows the priest Theophilus receiving his soul back from the Virgin in the form of a bond. This area of painting had been in the most desperate condition, with parts of the figure-subjects literally hanging off the vault, and the whole surface covered with a very hard and severely darkened crystalline layer.

## **2.2 ENVIRONMENTAL CONDITIONS**

It was beyond the brief of this survey to include an investigation of the internal and external environmental conditions that may be affecting the vault paintings. In 1988 a study was undertaken of the moisture-related deterioration of the paintings and stonework in the crypt by M. Alof, a student at the Courtauld Institute of Art, Conservation of Wall Paintings Department (Alof 1988). This included an examination into the sources of moisture; investigations of relative humidity, surface and air temperatures, and the effects of heating; and a study of the problems of recurrent soluble salt activity. Results of these investigations indicate that the crypt is supplied with moisture from adjacent earth and from the poorly maintained drainage system; this, combined with the drastic heating changes, provokes cycles of salt crystallization which are extremely damaging to the wall paintings and stonework. These prevailing conditions also suggest that the formation of a sulphate crust on the surface of the paintings is a continuing problem.

Since then circumstances have changed to a degree in that the eastern part of the Crypt (Bays 1-12 and 15-17), now called St Ithamar's Chapel, is screened off and has its own system for environmental control. Since then, as far as we know, there has been no monitoring of environmental conditions to assess the impact of these changes in the remainder of the Crypt.

While conducting this survey we carried out a fairly detailed examination of the painted plaster treated in 1984/5 (Bay 18 and arch soffits G and F) and in 1988 (Bays 33 and 40) and found no obvious signs of deterioration. Nevertheless, it is important to consider the likely impact of any changes in ventilation and/or heating, proposed as part of the upgrade of the kitchen area (Bay 13), may have on the paint and plaster.

## **3. BAY 13**

### **3.1 DESCRIPTION**

Bay 13 is in the SE corner of the south transept of the Crypt. It comprises a quadripartite ribbed vault (ca. 12ft x 12ft) with dressed stone walls to the E, W and S: a door opening in the east wall and a deep window recess in the south. The west wall includes a blocked in archway and a spandrel of painted plaster survives above the south side.

For the purposes of this survey the vault quadrants will be referred to as A, B, C and D: as on the appended plan (Appendix 1) these being the east, south, west and north quadrants respectively.

The vault plaster and west wall spandrel are decorated with red line masonry pattern enriched with rosettes: in addition, there are traces of an overlying red paint layer on a limewash ground. This layer of decoration is very fragmentary and in places the paint has been smeared by later scraping: what remains is partially obscured by thick accretions of dirt and coal dust.

### **3.2 TECHNIQUE**

The vault plaster support is composed of three layers, and is as much as 10cm thick in places to provide a consistently level surface over the rough rubble core of the vault (impressions of wooden shuttering were observed on the mortar infill of the rubble core, itself applied in different layers). The plaster contains smoothly rounded quartz particles, lumps of calcium carbonate, and a crushed sea-shell aggregate. On top of this base plaster is a much finer ground for the painting, of only about 2mm thickness, and with much higher lime content, followed by a limewash ground layer.

In 1988 paint samples were analysed to identify the red used for the rosettes in the masonry pattern of Bays 33 and 40: as in Bay 13 the paint had darkened to such an extent that in places the rosettes appear almost black. This colour was found to be a combination of vermilion and red lead, both of which have a tendency to darken. While these two pigment changes account for the darkened appearance of most of the rosettes, it was also evident from the cross-sections that in some cases this was caused by the sulphated surface crust. The analysis indicated there was no oil present in the pigment binding medium, leading to the assumption that protein, in the form of egg or glue size was used as the binder.

## 4. CONDITION OF THE PAINT AND PLASTER

### 4.1 GENERAL COMMENTS

The most serious deterioration of the Crypt vaulting has been the detachment and collapse of much of the painted plaster away from its underlying support. The cause of this deterioration is related to earlier water incursions and related continuous cycles of salt crystallisation. The earlier presence of coal-burning boilers (and a suggested use as a foundry) would have created dilute sulphuric acid which would dissolve the calcium carbonate of the plaster and, in turn, create a calcium sulphate crust to form, trapping the existing dirt beneath a very hard surface. Gypsum and soot were found in all the samples taken from elsewhere in the Crypt and analysed in 1987. The dramatic darkening in the area of Bay 13 may indicate the site of a boiler and/or forge.

No record exists of any previous interventions to the paint and plaster of Bay 13. It is evident from residual fragments of limewash still adhering to the surface that the decoration had been covered over but we can only assume it was exposed in the nineteenth century and that at the same time lime plaster repairs were made to the larger open cracks in the vault. Those repairs were applied proud of the surface and overlapped the adjacent painted decoration. The repair plaster has degenerated over time and in many places fallen away. What remains lacks cohesion.

### 4.2 CATEGORIES OF DAMAGE

Six categories of damage have been marked on **Graphics 1-9** appended to this survey:

**Flaking paint and ground:** indicating areas where the limewash ground is separating either from individual layers or from the underlying plaster support. Included in this category are areas of flaking ground and flaking paint and associated losses. Areas of extensive flaking are indicated generally rather than individually.

**Open cracks:** These tend to be related to structural movement. Only the most obvious cracks are marked and these should be filled with a lime-based plaster. Plaster in the immediate vicinity of the cracks is stable unless marked otherwise.

**Plaster loss:** Signifying the larger losses within the vault paintings that should be filled for either physical and/or aesthetic reasons.

**Loose plaster (treatment desirable):** The majority of the loose plaster marked on the graphics fall into this category. There are numerous areas where there has been loss of adhesion between the plaster layer and substrate. Such areas are identified by tapping or by applying gentle pressure to the surface and watching for movement. Less movement results with pressure on areas classed as unstable (treatment desirable). Significant deterioration would have to occur for there to be a risk of loss in these areas. Nevertheless, as a preventive measure these areas of plaster should be re-adhered during the proposed treatment programme. The process involves filling the voids between the plaster layers and substrate with a lime-based grout, ensuring a firm bond is established between the plaster and the grout and between the grout and the wall.

**Loose plaster (treatment necessary):** Identifies areas of highly unstable plaster where any slight deterioration in their condition or an accidental impact would result in loss of an area of the plaster layer and overlying paint.

**Inappropriate plaster repair:** This category covers those earlier repairs that are unstable, of an unsuitable material or visually intrusive. It is proposed that the repair plaster should either be removed and replaced or disguised with suitably coloured lime grounds.

### 4.3 QUADRANT D

#### *East Side (Graphic 8)*

- Plaster - This area is in relatively stable condition. An open crack extends N-S along the centre of the quadrant and two small diagonal cracks extend down to the upper north edge. The upper section is unbroken within the upper section except for hairline cracks. There are some hollow sounding areas but these are stable and would be hard to grout given the difficulty locating voids within a friable substrate. The lower section has two large areas of loss and an area of small losses and disrupted surface skim. The plaster around losses and the disrupted area is highly unstable: the skim coat having detached from the substrate.
- Paint and ground - The thin white lime ground layer and surviving red masonry pattern is generally stable except where it overlies disrupted plaster. Only traces of the masonry pattern survive and what is there appears to have been smeared at some stage. It is now stable being covered by a grey sulphate crust. The vermilion and red lead rosettes appear to have crinkled and contracted so that the remaining paint, and presumably the underlying ground, appears as a crinkled blob slapped onto the surface. Although it appears unstable it is generally firmly attached.

#### *West Side (Graphic 7)*

- Plaster - Is unbroken and sound except for one 6" diameter highly unstable area of detached plaster in the upper section and a loss at the bottom of the spandrel.
- Paint and ground - As well as the masonry pattern and rosettes there may have been another design within the upper area. Where this apparent second design remains the paint and ground are crinkled and flaking badly.

### 4.4 QUADRANT C

#### *North Side (Graphic 6)*

- Plaster – A wide horizontal crack separates the upper and lower sections with another diagonal crack within the lower section. A loss at bottom of the spandrel. Various narrower cracks within the upper section. The cracks are not caused by delamination of the plaster surface skim as the plaster is not hollow or loose. The cracks must be through the substrate as well. Requires filling and some grouting around the edge. Some previous repair plaster clings to the surface but lacks cohesion and is crumbling.
- Paint and ground – General comment is that there is a thin covering limewash on much of the surface. This in places has crinkled up and appears to have combined with the underlying paint so that it is difficult to distinguish which layer is which. There is flaking and delamination in localised areas of the combined layers of paint and ground. The rosettes are clearer in this segment. It is possible to make out the narrower painted leaves at 2, 5, 7 and 10 o'clock. The discolouration is much worse in the lower section.

#### *South Side (Graphic 5)*

- Plaster – Various cracks and some displaced plaster within the upper section and crumbling residue of repair plaster. The lower 2ft of plaster in the segment is severely pitted. There are small localised areas of plaster loss within this area and some detached bits of hanging plaster. The lower part is effectively lost.
- Paint and ground – Similar to previous. Fewer rosettes particularly lower down. Worst of the discolouration/residual covering limewash within the upper part. Also flaking within the upper part.

### 4.5 QUADRANT B

Generally in Quadrant B it is difficult to identify/distinguish the paint as the surface is so discoloured. There is surface pitting of plaster and paint overall. A great deal of work is required to get anything out of it. There is displaced plaster along a (N-S) centrally placed crack. Overall the skim coat of plaster is loose. Some areas are highly unstable.

*West Side (Graphic 4)*

- Plaster – Displaced crack runs N-S along the top. Losses at top edge and lowest 2.5ft.. Lower part mirrors damage to the adjacent south severely with much pitting and displacement. A crumbling repair extends down the south side. Remainder of the surface is badly discoloured with significant pitting and small losses.
- Paint and ground – All remaining paint and residual covering limewash is crinkled and flaking. The surface generally is severely discoloured.

*East Side (Graphic 3)*

- Plaster – Similar condition to west. Repair extending along the south side. Less loss and pitting within the lower area. Within central area there are localised areas of detached plaster. Pitted and disrupted.
- Paint and ground – As west side.

**4.6 QUADRANT A***East & West Sides (Graphics 1 & 2)*

- Plaster – Large wide structural crack runs (EW) across the centre. The plaster is displaced so the south side is much lower. Some open cracks within the south side and plaster loss at low level. On the north side largely unbroken in central area. Loss along leading edge of spandrel at low level and one other all with associated detachment.
- Paint and ground – Condition and surface discolouration similar to Quad B but slightly darker. All remaining areas of rosettes and residual limewash are crinkled but less flaking.

**4.7 WEST WALL SPANDREL***(Graphic 9)*

- Plaster – 80% highly unstable largely it is the substrate layer that has detached. Lower section is lost. Repair and crack divide the upper section.
- Paint and ground – Red and pink paint is smeared within the upper section. The scheme is unidentifiable. Little paint within the lower section. There is surface discolouration overall with some recent losses. There is a large area of flaking paint and ground.

**5. CONDITION OF THE STONE****5.1 THE VAULT RIBS**

In the more elaborately decorated Bays of St Ithamar's Chapel the ribs were painted with scrollwork, wavy lines or a white masonry pattern on the joints; however nothing has survived on the ribs in Bay 13. The majority of the original stone surface has deteriorated and is lost. The small surviving fragments of original surface are blackened by coal dust and surface dirt whereas the surface exposed by loss is dusty and shaling but relatively clean by comparison. Generally the mortar is absent from the wider joints between blocks.

**5.2 THE STONE WALLS**

The dressed stone of the walls and the piers and capitals supporting the vault ribs is in good condition but there is some deterioration of the mortar joints. The whole is blackened by coal dust and dirt.

**5.3 TREATMENT OF STONEMWORK**

Surface cleaning of all the exposed stone in Bay 13, repointing of mortar joints as well as any necessary consolidation of the stone surface should be carried out by a specialist stone conservator. Treatment to the vault ribs should be carried out while to the paint and plaster is in progress.

## **6. TREATMENT TESTS**

### **6.1 SURFACE CLEANING**

Extensive cleaning trials were conducted by ourselves and by the Courtauld Institute of Art, Conservation of Wall Paintings Department in 1984-5 and 1987.

In 1984-85, poultices of ammonium bicarbonate and sodium bicarbonate were used for cleaning with partial success on the figurative scenes in bay 18; however, this system left a problematic surface residue or 'bloom'. In 1987, mechanical cleaning tests using dampened fibre-glass brushes appeared to be more successful, but microscopic examination revealed that the crust had again been only partially removed; in addition, this system was time-consuming and potentially too abrasive. Cleaning attempts using a reagent mixture known as AB57, which has been formulated to remove encrusted material, also met with limited success. This indicated the need to develop a more specific chemical mixture which would break down and transfer into soluble form the intransigent sulphate crust at Rochester.

Following extensive analysis and tests an effective cleaning technique - involving the use of a poultice based on ammonium carbonate, sodium bicarbonate and EDTA (ethylenediaminetetra-acetic acid) - was developed during the 1988 phase of works in collaboration with the Courtauld Institute of Art, CWPD. This method was employed on Bays 40a & d and 33c and on Section c of the main area of figurative paintings in Bay 18, previously stabilised by the Perry Lithgow Partnership in 1985.

At the time there were reservations regarding the use of EDTA in wall painting conservation but given the particular circumstances at Rochester, and strictly controlled conditions, its use was considered justified. However further research and technical analysis since then has highlighted concerns regarding the potential damage to the substrate and paint layer, through the formation of silica and alumina gels, associated with EDTA, to the extent that it should not now be considered for use on wall paintings.

As a result in 1996, during the treatment of the vaulting in St Ithamar's Chapel surface cleaning was achieved using tri-ammonium citrate in varying solutions, applied either by brush through Japanese tissue, or in a poultice with fine grade Arbocel paper pulp and cellulose and rinsed thoroughly to remove any residue. The success of this process was mixed: in some areas the surface dirt was removed with dramatic results while in others it was not possible to achieve a complete clean. This because tri-ammonium citrate does not break down the hard sulphate crust which has trapped a certain amount of dirt beneath.

Surface cleaning trials carried out on Bay 13 during this survey indicate that a considerable amount of the surface discolouration may be removed by swabbing with deionised water. Further dirt/soot may be removed by a secondary clean using a 5% solution of tri-ammonium citrate in deionised water. The sulphate crust remains on the surface along with grey streaks of trapped dirt; however, as the photographs of cleaning tests illustrate, this method results in an acceptable level of clean in this area of the Crypt.

It is important that the swabs are rolled gently across the surface rather than rubbed. Rubbing tends to squash the residual covering limewash layer into a paste and disrupts the crinkled paint and limewash ground. The processes of consolidating flaking and loose paint and ground layers and surface cleaning will have to be carried out simultaneously.

## **7. TREATMENT PROPOSALS**

### **7.1 SURFACE CLEANING**

Where the paint and ground layers are reasonably sound loose dust, soot and dirt particles to be brushed from the surface, using small and very soft brushes; the dust sucked into a vacuum cleaner nozzle held close by. This to be followed by swabbing with deionised water: rolling the swabs gently over the surface to avoid disruption of the crinkled paint and ground layer. Further dirt/soot to be removed by a secondary clean using a 5% solution of tri-ammonium citrate in deionised water, again gently rolling the swabs across the surface.

The processes of consolidating flaking and loose paint and ground layers and surface cleaning will have to be carried out simultaneously.

## 7.2 CONSOLIDATION OF POWDERING PAINT

A weak solution of Paraloid B72<sup>1</sup> (3-5% in acetone) is a proven material for consolidation of weakly bound/powdering pigment. The consolidant will be applied by brush through Japanese tissue or by syringe as appropriate. For health and safety reasons acetone is the preferred solvent for B72. Additional advantages in this case are: the solvent evaporates quickly allowing the consolidant's effectiveness to be tested almost immediately and more applied where necessary; a less volatile solvent allows the consolidant to penetrate further into the support where it is not required; any excess consolidant remaining on the surface may be removed easily during later treatment processes

## 7.3 RE-ATTACHMENT OF THE PAINT AND GROUND LAYER

Most areas of loose and flaking limewash ground will be re-adhered using dilute lime slurry. This grout to be injected into voids and dripped behind lifted flakes, after pre-wetting with an IMS/water solution: the treated areas then pressed into position and the excess grout cleaned from the surface. Lime slurry is an excellent material for re-attaching large flakes and delaminating lime ground. Obviously it is compatible with the original material but, in addition, its bulk cushions and supports the ground layer as it is pressed back and does not impede porosity.

The vermilion and red lead pigments of the rosettes are potentially lime sensitive so any flaking paint and ground within the rosettes should be re-attached by injecting Industrial Methylated Spirits (IMS) through a fine needle behind the flakes, followed immediately by the injection of small droplets of the adhesive solution - a 5% or 10% solution of Plextol B500 in deionised water (depending on the distortion and thickness of the paint). The flakes then gently eased back into place with a small pad of dry cotton wool through Japanese tissue: the dry cotton wool absorbing excess adhesive displaced as the flakes are pressed back.

## 7.4 CONSOLIDATION OF THE PLASTER SUPPORT

All loose areas of support plaster to be secured by injecting a grout into the voids between plaster and the supporting substrate. It will not be feasible to ease back into plane areas of tented distortion without further damage to the plaster skim and risk of disruption to the adjacent plaster. The tented plaster will have distorted over the period of deterioration to the extent that it will no longer fit back into the available space. In these instances rather than attempt to press back the plaster the voids to be filled with a grout. If necessary a facing of Japanese tissue paper adhered with Tylose MH300 (60ml to 1L water) should be applied to the surface of the loose plaster. After pre-wetting with an IMS and water solution a grout of Trass/lime putty will be injected. The mix and consistency of the grout will vary according to the depth of each void and the distance it has to travel while being injected under pressure. Wherever possible the grout should be introduced through existing holes or cracks. Where it is necessary to drill holes through the surface plaster layer to give access to the voids the holes to be of the minimum size required. Presses to be applied either before grouting (to counteract the pressure of the injection process) or immediately after to ensure good adhesion and to minimise the effects of shrinkage. When a press is removed the area will be examined and, if necessary, more grout injected and the press reapplied. This process will be continued until the plaster is effectively secure.

Exposed friable plaster within areas of loss as well as voids between delaminated plaster layers or between plaster and substrate to be infused with thin lime slurry/ Plextol B500 (5% solution) prior to filling.

## 7.5 REMOVAL OF RESIDUAL COVERING LIMEWASH

Removal of the small isolated patches of covering limewash will clarify detail and improve the coherence of these paintings. The unpainted limewash will be removed mechanically using scalpels followed by Wishab sponges to reduce lime bloom on the surface.

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<sup>1</sup> Paraloid B72 is an ethyl methacrylate co-polymer which through tests has been classed as one of the most stable synthetic resins available to conservators (Feller Class A). It is the preferred material for this treatment process as it does not become insoluble with age and, if applied sparingly, will not impair surface porosity.



## **7.6 TREATMENT OF INAPPROPRIATE PLASTER REPAIRS**

All previous repair plaster should be removed and replaced with a more appropriate mortar (as detailed below).

## **7.7 FILLING OF PLASTER LOSSES**

The crumbling edges of plaster loss to be consolidated with fine aggregate, sharp sand/lime mortar ribbon repairs. All plaster losses to be filled with a porous mix of washed and variously graded, sharp sand/lime putty (3/1 mix). The deeper holes to be built up in layers, using a coarser aggregate, allowing time for the plaster to dry between applications. The final plaster layer(s) and repairs to open cracks will use a more finely graded sand to simulate the original surface texture.

## **7.8 REINTEGRATION OF PLASTER REPAIRS**

A limewash ground tinted with mineral pigments to be applied to all new plaster and the earlier, visually inappropriate repairs. Where necessary, water-colour washes to be applied to further tone in the grounds. There will be no reconstruction of missing details.

## **7.9 REINTEGRATION OF PAINT LOSSES**

Distracting white lacunae to be toned-down using water-bound mineral pigments in a technique obvious on close inspection. This process should enhance the clarity of the scheme without compromising its originality or accuracy from an art historical perspective. It will also serve as a visual guide for monitoring future losses. There will be no conjectural reconstruction of missing detail.

## **8 TREATMENT DOCUMENTATION**

A detailed written, graphic and photographic record would be kept of all treatments and observations made during the conservation of the painted decoration. Two copies of the final conservation record will be supplied to the Client; a third copy will be retained by The Perry Lithgow Partnership. Any further copies of the conservation record would be charged at cost.

### **8.1 PHOTOGRAPHIC DOCUMENTATION**

The photographic record will include identical sets of 6in x 4in colour prints and 35 mm mounted transparencies. Two sets of the photographic record would be presented to the client, the Perry Lithgow Partnership shall retain a set.

Photographic details will be provided - using direct flash, raking light flash and UV fluorescent sources as appropriate - to illustrate examples of damage, deterioration, surface accretions, previous interventions and other specific conditions before, during and after treatment. Before and after photographs of any additional treatment tests will be included. A written description of each photograph will accompany the photographic record.

### **8.2 WRITTEN AND GRAPHIC DOCUMENTATION**

The Conservation Record to include all relevant text from the Condition Survey, such as: a description of the wall paintings, original materials and technique, previous interventions; condition, documented treatment tests and conclusions on the causes of deterioration. It should also contain detailed descriptions of the methods and materials involved in the treatment processes and, if appropriate, recommendations for future maintenance.

The graphic record to make use of the relevant Condition Survey multi-layered vector graphics, adapted as necessary to form treatment records. The conservators responsible to plot interventions by hand onto scaled printouts as they occur. The hand-plotted information to be, in turn, be scanned into the computer and converted to multi-layered vectors.

**9. LIST OF PLATES**

1. Bay 13 overall: taken from the north.
2. Quadrant A, north severy: for comparison with Graphic 1.
3. Quadrant A, south severy: for comparison with Graphic 2.
4. Quadrant B, east severy: for comparison with Graphic 3.
5. Quadrant B, west severy: for comparison with Graphic 4.
6. Quadrant C, south severy: for comparison with Graphic 5.
7. Quadrant C, north severy: for comparison with Graphic 6.
8. Quadrant D, west severy: for comparison with Graphic 7.
9. Quadrant D, east severy: for comparison with Graphic 8.
10. West wall spandrel: for comparison with Graphic 9.
11. Bay 13 overall: taken from the north.
12. Quadrant A, central area: raking light detail showing the large wide, previously filled, structural crack running (EW) across the centre. The plaster is displaced so the south side is significantly lower.
13. Quadrant A, north severy: raking light detail of plaster loss and associated detachment.
14. Quadrant A, south severy: raking light detail showing areas of unstable plaster and plaster loss.
15. Quadrant A, south severy: detail showing the level of surface discolouration in this quadrant and an area that appears to have been scraped.
16. Quadrant B, central area: the severe discolouration makes it difficult to establish the extent of decoration surviving in this quadrant. A wide, previously filled crack extends (NS) across the inner half of the apex. Overall the skim coat of plaster is loose. Some areas are highly unstable.
17. Quadrant B, west severy: detail of this severely discoloured area showing fragments of the masonry pattern and other red paint (all crinkled) showing through the accretion of coal dust and dirt.
18. Quadrant B, west severy: detail of a typical area of the surface to show the pitted plaster and the crinkled paint and ground.
19. Quadrant B, east severy: an area of bulging and fractured, highly unstable plaster.
20. Quadrant B, west severy: raking light detail of the lower area showing severe discolouration, plaster loss and much pitting and displacement.
21. Quadrant B, west severy: cleaning test near the apex of this severely discoloured quadrant - deionised water followed by TAC (5% solution) and rinsed with deionised water.
22. Quadrant B, west severy: cleaning test near the apex of this severely discoloured quadrant - deionised water followed by TAC (5% solution) and rinsed with deionised water (as 21).
23. Quadrant C, north severy: an area of relatively well preserved painted decoration with the red single line masonry pattern and a rosette within each fictive masonry block. The photograph also shows the crudely applied repair plaster and the network of open cracks through the surface.

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24. Quadrant C, north severy: showing one of the occasional variations in the rosettes decorating the fictive masonry blocks. This rosette has a narrow point or spike between each 'leaf'.
  25. Quadrant C, north severy: a wide horizontal crack separates the upper and lower sections. This is intersected by a diagonal crack extending through the lower section.
  26. Quadrant C, south severy: showing various open cracks and some displaced plaster within the upper section and crumbling residue of repair plaster.
  27. Quadrant C, south severy: raking light detail of the lower area showing the lower 2ft of plaster in the segment is severely pitted. There are small localised areas of plaster loss within this area and some detached bits of hanging plaster. The lower part is effectively lost.
  28. Quadrant D, east severy: three cleaning tests all using water.
  29. Quadrant D, east severy: showing two other cleaning tests. The lower one using a wishab sponge; the upper de-ionised water. Surface cleaning with wishab sponges is not viable given the fragile state of some of the plaster and the crinkled nature of the paint and ground.
  30. Quadrant D, east severy: showing a square cleaning test. The right side of the test was cleaned with de-ionised water only, the left side with water but followed by a 5% solution of tri-ammonium citrate (TAC) then rinsed with de-ionised water. Significantly more dirt was removed by the TAC solution.
  31. Quadrant D, west severy: raking light detail showing a deteriorated previous plaster repair skimmed over a relatively narrow crack. As well as the masonry pattern and rosettes there may have been another design within the upper area. Where this apparent second design remains the paint and ground are crinkles and flaking badly.
  32. Quadrant D, west severy: raking light detail showing the crinkled paint and ground layers.
  33. Bay 13, west wall: only a spandrel of painted plaster remains in this area framed by moulded stone ribs. A plaster repair and vertical crack divide the upper section.
  34. West wall, plaster spandrel: under raking light showing the severe degeneration of the plaster substrate and the adjacent stone work. 80% highly unstable largely it is the substrate layer that has detached. Lower section is entirely lost.
  35. Bay 13, west wall: detail within the upper part showing the surface accretions flaking and loss.
  36. Detail of a section of stone rib showing how much of the original surface skin and pointing mortar is lost. The exposed stone surface is friable and requires consolidation.
  37. The north-east pier: showing the stone in good condition although coated black since the Crypt was used as a coal store.
  38. Window recess to south of Bay 13, east side: showing the severely discoloured dressed stone surface as well as the deteriorated surface of the adjacent stone rib of the vault.