

# The Tower of London

## Survey of the External Walls for Future Maintenance

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**Date of Report:** 23/07/2008 — 06/08/2008

This survey was carried out during the above dates.

The focus of investigation is the conservation needs of the external walls of the Tower of London site.

### **Site Inspection:**

Visual inspection only, approximately 2m from ground level (the conservator's height). No use of metal detector or other equipment.

### **Observations:**

There are remarkable hollows or holes, past cement repairs to the joints and joint failure throughout the wall face.

There is considerable vegetative invasion of the external walls.

Biological infestation includes moss, lichen and algae, especially on the wallhead and areas exposed to running water.

Flaky and crumbly samples of stone from the wall face provide evidence of the decay of its load-bearing physical properties.

### **Evaluation:**

These noted changes will eventually cause permanent and serious structural damage.

**Treatment:**

Vegetation was removed mechanically. A moderate herbicide was used to avoid regrowth. The decayed condition of many joints after the removal of vegetation resulted in re-pointing with lime mortar. This re-pointing occurred in the external face of the outer walls in the South, West and North Moats.

All treatments were applied to the lower parts of the wall — approximately 2m high from the ground (the conservator's height).

**Detailed Condition Survey****Lion Tower Drawbridge Pit**

Vegetation is remarkable throughout the area. Weed removal was not carried out at this time: the area needs secure access and facilities for treatment.

**Middle Tower (Main Entrance)**

There is no evidence of vegetation and/or joint failure.

**Byward Tower**

There is no evidence of vegetation and/or joint failure. However, moss is present on the lower left-hand side of the West Moat tower.

**Wall in the West Moat**

The condition of the wall face is relatively good and the stone sound, although some discoloured areas (blackened) caused by air pollution (sulphation) and also joint failure are evident.

The area is divided for inspection into nine sections according to the vertical runs of drainpipes.

- **Section 1:** vegetation is present on the left-hand side, from 2.5m off the ground to the wallhead where rainwater runs off. Some joints were re-pointed with lime mortar.
- **Section 2:** vegetation is present on the upper centre side just below the coping stones. Weeding and re-pointing were carried out where some joints were in considerable danger.

- **Section 3:** vegetation is visible on the upper centre and upper left-hand side areas, 5m above ground level. Some plants are present at the top of the right-hand side.
- **Section 4:** vegetation is visible on the upper right-hand side at 5m height from ground level.
- **Section 5:** vegetation is present on the upper side around the fifth drainpipe at 6m height from ground level.
- **Section 6:** vegetation is visible on the upper right-hand side around 6m from ground level.
- **Section 7:** vegetation is visible on the upper centre and upper left-hand areas, 5m from ground level.
- **Section 8:** no presence of vegetation.
- **Section 9:** vegetation is present on the left-hand side, 4m from ground level, extending to the top of the wallhead.

### **Legge's Mount (section 10)**

Vegetation is visible on the upper right-hand side just below the coping stones. Viewed from the inner side of the Mount, some plants are actively growing on the red brick rooftop (80x100cm approx). They should be removed and the area possibly re-pointed.

### **Wall in the North Moat**

The wall is in good condition compared with the West Moat wall. Some lower areas of the wall need to be re-pointed.

The area is divided into ten sections according to the vertical drainpipes, as with the wall in the West Moat.

- **Section 11:** no evidence of vegetation. The lower area needs to be re-pointed generally.

- **Section 12:** no vegetation. There are a few big hollows on the lower left-hand side and the area just above the vent where some joints have lost their mortar.
- **Section 13:** vegetation is visible on the top right-hand side just below the coping stones.
- **Section 14:** no vegetation. Some areas need to be re-pointed, for example on the right-hand side area around 4m from ground level.
- **Section 15, 16, 17:** no vegetation or major joint failure.
- **Section 18:** Some plants are visible on the left hand side rooftop. The area needs a secure access for treatment.
- **Section 19, 20:** No vegetation or major joint failure.

### **Brass Mount (section 21)**

Vegetation is visible on the top right-hand side (a hole for drainage is present) and top centre areas (north and northeast side, from the first to sixth embrasures). There are two vertical cracks on the south side. The cracked joints exhibit loss of mortar.

### **Wall in the East Moat:**

A few larger holes are present in the wall. Some lower areas need to be re-pointed. The wall is divided into eleven sections according to the vertical drainpipes.

- **Section 22:** there is a considerable hole missing its original stone block on the lower side. The size of the hole is 20x 30x 30cm approx. The lower area should be re-pointed throughout. No vegetation is present on the wall, but some plants are visible on the coping stones: they can be seen from the other side of the wallhead.
- **Section 23, 24:** no vegetation. The lower area should be re-pointed as some joints are failing.
- **Section 25 (the area between the second and third drainpipes):** no vegetation. The area is quite clean.

- **Section 26:** no vegetation or major joint failure.
- **Section 27:** no vegetation. A few larger holes or hollows are notable in the lower area, especially the one on the lower right-hand side (30x30x70cm approx).
- **Section 28, 29, 30, 31:** no vegetation or major joint failure.
- **Section 32:** some plants are active on the top left-hand side corner. The lower right-hand side area should be re-pointed on the whole.

### **Develine Tower (section 33)**

No vegetation or major joint failure.

### **Wall in the South Moat**

The area is divided into seven sections includinn two towers.

- **Section 34:** No vegetation. Some stone blocks are noted for their physical decay: they are flaky or crumbling. Some joints are failing.
- **Well Tower (section 35):** no vegetation or major joint failure.
- **Section 36:** no vegetation. Some stone blocks exhibit significant physical decay. They are flaky or crumbling, possibly due to cementicious pointing in the past.
- **Section 37:** no vegetation or major joint failure.
- **Cradle Tower (section 38):** no vegetation. The majority of the stones on the lower area are damaged and flaky.
- **Section 39:** no vegetation. The lower area may require re-pointing: soil is evident in the joints.
- **Section 40:** no vegetation or major joint failure.

## **Outer Walls in the Moats**

- **Outer East Wall:** salt crystallisation can be seen right across the east-side red brick wall suggesting long-term exposure to water. Some bricks exhibit dramatic damage: they are friable and no longer possess their original shape . This area requires further examination for treatment.
- **Outer South Wall:** vegetation can be seen on the upper area of the south-side wall (opposite to section 33-36, from the south end of the Tower Bridge to East Drawbridge).

## **St. Thomas' Tower and Traitor's Gate**

No signs of vegetation or major joint failure on St. Thomas' Tower.

However, vegetation including moss can be seen on both the inner and outer walls and the stairs to Water Lane in the Traitor's Gate. The plants and moss should be removed and joints colonised by plants should be re-pointed with lime mortar. In order to carry out treatment, it would be necessary to have secure access to the area, due to the presence of water.

## **Inner Lower Walls between the Traitor's Gate and the Cradle Tower**

No vegetation. The upper area of the inner wall should be re-pointed as the joints are failing throughout. Mixture of biological infestation, moss, algae and lichen are obvious on the top part of the inner wall. This should be removed as it could destroy the structure of the stone. Possibly, an ammonium-based biocide which is less harmful than a chlorine-based one could be used for treatment.<sup>1</sup>

## **Inner Corner and Old Wall near the Well Tower**

Vegetation is present throughout the remains of the old wall near the Well Tower and the fenced enclosed area immediately next to the old wall.

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<sup>1</sup> The use of a quaternary ammonium biocide was encouraged by John and Nicola Ashurst. Sourced from the English Heritage website, RTAS and Cowdray House, Midhurst, Cowdray House Chapel: Plaster Conservation, Conservation Bulletin, Issue 1, February 1987, [www.english-heritage.org.uk/upload/pdf/Conservation\\_Bulletin\\_01.pdf](http://www.english-heritage.org.uk/upload/pdf/Conservation_Bulletin_01.pdf) (accessed on 11/08/2008)

### **Small Walk and Rooftop around the Martin Tower (Inner Side)**

Some plants are actively growing in the enclosed small passage just outside the shop exit and the rooftop of the building next to the Tower (north side). They should be removed and the area inspected further.

### **South Side Corner of the Martin Tower**

Moss growth can be seen on the lower north corner of the tower. It is likely that the moss is permanent because of the location of the drainpipe and regular saturation with rainwater from the drainpipe.

### **Outer Wall between the Martin Tower and the Brick Tower**

Vegetation is visible on the upper right-hand side near the Brick Tower.

### **Outer Wall between the Brick Tower and The Bowyer Tower**

Vegetation can be seen on the upper areas.

### **Outer Wall between the Bowyer Tower and the Flint Tower**

Vegetation can be seen on the upper left and right-hand sides, close to the wallhead.

### **Flint Tower**

The majority of the joints are failing and some deep hollows are visible. The area should be re-pointed throughout.

### **Walls around the Stairs in the Centre of the Site (between the Tower Green and the White Tower)**

Biological infestation, including moss, algae, and lichen, is remarkable on the coping stones of the walls. The moss layer is quite thick (1-2cm approx). The appearance of the area is of a green mat hiding the stone surfaces.

### **Wall of the Inmost Ward, Coldharbour Gate, Wardrobe Tower**

Vegetation is present throughout on the wall face. The plants are vigorously active. This may be due to the particularly decayed condition of the stonework. In consequence, the area should be examined closely after the removal of vegetation.