8.21 STABLE BLOCK & CAFE - BOUNDARY WALL REPORT & PHOTOS

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STRUCUTRAL REPORT
BOUNDARY WALL TO REAR OF STABLES
MARBLE HILL PARK
TWICKENHAM
LONDON

Client: English Heritage
Brooklands
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APPENDICES:

1.0 Introduction

1.1 We have been instructed to undertake a structural condition survey of the brick boundary wall to the rear of the Stables in Marble Hill Park, Twickenham, London.

1.2 This report will comment on the condition of the wall and its structural stability as it exists. It will also comment on the structural implications of building on or adjacent to the wall. We have been provided with preliminary drawings by van Heyningen and Haward Architects: which are listed here as follows:

- 533-L-004-Proposed Site Plan 1-500_Rev C
- 533-L-100-Proposed-Ground Floor Plan_Rev C

1.3 We visited on 09 January 2017 to inspect the boundary wall and its condition.

1.4 For the purpose of the survey the elevation facing the stables is considered to be east facing; with the wall running north and south.

1.5 Access to the wall was only available from the Stables side of the wall (east elevation), thus only one side was inspected. It should also be noted that the upper courses were severely obscured from dense ivy growth.

2.0 Description

2.1 The brick wall forms the boundary wall between Southend House and the Stables. The report will focus on this main length of the wall, but we will also comment on the two cross walls, with one at the north end and one at the south end.

2.2 The wall is formed of London stock bricks with a variation in bonds. The majority of the wall appears to be Flemish Bond with several areas with a variation of this bond; this is assumed because of localised rebuilding. The lower four courses are all header courses.

2.3 The coping to the top of the wall appears to be a brick on edge; there was difficulty inspecting this area because of the dense foliage.

2.4 The wall is approximately 27m in length extending the length of the Stables Building.

2.5 Where it was possible to inspect the wall thickness it was recorded as approximately 330mm thick.

2.6 The wall steps up in height to 2.27m approximately 5m before the north end of the wall. At a further 2.5m from this point there is a pier and a joint where the wall construction changes: the wall height is 1.94m with newer bricks.

2.7 The north end cross wall abuts the main length of the wall with an adjacent pier; there is no brick joint between the two walls. The cross wall maintains the Flemish bond and brick on edge coping. There is an opening in the north end wall with piers either side, the wall continues after the opening to abut the stables.

2.8 The south end cross wall steps up to 2.35m in height. It is built in Flemish bond with a tile drip course and a brick on edge coping. The wall is narrower above the tile course at 215mm thick.

2.9 There is a gated opening within the south end cross wall with piers either side. Towards the stables the wall steps up in height again to approximately 2.85m height.

3.0 Condition and Suggested Repairs

3.1 The first 5-6m of the wall is severely out of plumb, leaning approximately 140mm over a height of 1.74m towards the east. This out of plumbness affects the stability of the wall as it exceeds the “middle third rule” in which the centre of gravity of the wall should lie within the middle third of the wall which is 110mm in thickness. The out of plumbness reduces to 70mm towards the north end of the wall.

3.2 Only rebuilding can correct the lean in the wall. The length of rebuilding will be in the region of 5-7m as the new coursing has to be tied into the existing; alternatively a new pier could be added, this would be a natural point to adjust for the out of plumbness of the remaining length of wall. Rather than rebuilding, buttresses could be added to brace the wall but this would have a visual impact and also increase the footprint of the wall.

3.3 Roots from the established ivy bush have penetrated the upper 4 courses of masonry. The ivy should be removed, the upper four courses carefully dismantled to allow for removing the vegetation within the wall, and then these courses can be rebuilt. The extent of root penetration is not clear but it appears that the full length of the wall requires this treatment. This repair is required as the vegetation allows for water to penetrate the wall, which in turn erodes the masonry and further destabilises the wall.

3.4 The mortar to the lower four courses of the wall is severely eroded. Deep repointing of this area is required for the full length of the wall.

3.5 Cementitious mortar has been used for repointing in particular to the top of the wall and the coping, but there are also patch repairs throughout the length of the wall. This mortar will trap moisture, causing erosion of the adjacent bricks, and also possibly movement in freeze thaw cycles. This should be removed and repointed with an appropriate lime based mortar.

3.6 All of the repairs should be carried out with an appropriate lime based mortar. Mortar testing is advised as this will inform the repairs and mortar selection.

3.7 To the north end of the wall there are two large trees on the west side (within Southend House’s grounds) growing in close proximity to the wall. As these trees cannot be removed, this area of the wall must be closely monitored. It is clear this portion of the wall has been rebuilt in the past and it is likely because of the proximity of the trees. The roots of the large trees could cause shrinkage of the soils, and even physical pressure against the footings from the growth of the roots. These changes could cause cracking and movement in the wall. It is likely in the long term some rebuilding will be required or deep underpinning.

3.8 The north end cross wall has extensive ivy growth to the north elevation which carries over the top of the wall. The wall is likely to require some repointing below the vegetation, but we did not observe and root penetration into the masonry. There is also a medium sized elder tree growing from the base of the wall. As this tree matures the growth may become a problem for the adjacent masonry wall, this area of the wall should be monitored it the tree is retained.

3.9 The condition of the south end cross wall appears fair but some repointing of the upper courses below the ivy is likely required.

3.10 Trial pits revealed the a stepped brick footing to a depth of approximately 750mm-850mm below ground level which is sufficient for a wall of this height.

4.0 Proposals and Recommendations

4.1 The proposals involve constructing a new café building along the footprint of the existing wall or adjacent to the existing wall.

4.2 Building over the existing wall or taking support on the existing wall is not feasible given the 330mm wall thickness and the condition of the wall. The wall thickness limits the height of the wall, and a greater thickness would be required for a wall height over 1800mm in masonry. It might be possible to build over the existing masonry wall with a lightweight timber stud wall but

the wall would have to be braced at regular centres with masonry cross walls tied to the existing wall; this is not practical for a café arrangement.

4.3 Point loading on the existing wall would not be acceptable as differential settlement could be an issue given the changes in construction of the wall and proximity of trees. Some lightweight disturbed loading on the wall may be acceptable but roof loading would have to be limited and thus the span of the new roof would be limited. The repairs described above (rebuilding and repointing) would have to be completed before any alterations took place.

4.4 Building adjacent to the existing wall with a new masonry wall would require underpinning the full length of the wall as the new footing depth would exceed the existing 750mm depth; with the adjacent trees, a foundation depth in excess of 2m is required. The rebuilding and repointing repairs would have to be carried out first.

4.5 Support for the new structure could be set back from the existing wall, but this would mean the new building would be visible to the neighbours and it is our understanding that this is unacceptable.

4.6 Rebuilding the existing wall on new deeper foundations to an increased thickness would ensure the stability of the new wall at the increased height; it would also eliminate the risk of differential settlement, and it would allow for support for the new structure to be taken off the masonry wall.

5.0 Summary of Recommendations

5.1 The condition of the main length of this boundary wall is poor and repair to the wall including rebuilding the 5-7m stretch that is severely out of plumb is required irrespective of the new building proposal selected. We have summarised the repairs required for each option below.

5.2 Recommended repairs to stabilise the main wall in the long term in the existing arrangement:

- 5.2.1 Rebuilding of approximately 5-7m of the wall where the wall is severely bowed.
- 5.2.2 Deep repointing of lower 4 courses of wall for full 27m length.
- 5.2.3 Repointing 50% of brickwork (or 100% for a more visually cohesive appearance).
- 5.2.4 Removing cementitious repointing patch repairs. Assume an area equal to 5m².
- 5.2.5 Dismantling and rebedding of upper 4 courses of brick work including coping for full 27m length of wall.
- 5.2.6 Continue to monitor wall in close proximity to the large trees at North End. Long term remedial work to deepen footings may be required.

5.3 Recommendations for building on the existing wall:

- 5.3.1 Heights above 1.8m: Not recommended as stability of wall will be affected as the plumbness cannot be wholly corrected without complete rebuilding and increasing the wall thickness. Underpinning would also be required in proximity to the trees.

5.4 Recommendations for building adjacent to the existing wall (New structure would be visible above 1.75m height):

- 5.4.1 Carryout repairs outlined in 5.2.
- 5.4.2 Sequenced underpinning of wall to a depth of 2m.

5.5 Recommendations for rebuilding the wall:

- 5.5.1 New foundations at an increased depth would eliminate issues related to differential settlement.
- 5.5.2 Rebuilt wall will be plumb and thicker and thus the height can be increased.
- 5.5.3 Support for the new structure could be taken off the existing wall.

APPENDIX A

Photographs

Photograph 1 – View of boundary wall.

Photograph 2 – North end of boundary wall.

Photograph 3

Photograph 4 – South end of wall, wall severely bowed in this area.

Photograph 5 – Near south end, area of rebuilding to wall.

Photograph 6 – Cementitious mortar to rebuilt area of wall.

Photograph 7 –The severe lean in wall as viewed from the south end of the wall.

Photograph 8 Root penetration into masonry to top of wall.

Photograph 9 – Vegetation growth and cementitious mortar has destabilised the top of the wall.

Photograph 10 – Extensive ivy growth to top of wall.

Photograph 11 – Cementitious mortar pointing to top of the wall.

Photograph 12 - Root penetration into masonry to top of wall.

Photograph 13 – North end of wall, change in wall height.

Photograph 14 – Root penetration into masonry at north end of wall.

Photograph 15 – Junction of north end of wall and North cross wall, change in construction at pier- wall is likely rebuilt because of proximity of large trees to west elevation.

Photograph 16 – North cross wall.

Photograph 17 – Elder tree in close proximity to north cross wall.

Photograph 18 – Ivy growth to north cross wall.

Photograph 19 – Continuation of north wall and junction with stables building.

Photograph 20 – Ivy growth to north elevation of north end cross wall.

Photograph 21 – Vegetation growth in close proximity to North elevation of north end cross wall.

Photograph 22 – South end of main wall.

Photograph 23 – South end of main wall, minor erosion of bricks and extensive ivy growth.

Photograph 24 – South end cross wall, height of wall increases, extensive ivy growth to top of wall.

Photograph 25 – South end cross wall at junction of stables building.