29 New End, Hampstead

Structural Report : Reconstruction of Lawn House Buttresses

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Date 10.10.2016

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Structural Engineers & Technical Designers

Quality management

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Revision Status/ History

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1.0 BACKGROUND

Fluid Structures are acting as structural engineers for New End LLP in connection with the redevelopment of the site at 29 New End

The site is substantially occupied by a nurses home which is to be removed to allow for construction of a new seven storey residential building. The superstructure will have a similar footprint to the nurses home but be constructed over a larger footprint basement. Due to the slope of the site the basement will vary in depth from 3m to 10m.

As part of the basement construction works it is proposed to reduce the encroachment into the site of two existing brick buttresses which abut the west boundary wall.

The buttresses are shown below, close to the Grade II Listed building of Lawn House which is adjacent to the site.

This report summarises the structural engineering aspects of the proposed buttress alterations.

2.0 CHRONOLOGY OF DEVELOPMENT

Pre-Construct have prepared an archaeological report in connection with the development. The 1762 map of Belsize Manor and Lands included therein indicates that the site of 29 New End was undeveloped open space, albeit with indications of garden walls crossing the site. The existence of these garden walls was confirmed during 2016 archaeological excavations.

Refer to 1762 plan overleaf.

Lawn House is shown as existing on the 1762 map therefore dates from prior to this. Pre-Construct note that the Victoria County History suggests that Lawn House was built “probably before 1709”

Soil Consultants have completed a desk top study which includes collation and review of historic OS mapping, The 1870 mapping shows the site to still be undeveloped, and also makes clearer the alignment of the East-West wall crossing the site and abutting the west boundary slightly north of Lawn House :

OS 1870, part, extracted from Desk Top Study

Figure 6
Belsize Manor and Lands: compiled for Lord Chesterfield, 1762

Later mapping shows the OS did not resurvey the site until 1953, with the current nurses home then shown on the 1953 1:1250 edition. The 1953 map also shows the reworking of the previous external steps and walls to correspond to the current arrangements.

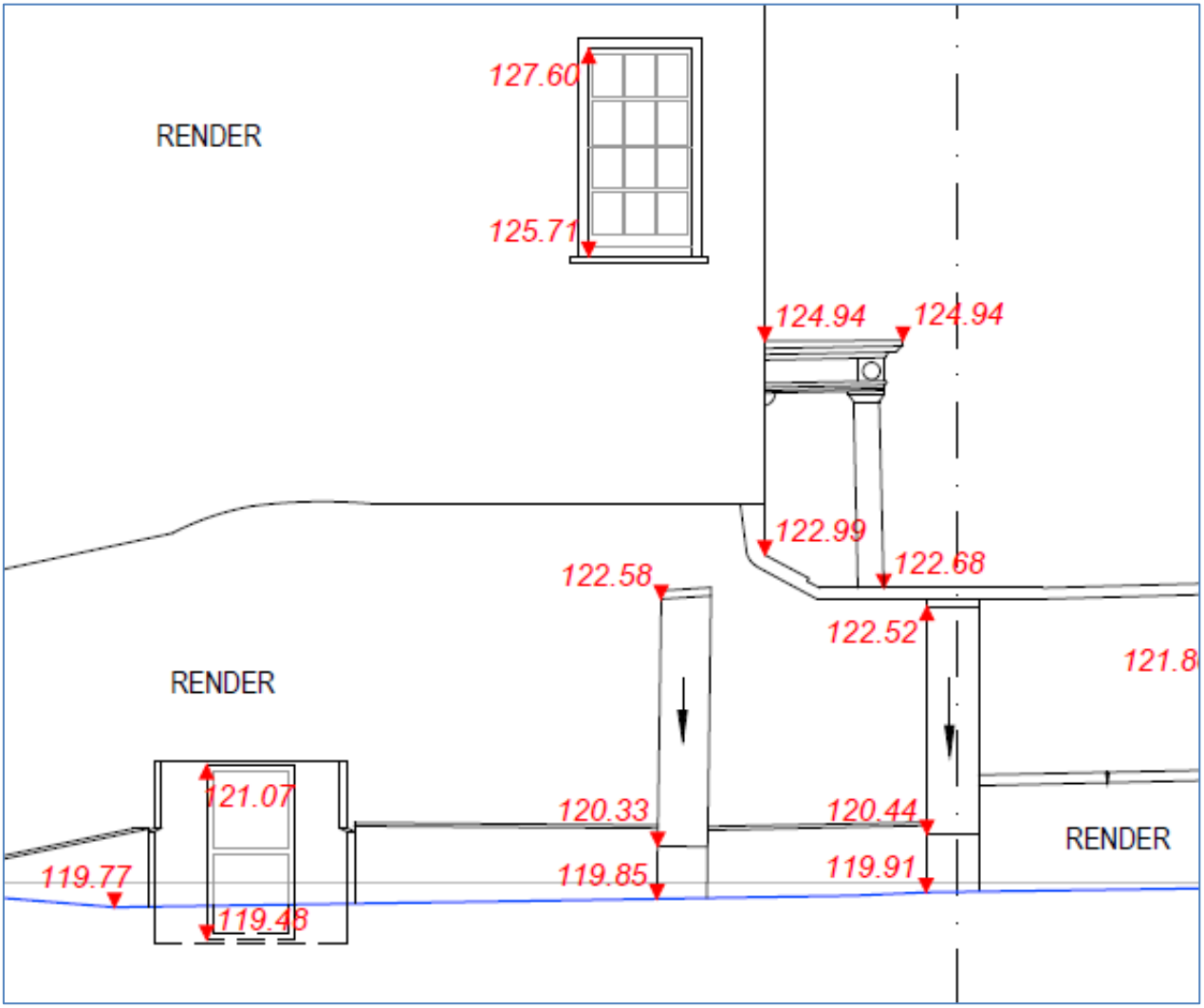
Separate records from the London Metropolitan Archive confirm the nurses home was constructed between 1938 and 1939.

In summary Lawn House, and probably the site boundary walls, date from around 1709 or earlier. The current alignment of the boundary wall, and the beech tree, are shown on the 1870 OS plan. The 1870 plan also shows an East-West garden wall at the position of the current north buttress, this wall being removed at around 1939 when the nurses home was constructed.

3.0 FUNCTION OF BUTTRESSES

In light of the chronology above it appears reasonable to conclude that the two buttresses, which are of brick matching the nurses home, were constructed in 1938-39 as part of the nurses home external landscape works..

By this time the boundary wall would have been at the very least 70 years old, and possibly over 200 years old. It would already have been subject to stresses from the established beech tree and possibly unbalanced earth pressures due to site slopes, and likely to be showing distress. Trial pits have shown the footings to be limited to simple shallow brick corbels.



The northern buttress location aligns with the now removed East-West garden wall therefore is likely to have been constructed as a substitute for any lateral stability provided by the wall being removed, and/or to address any lean.

The southern buttress aligns approximately with change in height of the boundary wall, a step of 0.75m. The buttress is offset from the north façade of Lawn House, which is on the far side of the boundary wall, by 0.5m. Lawn House also extends to a height of 12m, five times greater than the buttress height.

It is reasonable to conclude the buttresses were provided as an effort to ensure lateral stability of the brick boundary wall and are unlikely to provide any significant restraint to the house beyond.

4.0 PROPOSED BUTTRESS RECONSTRUCTION

To reduce the horizontal extent of the two buttresses it is proposed to reconstruct the two brick buttresses in brick clad reinforced concrete on a mini piled foundation. See Appendix A.

To ensure stability of the boundary wall during the works temporary lateral propping will be provided adjacent to and in between the buttress positions as noted.

The temporary and permanent works will be constructed to resist a lateral force of not less than 5% of the gravity load of the relevant length of restrained wall.

In the permanent situation adequate rigidity of the RC structure will be ensured by reinforcing bar continuity from buttress to ground beam.

Differential movements between the boundary wall and the mini-piled foundation during adjacent basement construction will be very limited as both foundations will bear into the same soil mass. The Ground Movement Assessment, carried out as part of the Basement Impact Assessment and scheme design, has shown that the differences in soil movements between the locations of the new mini-piles and the existing corbelled footing are minimal.

APPENDIX A

BUTTRESS RECONSTRUCTION DRAWINGS AND SEQUENCE

24397

11 August 2016

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Proposed Sequence of Work for Alterations to Buttress 1 and 2 Adjacent to Lawn House

To be read in conjunction with KSR Architects drawing 15031-LB-001 and Fluid Structures drawings 24397/SK04T2 and SK06T2

It is proposed to remove the two garden wall buttresses adjacent to the north East corner of Lawn House, on the 27 New End site, and replace these with new. The existing buttresses are 18" brickwork, believed to date from the construction of the Nurses Home (1950's), whilst the new will be of reinforced concrete (RC) with a brick facing, requiring a smaller footprint on the 27 New End site.

The principle is to form a new permanent footing of RC on minipiled foundations, prop the wall with temporary steel posts, remove the old buttresses, then form the new pair of buttresses.

1. Prepare existing ground adjacent to Lawn House for a small mini-piling rig.
   (Ground level is 119.8m AOD. Organic material will be removed and minimum 150mm layer of hardcore placed)

2. Bore minipiles. These will be augured cast in place reinforced concrete piles nominally 300mm diameter and expected to be around 8m deep.

3. Trim pile heads and expose the pile reinforcement

4. Excavate trench circa 750 deep and then shutter and cast the RC ground beam / pile cap adjacent to Lawn House, including forming the two necessary openings through the 2No existing buttresses. These openings will be approximately 750mm square and formed using hand tools. The RC ground beam will be T-shape on plan for stability.

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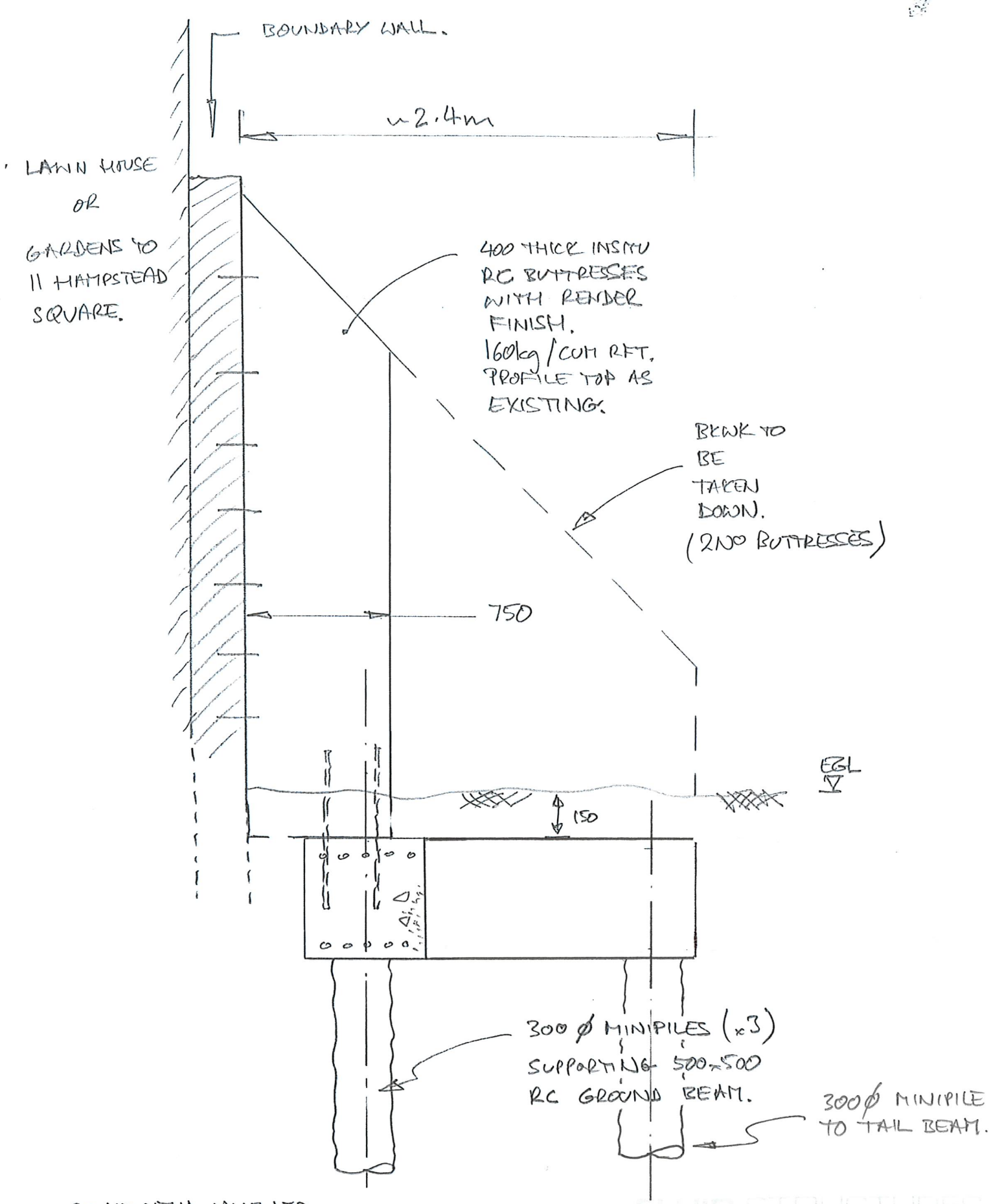
5. Erect 3No bolted temporary steel 254x254 UC 89 posts onto the top of the RC ground beam/pile cap, with 4No M20 holding down bolts at their bases. Pack the gap between these posts and the garden wall with timber packing secured in position

6. Demolish the 2 buttress using hand tools

7. Shutter and cast the two new RC buttresses, now only 750mm in length

8. Take down temporary timber packing and 254x254 UC steel posts

The basement pile mat and piling works can now commence.



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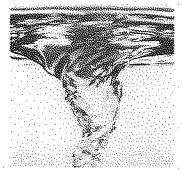

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