STRUCTURAL ENGINEER'S REPORT

FOR

THE LODGE
HIGHATE ROAD
LONDON
NW5-1BS

VAT Reg No. 527 9226 27

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Contents

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1.0 Introduction

1.1 Techniker were asked to carry out a structural Appraisal of the following buildings, forming the site at Highgate Baptist Church, Highgate, London.

- Existing Manse House
- Nursery Building adjacent to church.
- Chapel
- Current Worship Space - Extension

1.2 It is proposed to sell the chapel for development, with the remaining structures being refurbished at a later date.

1.3 This report is limited purely to structural issues and excludes any detailed commentary on the cladding, finishes, waterproofing or services.

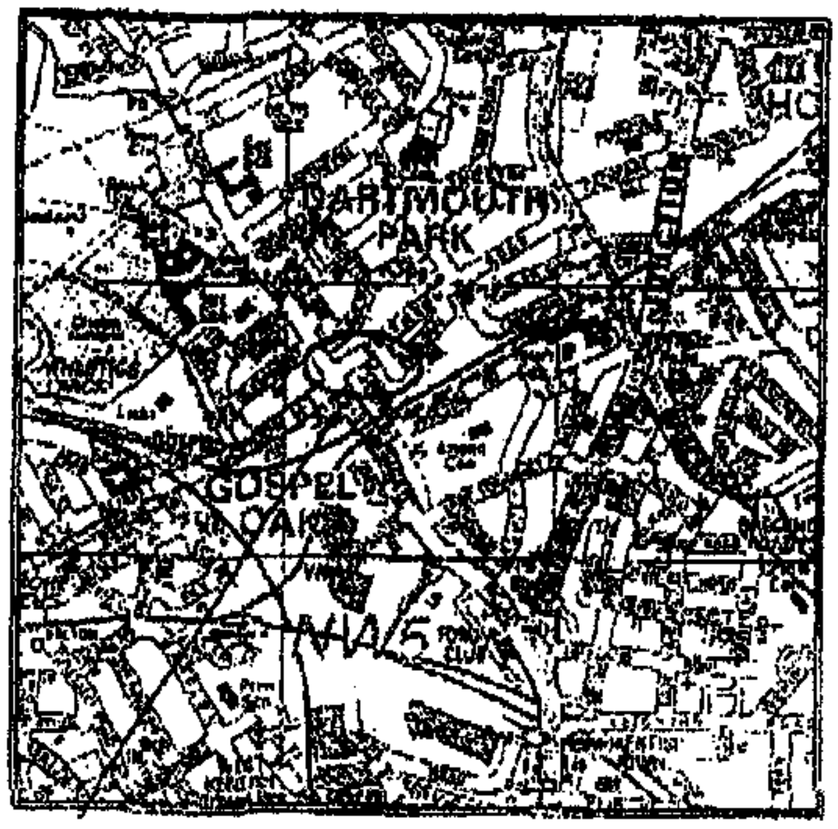
1.4 This report is based primarily on observations during two site visits to the hall, one on the 15th June 2005 and the other on the 7th July 2005.

1.6 This report is based on a visual inspection of all accessible areas of the building.

2.0 Description of Existing

2.1 Site Description and History

2.1.1 The site is located on Highgate Road, on the corner of Chetwynd Road as



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2.1.2 The church was built in 1894 with the extension and nursery building being constructed two years later. It is likely that the manse was constructed around the same time as the adjacent buildings.

2.2 Geology

2.2.1. A site investigation has been carried out by Soil Consultants Ltd to determine the ground conditions and provide details of the existing foundations. This is available for any further information.

2.2.2. The site is covered by a variable thickness of made ground up to a depth of 1.8m. Below this level the site is founded on a London Clay with a very high plasticity index. The clay is desiccated up to a depth of 4m, due to the presence of some large trees on site. The London Clay becomes more competent at a depth of 4-5m

2.2.3. There are a large number of areas where the buildings are exhibiting signs of distress due to subsidence. This is due to existing foundations having insufficient depth across the whole site and being within the zone where the clay is prone to shrinkage. Particular badly affected areas to note are the corner of the nursery building by the large ash tree, the main chapel by the trees along Chetwynd Road and the rear façade of the manse building.

2.2.4. The trees on and around the site combined with the high plasticity index of the soil are considered to be the cause of the subsidence problems on the site.

2.2.5. The large mature ash tree by the corner of the nursery is subject to a tree preservation order.

2.3 Existing Structures

2.3.1 Chapel

2.3.1.1 The chapel, measuring approximately 14m x 23m on plan is an open plan masonry structure with a pitched timber roof.

2.3.1.2 The chapel roof consists of timber purlins supporting timber rafters. The purlins span between existing timber trusses, which in turn span between the main piers of the outer walls. The roof is completely supported by the piers and walls and has no internal point of support.

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2.3.1.3 The church gallery, including organ, is supported off both the external walls and an interior series of columns bearing onto assumed pad footings.

2.3.1.4 The existing church floor consists of suspended timber joists over a void - depth of void to be determined - spanning between assumed sleeper walls.

2.3.1.5 The external walls of the church consist of brick clad in ashlar with rubble filled piers at approximately 4.0m centres with wall panels spanning between.

2.3.1.6 The front wall is laterally restrained by the organ gallery and takes additional lateral support from the porch area of the church.

2.3.1.7 The rear wall, which forms the wall of the basement, is partially restrained by the extension structure behind. The baptismal pool is formed adjacent to this rear wall.

2.3.2 Extension

2.3.2.1 The extension is contemporary with and of a similar form of construction to the chapel.

2.3.2.2 This consists of a two-storey structure plus basement under part of the footprint of the extension.

2.3.2.3 The main construction is masonry with timber floors in the room areas and stone floors in the ground floor circulation areas. The timber floors span onto load bearing masonry walls in the basement, with the stone corridors forming part of an original underfloor heating system formed from the flues of the fires in the basement.

2.3.2.4 At first floor level the footprint of the extension is mainly occupied with a large space currently used as a recreation space for the nursery school. The timber floors of this space appear to span onto loadbearing stud walls and timber beams and cast iron columns under, one of which can be seen.

2.3.2.5 The roof of this large open area consists of composite steel and timber trusses spanning between the sidewalls of the recreation space.

2.3.2.6 The main staircase of the extension is a cantilever stone staircase with an intermediate steel support bracket at the first landing position.

2.3.3 Existing Manse

2.3.3.1 The manse was constructed in the mid 19th century.

2.3.3.2 This consists of a three-storey structure with a basement built using traditional masonry construction with timber floors spanning front to back onto a spine wall structure. It is currently divided into three flats.

2.3.3.3 The roof consists of timber trusses spanning side to side, onto a central wall or beam. We did not gain access to the roof space at the time of our visit.

2.3.4 Nursery Building

2.3.4.1 The nursery building was constructed approximately 5 - 10 years after the construction of the extension, between 1884 and 1889.

2.3.4.2 This is a single storey brick building with a ground-bearing slab. Due to the presence of an existing tree at one corner of the building this slab has to be re-levelled regularly due to ground movement.

2.3.4.3 Walls are of masonry construction with a series of piers at 3.4m centres with wall panels and windows spanning between. Existing lintels over windows are timber.

2.3.4.4 The roof consists of tiles on boards spanning between purlins. These in turn span between existing steel angle trusses, which span between the piers of the main walls.

2.3.4.5 The rear wall of the nursery has an intermediate pier, which serves to stabilise the wall.

3.0 Findings

3.1 Chapel

3.1.1 The existing timber trusses had, at the time of our visit, been observed to have significant dry rot at their bearing locations. The dry rot has affected both the roof and the floors and is continuing to spread. A subsequent visit to site with Wards timber specialists confirmed that the extent of the problem has increased in the years since the initial timber inspection was carried out. The problem is concentrated on the two trusses towards the rear of the chapel. It is proposed to temporarily prop these trusses at the position closest to the support where the timber is not rotten. The propping will have to extend through the high

level gallery floor and bear onto a new mass concrete foundation at the existing ground floor level.

3.1.2 There is evidence of cracking and movement throughout the chapel. One of the existing piers on the Chetwynd Road elevation of the chapel has undergone significant movement with the result that its base is no longer in contact with the structure above it. This is evidenced internally by an observed deflection in the gallery edge as well as cracking in the window above the pier.

3.1.3 There is evidence of water ingress into the church, possibly as a result of inadequate guttering and roof drainage.

3.1.4 In the front porch area of the church there is evidence of dry rot in the floors, many of which have already been replaced. It is likely that the existing timber floors throughout the chapel will have to be replaced.

3.1.5 The timber structure supporting the organ gallery is also affected by the dry rot and will have to be replaced

3.2 Extension

3.2.1 There are signs of movement and cracking throughout the existing masonry walls in the extension.

3.2.2 In the existing large recreation space there are some signs of dampness on the walls. According to the caretaker this is due to overflowing drains. There is also evidence of movement on the back elevation of the extension with symmetrical cracking on this wall around the windows.

3.3 Manse

3.3.1 The house adjacent to the existing manse was demolished some time ago. As a result the existing sidewall of the manse has separated from the existing floors and has "bellied out" to a small extent. It will be necessary to tie this wall into the existing floor plates of the house.

3.3.2 There is severe cracking throughout the building, in particular on the rear façade of the manse, as well as internally on the walls adjacent to the staircase. It is thought that this cracking is due to subsidence due to a combination of tree roots and an inadequate depth of foundation in soil with a relatively high plasticity index.

3.3.3 At the time of our visit there was no visible signs of dampness in the upper floors of the property, with the exception of localised dampness under the existing bathroom floor, due to inadequate sealing of the

shower. From the extent of this dampness there is a likelihood that the joists supporting the floor may be rotten and may need to be replaced. This should be inspected to determine if rot has set in.

3.3.4 There was evidence of existing dampness in the basement, where the sidewall is partially retaining. This section of wall will need to be tanked to prevent future water ingress.

3.3.5 In the basement there was also evidence of dry rot in the architraves of the doors. The extent of this will have to be determined to ensure it has not spread to the joists of the ground floor level.

3.3.6 The front porch and stub garden retaining wall are exhibiting signs of significant movement. The porch will have to be rebuilt, as will the existing masonry retaining wall. It is likely that a reinforced masonry retaining wall with more embedment will be an appropriate replacement for the existing wall.

3.3.7 As stated previously there was no access to the roof during our visit so its condition is unknown.

3.4 Nursery

3.4.1 As mentioned previously the existing floor of the nursery consists of a ground bearing slab which has had to be levelled a number of times in the past due to ground movements as a result of the close proximity of the tree.

3.4.2 The existing roof is not currently insulated but looks to be in a dry condition, with no obvious signs of rotten timbers.

3.4.3 In the nursery the existing steel angle trusses will have to be tested to ascertain the grade and yield strength of the steel with a view to determining their capacity for additional loading if required in the refurbishment works.

3.4.4 The existing lintels over the windows are of timber and although there are no obvious signs of decay, it is likely that these would need to be replaced as part of any refurbishment works.

3.4.5 The back wall of the nursery, adjacent to the children's play area is currently earth retaining although there were no observable signs of dampness or water ingress inside the wall.

4.0 Discussion

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4.1 The predominant problem on this site is subsidence. This has contributed to a significant number of the structural problems throughout the various structures on the site.

4.2 The cracking in the brickwork throughout the site will have to be repaired. However prior to this work being carried out, the cause of the movement will have to be treated. Trees can cause changes of moisture levels in clay which in turn can cause the ground to shrink or heave. This has caused much of the damage to the buildings on the site.

4.3 The removal of trees can cause the ground to heave very gradually as water moisture levels equilibrate; therefore it is not appropriate to remove the trees on site. The site investigation recommends that any spread footings should be greater than 4m in depth to be beyond the zone of influence of moisture movement on the site. Excavating to this depth is not practical and requires extensive shoring. Piled foundations are therefore considered more appropriate for the site

4.4 In order to minimise the risk of future movement the foundations to all of the existing structures on site will need to be underpinned. Given the depth of the zone of influence of moisture movement on the site piled underpinning is likely to be the most appropriate solution.

4.5 The timber trusses of the chapel roof affected by rot at their bearing-ends will have to be propped through the gallery onto new foundations cast on the existing ground.

4.6 The existing surface water drainage system and guttering will have to be updated and improved to prevent water ingress into the church area.

4.7 In addition to the structural items mentioned above, the existing render is in need of repair at various points around the building.

4.8 In the case of the existing manse, the sidewall should be tied back to the floors and to the roof. New steel tie straps should be cast into concrete padstones and fixed to the existing joists.

4.9 At this stage the alterations to the chapel have not been finalised - however it is likely that the existing roof will be removed as part of any new development of the site therefore the temporary propping of the timber roof trusses is sufficient to ensure the roof stability in the short term.

5.0 Conclusions

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5.1 The foundations of all the structures to be retained on the site require underpinning to ensure against future movement due to subsidence. The depth require for spread footings for the buildings on site mean that piling is the most economic and appropriate solution. New structures should be founded on piles and existing structures should be supported on piled underpinning.

5.2 After the underpinning has been carried out, the existing cracking and damage to the brickwork throughout the site will be repaired.

5.3 In general, walls and floors will be tied in where necessary using steel tie straps and concrete padstones.

5.4 A temporary structure will need to be erected to prop the timber trusses affected by rot in the chapel roof. Propping forces and a possible connection detail are presented in Appendix A of this report. In the event of failure of the roof truss bearings, the temporary structure will support the roof until the new works commence.