



## 47 Woodland Gardens N10 3UE : Underpinning Method Statement

### 1. References

- 1.1. Suggested Basement Structural Method Statement for 47 Woodland Gardens submitted with Application for Planning ref M20078/LS dated May 2020 by MiNT Structures.
- 1.2. Structural Design of Modifications for 47 Woodland Gardens by AMA Consulting Engineers, drawings ref. 21069: S100 P5, S200 P2, S201 P3, S202 P1, S500 P1.
- 1.3. Geotechnical Ground Investigation and Basement Impact Assessment report for 47 Woodland Gardens by Jomas Associates Ltd, ref P3963J2460/JLW dated 25/1/22.

### 2. Preliminaries: recommendations in Ref 1.3:

- 2.1. Vertical deepening 0.8m: to be addressed by Engineering Designers for permanent works.
- 2.2. Site subsoil: generally London Clay. Brown/dark grey to black sandy clay considered to be made ground to 3.8m depth overlying London Clay. Possible perched water table in made ground: to be noted and taken into account in permanent works design by Engineering Designers, and by temporary works design.
- 2.3. Slope stability assessment for project not considered necessary: to be noted.
- 2.4. Heave protection is recommended in a/c with NHBC 4.2 (building near trees): to be noted by Engineering Designers for permanent works.
- 2.5. Allowable bearing capacity 90kPa: to be noted and taken into account in permanent works design by Engineering Designers, and by temporary works design.
- 2.6. Temporary support to excavations needed: to be noted for temporary works design.
- 2.7. Concrete class required DS-3: to be noted and taken into account in permanent works design by Engineering Designers.

### 3. Method Statement for construction of Underpinning

#### General

- 3.1. *Requirements of Engineering Designers (ref 2 drg S500 P1).*  
Work to be carried out in accordance with the engineer's drawings and to the approval of the architect and the building control officer.
- 3.2. Method of working proposed by the contractor to be submitted to the architect and copied to the engineer and agreed in writing a minimum of 14 days before work is to be commenced on site.
- 3.3. Contractor shall be responsible for the safety of the underpinned structure and provide all necessary shoring, strutting and bracing to ensure its safety and stability at all times.
- 3.4. Contractor to submit a method statement sequencing the works and the proposed locations of the underpins, their lengths, locations of bracing/propping and the calculations to accompany them. The method statement along with calculations and drawings are to be submitted to AMA Consulting Engineers and the architect 14 days before work is to be commenced on site. Under no circumstances will any excavation work commence prior to the structural engineer commenting on the contractor's temporary works proposals.
- 3.5. The contractor is to carry out a survey of the property and adjacent area to establish the location of obstructions such as service runs or drains. Any obstruction found is to be

brought to the attention of the architect/engineer. The contractor is to allow for any temporary support to the services or obstructions during the underpinning.

### **Sequencing**

- 3.6. The underpinning is to be undertaken in short sections not to exceed 1000mm length. The underpinning is to be undertaken on a 'hit and miss' sequence in the order shown on drawing S500. The contractor may propose alternative sequences for consideration by the engineer. The contractor is to submit a plan clearly numbering all the pins, their lengths and the proposed sequencing. A programme of the works in line with the numbering sequence is to be submitted.
- 3.7. No adjacent pin is to be excavated until a minimum of 48 hours after the adjacent pin has been cast and packed up.

### **Preparation & Excavation**

- 3.8. Excavation is to take place only to the pin under construction. Under no circumstances are adjacent pins to be opened.
- 3.9. During excavations ensure vertical faces are shoreward at all times using 18mm plywood, timber waling pieces and horizontal strutting. The exposed face of the excavation should be lined with 'Hardie Backer 500' cement board trench sheeting or similar permanent sacrificial shuttering with de-bonding membrane installed to the inside face of trench sheets prior to concreting.
- 3.10. Reinforcement should be placed in position to prepare for casting the underpinning base. Starter bars as shown on drawings S200 and S201 should be provided to enable the connection between the base of the vertical stem to be formed.
- 3.11. The excavations are to be kept dry at all times and the bottom is to be bottomed out immediately before concrete is placed.
- 3.12. The appointed building control officer is to inspect and pass the excavated surfaces and reinforcement prior to concreting the bay section.

### **Placing concrete**

- 3.13. Concrete base and kicker sections are to be poured to the structural engineer's details. Use vibrating pokers to ensure full compaction of concrete and removal of trapped air pockets within forms.
- 3.14. Once the base has cured sufficiently (minimum 24 hours after casting) place reinforcement to the vertical stem including horizontal downlink bars to neighbouring pins in accordance with the engineer's drawings.
- 3.15. Install formwork for the vertical stem and secure in place with adjustable props and timbers supported off the central Earth mass to retain the concrete during pouring.
- 3.16. The concrete for the underpinning section is to be poured continuously to 75mm below the soffit of the existing footing. The concrete is to be fully compacted using a mechanical vibrator.
- 3.17. The top 75mm of the pin is to be filled to the full depth and width of the void with a well-rammed 1 to 3 cement and sharp sand mix. The filling of this void is to be undertaken a minimum of 24 hours after the concrete has been poured.
- 3.18. Adjacent pins are to be keyed together using M16 600mm long dowel bars @ 400mm centres to match the reinforcement specified on the drawings. All pins are to have hydrophilic strips provided at the construction joints.
- 3.19. Formwork is to be struck a minimum of 7 days after pouring vertical stem.
- 3.20. Underpinning is to continue according to the sequence specified in drawing S500.
- 3.21. The sides of the completed pin are to be thoroughly cleaned and scabbled to the satisfaction of the engineer. The soffit of the existing footings is to be levelled off and

cleaned of all loose or detrimental material. No projecting partitions of the existing footings are to be trimmed except as shown on the drawings or directed by the engineer.

### **Temporary propping**

- 3.22. Following completion of all underpinning the central soil mass can be excavated in stages to allow installation of high-level lateral 'Mabey Mass 50' or similar engineer approved props in accordance with the propping plan. The remaining central soil mass can now be removed and the 2nd row of lateral props can be installed to restrain the lower 3rd of the pins. Rows of horizontal props/shoring will be required to all full-height underpins spanning across the basement or raking to suitable propping positions or thrust blocks. Props should remain in place until the basement and any ground floor slabs have been fully constructed and have sufficiently cured providing permanent lateral restraint to the new RC retaining walls.
- 3.23. Excavations should continue for the reinforced concrete basement slab. The base of the excavation should be compacted to the structural engineers specification and reinforcing bars placed in accordance with the engineer's drawings. The basement slab should be cast to the structural engineer's details using vibrating poker to ensure full coverage of concrete and removal of trapped air pockets.
- 3.24. Propping may be removed a minimum of 14 days after casting of the basement slab.

### **Monitoring of structure**

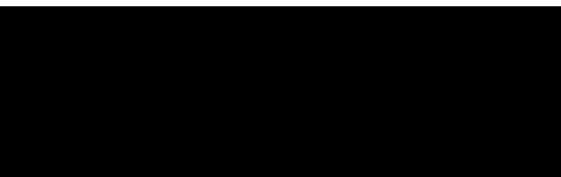
- 3.25. The number and positioning of items of levelling equipment will likely be required to change during construction. This should be agreed between the contractor and monitoring specialist as work progresses. It should be ensured that throughout construction all required monitoring can be accomplished with ease. Levelling equipment and target should be protected against damage and clearly marked on site. Any monitoring equipment damage during site works should be reported to the monitoring specialist and replaced immediately.
- 3.26. The use of temporary propping as described above, sequencing of underpinning as described in 3.6 and 3.7 above, following the provisions set out in ref 1.3, and following the monitoring provisions described in this section enable the predicted level of cracking which may appear in the building and adjoining buildings during the works to be restricted to Level 1 on the Burland Scale. The description of Level 1 is "Fine cracks which are easily treated during normal decoration. Damage generally restricted to internal wall finishes. Close inspection may reveal some cracks in external brickworks or masonry. Typical crack widths up to 1mm."
- 3.27. Precise locations for levelling targets should be prescribed by the monitoring specialist. A minimum of 8 to 12 target locations should be installed around the whole site to provide Northings, Eastings and level measurements to an accuracy of +/- 0.3mm. Survey targets are to be securely fixed to the party wall at 1m above the existing floor level. Install targets in at least the following locations: at the junction of the front wall/party walls, the rear wall/party walls and at approximately 2m centres between the front and rear walls as indicated on the drawing.
- 3.28. Install at least one control/benchmark target as indicated on the drawing.
- 3.29. Prior to commencement of construction, monitoring reading should be carried out once to establish a set of control values. As soon as basement construction commences, monitoring should be carried out and readings taken following the curing of each of the first 5 pins board. If levels of observes settlement are within acceptable limits following the first 5 pins, monitoring frequency can be reduced to taking readings

following the casting of every other pin. Following completion of all works, monitoring should be taken twice more as a minimum.

- 3.30. The relative position and level of the targets should be checked weekly during excavation and construction of the basement. The results should be logged and plotted to an exaggerated vertical scale to highlight evidence of any movement.
- 3.31. The logs should include trigger levels:  
 Green limits  $\pm 2.5\text{mm}$ : activities may proceed  
 Amber limit  $\pm 5\text{ mm}$ : increase the monitoring frequency (minimum twice weekly), review the structural scheme and start implementing contingency measures if trends indicate the red trigger level may shortly be reached (e.g. If recorded values are greater than 80% of maximum projected settlement).  
 Red limit  $\pm 8\text{mm}$ : implement measures to secure the site, cease movements and stop all construction works (recorded values are at or above tolerable levels, exceeding serviceability limit states).
- 3.32. The weekly logs should be assessed and interpreted by the monitoring surveyors and issued weekly to the party wall surveyors.
- 3.33. Where maximum movement recorded exceeding amber/red trigger values these should immediately be reported to the design team along with a description of all recent on-site activities. A review of the results should be undertaken and readings re-checked to confirm their accuracy. The design team should not assess the movement focusing solely on the affected areas but also review the site as a whole, checking for non-proximate contributory factors. Appropriate repair specifications and reviews of working practices should be specified and implemented to minimise risk of progressive settlement.

#### **Dewatering during construction**

- 3.34. if, during any excavation work, significant ground water ingress is found a local sump one cubic metre in volume should be provided formed at a level below the base of the excavation being worked on.
- 3.35. The vertical faces of the sump chamber should be supported with a pre-made shutter positioned in the area excavated for the sump. The sump shutter should be constructed from 18mm thick plywood sheets with drilled vertical faces to provide a porous surface allowing ground water to flow through.
- 3.36. Ground water will now flow into the excavated sump and is to be extracted using a suitable dewatering pump and appropriate diameter discharge hose. Discharge from the sump should be directed to the nearest manhole and a drain filter should be fitted to avoid any large debris being deposited into the sewer.
- 3.37. After completion of the excavation of preparation for the concrete pour has been carried out ensure the sump area is fully dewatering before removing the pump and pouring concrete into the sump.
- 3.38. The process should then be repeated for each excavation where groundwater is found.



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