



Specification for Piling

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Havant 32 New Lane

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Prepared for:

Havant Property Investment LLP

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1 PREAMBLES

This Specification shall be read in conjunction with all other Contract documents, which include Drawings and Standard Forms of Tender. Should any queries arise in respect of this Specification, they shall be referred to the Engineer.

All references to the "Main Contractor" in this specification shall mean the contractor employed by the client to take overall responsibility for the building works.

All references to the "Architect" in this Specification shall mean the leader of the professional team who is responsible to the Client under the terms of the contract.

All references to the "Engineer" in this Specification shall mean Pinnacle Consulting Engineers Limited or their representatives.

1.1 Description of the Works

The scheme consists of the construction of a warehouse with an adjacent multi-story van park (MSVP). The warehouse will be founded with shallow foundations, whereas the MSVP will be piled due to the large expected structural loads. The piling contractor shall be in receipt of the site investigation (SI) and all relevant architects and engineer's drawings to fully understand the site, the ground conditions and the constraints.

2 SCOPE OF THE WORKS

The Piling Contractor will be expected to act as a Sub Contractor to the Main Contractor and will be responsible for the design, supply, delivery and installation of the piles as shown on the Contract drawings in accordance with his requirements.

2.1 Design

The pile design and construction shall be in accordance with SPERW, clause B1.4 Option 2 (Specialist Contractor Design) based on performance requirements and other information provided by the Engineer.

The Piling Contractor shall confirm acceptance of the site investigation as adequate or propose further investigation as considered necessary.

Pile design to be in accordance with BS EN 1997-1 for a design life of 50 years.

The serviceability limit state will be reached when the settlement of any part of the structure is 20mm, or when the differential settlement between adjacent columns is 10mm.

All piles shall be designed for a minimum lateral load of 5% of their total vertical design load ($G_k + Q_k$) applied to the top of each pile.

3 TECHNICAL SPECIFICATION

3.1 Project Specification

Comply with the latest edition of the ICE Specification for Piling and Embedded Retaining Walls (SPERW), along with the additions and amendments listed in Clause 4.2 below and the Particular Specification given in Section 5.

3.1.1 Compliance with the Specification

Should the Piling Contractor wish to deviate from the Specification in any way, he shall agree such deviations with the Engineer in writing.

3.2 Additions and Amendments to the SPERW

3.2.1 Existing Services

Prior to commencing on site, the Contractor shall make enquiries from all available Local Authorities and Statutory Authorities, etc, concerning the position and depth of existing service pipes, cables and other underground constructions which are likely to affect the works. The Piling Contractor shall also check with the Local Authorities and Boards whether it will be necessary to provide any special sequences or restrictions of working conditions in connection with these services. Any known will be advised below but these will not necessarily be a complete analysis.

3.2.2 Site Inspection

The Piling Contractor will be deemed to have visited and inspected the site and all surrounding structures, etc, prior to preparing his Tender.

He will be deemed to have made himself thoroughly acquainted with all details of the site, surrounding buildings, structures, roads, services, etc, and other structures, road surfaces, pavings, etc, in the area that may be affected by the piling operations.

3.2.3 Avoidance of Damage/Nuisance

The Piling Contractor shall carry out the work in such a manner that none of the buildings or structures, including their foundations, cladding, finishes, etc, or road surfaces, pavings, services, etc, in the vicinity of the piling works are disturbed or damaged in any way or their occupants unreasonably disturbed or affected.

3.2.4 Site Investigation

Copies of any available Site Investigation Data, Reports and relevant layout drawings are attached with the tender documents.

The subsoil conditions shown relate only to the exact locations in which the boreholes and trial pits were carried out, and may not be totally representative of the site. Variations in the subsoil, ground water conditions, etc, may vary at other locations on the site.

The Piling Contractor will be deemed to have studied the available documents before preparing his tender, and his tender shall allow for carrying out the work in the conditions described in these

documents, and any other variations in the ground conditions that can be expected from geological records, etc.

If the subsoil conditions prove to be different from those shown, or if such conditions are suspected, the Piling Contractor shall notify the Engineer immediately.

No claims for additional costs arising from varied soil conditions will be allowed for work carried out prior to notifying the Engineer on any such variation in the subsoil conditions.

3.2.5 Attendances, Etc

All requirements of the Piling Contractor in respect of access, hardstandings, etc, or any attendances, etc, shall be subject to subsequent agreement with the Main Contractor.

3.2.6 Piling Level

Prior to commencement of piling, the Piling Contractor shall agree the piling level, which may not necessarily be the level of the site existing at the time of tender.

The piling working platform (piling mat) shall be designed by the Principal Contractor's temporary works designer based upon the ground conditions and the plant being proposed for the works considering the relevant temporary loading imposed by this equipment. The top level of this mat shall be determined and agreed between the PC and the specialist piling contractor.

3.2.7 Noise and Vibration

The Subcontractor is to allow for and ensure that all measures to control the noise levels produced by his operations on site required under or by virtue of any enactment or regulations, or by the working rules of any industry, or by planning conditions are strictly complied with.

The Subcontractor shall indemnify the Contractor against any claim or proceeding in respect of noise made on the Works. Allow for all costs arising from the stoppage or reprogramming of the Works because of noise.

The Subcontractor's attention is drawn in particular to the Noise Abatement Act, 1960, and the Environmental Protection Act 1990, etc, and all amendments thereto.

Guidance on measure which can be taken to control noise levels is given in BS 5228 (2014) "Code of Practice for noise and vibration control on construction and open sites". Specifically the Subcontractor shall arrange in respect of all work done under this contract:-

- That all compressors used on the site are silenced either by using only fully silenced models, fitted with effective exhaust silencers and properly lined and sealed acoustic covers, all to the designs of the manufacturers of the compressors.
- That ancillary pneumatic percussive tools and other machinery used on the site are fitted with silencers of a type recommended by the manufacturers thereof.
- That every such compressor, silencer or other contrivance is maintained in good and efficient working order and shall not have been altered in such a way that the noise caused in operation is made greater by the alteration.

If any action is taken to restrain the Subcontractor from causing a nuisance by making noise, he is to be responsible for taking immediate steps to reduce such noise to the absolute minimum.

The type of pile and method of installation is to be such that any vibration, shock, etc, caused does not damage any surrounding structures, services, etc, or cause any legally actionable disturbance.

All methods of working, costs, etc, necessary to avoid any nuisance, damage, etc, from noise, dust vibration, etc, are deemed to have been included in the tender.

4 PARTICULAR SPECIFICATION

4.1 Materials

4.1.1 Materials - General

All materials shall be in accordance with SPERW section B21.

4.2 Workmanship

4.2.1 Pile Handling and Driving

Shall be in accordance with SPERW section A4.3.

4.2.2 Setting Out

Prior to commencement of the piling works the Main Contractor shall set out the main grid lines, provide an agreed datum level, and afford facilities for the Piling Subcontractor to set out individual pile positions from such grid lines and datums. It shall be the responsibility of the Piling Subcontractor to set out the position of each pile from the grid lines set out by the Main Contractor.

All piles are to be accurately positioned in accordance with the Engineers' setting out drawings, and within the allowable tolerances in SPERW clause B1.8 and table B1.4.

The Main Contractor shall check and agree in writing, as piling proceeds the accuracy of the setting out of all piles, in relation to the main grid lines.

The Main Contractor shall inform the Engineer of any piles that have been constructed outside the allowable tolerances, and no subsequent work shall be carried out until further instructions have been received from the Engineer.

4.2.3 Obstructions

In the event of unnatural obstructions, such as old foundations, walls, basements, etc, below ground level being encountered during piling operations which render further progress on that pile impractical by the method employed, the Subcontractor shall immediately inform the Engineer and Main Contractor.

5 PILE TESTING

Pile testing shall be carried out in alignment with the recommendations of the Federation of Piling Specialists (FPS) Handbook on Pile Load Testing.

For this project the site has been characterised as MEDIUM risk level.

Characteristics of the piling works	Risk Level	Pile testing strategy
Complex or unknown ground conditions. No previous pile test data. New piling technique or very limited relevant experience.	High	Both preliminary and working pile tests essential. 1 preliminary pile test per 250 piles. 1 working pile test per 100 piles.
Consistent ground conditions. No previous pile test data. Limited experience of piling in similar ground.	Medium	Pile tests essential. Either preliminary and/or working pile tests can be used. 1 preliminary pile test per 500 piles. 1 working pile test per 100 piles.
Consistent ground conditions. Previous pile test data is available. Extensive experience of piling in similar ground.	Low	Pile tests not essential. If using pile tests either preliminary and/or working tests can be used. 1 preliminary pile test per 500 piles. 1 working pile test per 100 piles.

Table 3.1 from SPERW

All cast insitu piles shall be integrity tested.

For rapid loading and dynamic pile tests it may be necessary to increase the applied loads to the pile in order to overcome the ground damping effects. Calibration with static load tests is preferable, depending on the prevailing ground conditions.

For preliminary pile tests it is preferable to place the test pile(s) close to a borehole so that the test results can be reliably evaluated.

Where the ground conditions are reasonably uniform over the site area, working test piles should be located in positions that will give the best possible coverage of the area to be piled.

Where ground conditions vary across the site, the number of test piles may have to be increased in order to check the pile characteristics in different areas of the site.

Test pile locations shall be chosen to ensure that there is sufficient space available for the reaction system to be installed without interference with other piles on the site. Consideration should also be given to the location of test piles in relation to the work in progress on the site while the tests are being carried out. Vibrations from other works can interfere with the test pile results and must be avoided so as not to invalidate the results.

For projects with a very large number of piles, say over 1000, the number of test piles may be reduced below that recommended in SPERW Table 3.1, subject to agreement with the Engineer, once the pile designer can demonstrate confidence in the ground conditions and the pile construction method.

Acceptance criteria

Design verification load (DVL) shall be taken as $G_k + Q_k$ (permanent + variable loads) subject to agreement with the Engineer. Generally, pile tests should be carried out for the maximum load to be supported.

For piles less than 1000mm diameter, the maximum settlement permitted at the head of an individual pile during load testing at DVL should be 10mm plus the calculated elastic shortening of the pile shaft, and 20mm at $1.5 \times \text{DVL}$.

For test piles greater than 1000mm diameter a value in excess of 10mm may be appropriate subject to agreement with the Engineer.

If the measured pile settlement exceeds the permitted value then the pile designer and the piling contractor should investigate the causes and undertake appropriate remedial action.

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