



## Certification Performance Criteria Guidance

### B4.2 Substructure (including ground floor slab but excluding piling)

#### Performance criteria

Certifiers must satisfy themselves that adequate details for the foundations (and/or pile caps) have been prepared and that sufficient design calculations, which take account of the overall loadings and the findings of the ground investigation report, have been undertaken to demonstrate the adequacy of the design.

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#### Background

Standard 1.1 requires that, taking into account the nature of the ground, the building must not collapse nor be subject to deformations which would make the building unfit for its intended use, unsafe, or cause damage to other parts of the building or to fittings or installed equipment. In addition Standard 1.1 also requires that the building must be designed such that, taking into account the nature of the ground, there will be no impairment of the stability of any part of another building. Foundations must be designed to ensure that this standard will be met.

Standards 3.1 and 3.2 require that buildings are designed in such a way that there will not be a threat to the building or the health of people in or around the building due to the presence of harmful or dangerous substances, including radon gas. Although the Certifier is not required to certify that the design complies with these standards the design of the foundations, including ground floor slab, can be affected by measures taken to meet the standards and therefore Certifiers should satisfy themselves that there has been sufficient communication between members of the design team such that the Standards 3.1 and 3.2 will be met.

This sub-section should be taken to include pile caps and ground floor slab.

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#### Guidance

BS 8004:1996 Code of Practice for foundations was withdrawn in March 2010 and although it is still listed as an Approved Document within Appendix 1 of the Technical Handbook, care should be exercised when using withdrawn standards.

Eurocode 7 – BS EN 1997-1:2004 and National Annex EN1997-1 provide guidance on the geotechnical aspects of the design of buildings including foundations.

Further guidance can be found in the Manual for the geotechnical design of structures to Eurocode 7 published by the Institution of Structural Engineers May 2013.

The BSD publication ‘Procedural Guidance on Certification including information to be submitted with a Building Warrant Application’ April 2010 version 2 (sometimes referred to as the Blue Book) provides a checklist of details and drawings which should form part of the warrant application.

Certifiers must see that calculations for the design of the foundations have been prepared in accordance with an accepted methodology, have been checked by a suitably experienced person and that the design output has been properly reflected in the warrant application drawings.

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### Examples of Major Non-conformances

The design of the substructure clearly fails to meet the requirements of Standard 1.1.

Absence of suitably checked structural calculations and/or details for any primary element of substructure, except for precast foundations systems for RC1 buildings which were included on Schedule 1.

Calculations and/or details are grossly inadequate in relation to the size/complexity of the project.

Failure to document why there are discrepancies between the recommendations in the ground investigation report for the design of the foundations and the parameters used in the design.

Absence of performance specification and details on the warrant plans, where the design of any precast foundation system was included on Schedule 1 (Only applies to RC1 buildings)

Absence of calculations, etc. to justify the preliminary design shown on the warrant plans, where the design of any precast foundation system was included on Schedule 1 (Only applies to RC1 buildings)

Absence of evidence demonstrating that the certifier made adequate enquiry regarding the design of any precast foundation system and/or the experience of those undertaking the design where this was prepared by an external specialist/third party.

Absence of evidence to demonstrate that adequate enquiry and checks of a third party’s design for any precast foundation system had been carried out before an interim or final Form Q was signed. (Only applies to RC1 buildings)

Absence of evidence to show that there has been adequate enquiry to establish the provisions required to meet Standards 3.1 and 3.2.

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### Examples of Improvement Issues

Deficiencies in the building warrant plans e.g. failure to identify foundation locations, dimensions, changes of level, material specification and typical reinforcement details.

Absence of a note on warrant plans recording anticipated ground conditions and required bearing pressure.

Inadequate or insufficient calculations.

Inadequate performance specification and details on the warrant plans, where the design of any precast foundation system was included on Schedule 1. (Only applies to RC1 buildings)

Inadequate calculations, etc. to justify the preliminary design shown on the warrant plans, where the design of any precast foundation system was included on Schedule 1. (Only applies to RC1 buildings)

Inconsistencies between the design finalised by external specialist/third party and the performance specification submitted as a part of the warrant application, where an interim or final Form Q was submitted in respect of the design of any precast foundation system that was included on Schedule 1. (Only applies to RC1 buildings)

Insufficient evidence to show that there has been adequate enquiry to establish the provisions required to meet Standards 3.1 and 3.2.

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