
(Final 1 October 2014)
Foreword

The Housing Consumer Protection Measures Act of 1998 (Act No. 95 of 1998) requires:

1) the Minister to prescribe Technical Requirements relating to the warranty scheme; and

2) the National Home Builders Registration Council to publish a Home Building Manual which contains the Technical Requirements prescribed by the Minister and guidelines established by the NHBRC to satisfy such requirements.

The Home Building Manual was published by the National Home Builders Registration Council under Board Notice …. In Government Gazette No. of …………

This Guide:

- contextualises the Home Building Manual within the wider South African housing landscape and provides an overview of legislation which impacts upon housing;
- describes the roles and responsibilities of the different role players assigned in terms of the primary pieces of legislation governing the design and construction of homes, namely the National Building Regulations and Building Standards Act of 1977 (Act No. 103 of 1977), the Housing Consumer Protection Measures Act of 1998 (Act No. 95 of 1998) and the Occupational Health and Safety Act of 1993 (Act No. 85 of 1993);
- provides an overview of the requirements of the Home Building Manual and illustrates how the compliance methods may be applied in order to satisfy the NHBRC’s Technical Requirements for a basic house;
- highlights the differences and commonalities between the satisfying of National Building Regulations and the NHBRC technical requirements for homes;
- identifies and discusses extraordinary development conditions which necessitate regional adjustments to single storey homes having concrete foundations and floors, masonry walls and timber roof trusses; and
- provides a comprehensive overview of the warranty scheme.

Although this Guide has been drafted primarily for housing consumers and home builders, it nevertheless provides valuable insights into various aspects of housing and will accordingly be of interest to a wider audience.

This Guide is not meant to be a substitute for a detailed examination of the documents to which it refers.

1 The South African housing landscape ................................................................. 1-1
  1.1 Introduction 1-1
  1.2 The legislative landscape for housing 1-2
  1.3 Planning and design of housing developments 1-4
  1.4 The organisational landscape for housing 1-5
    1.4.1 National and provincial departments, local authorities and public entities 1-5
    1.4.2 Professional councils 1-9
    1.4.3 Professional bodies and trade associations 1-11
2 The design and construction of homes .............................................................. 2-1
  2.1 Introduction 2-1
  2.2 Applying the National Building Regulations 2-1
    2.2.1 Performance framework 2-1
    2.2.2 Appointment of competent persons 2-6
  2.2.3 Broad content of NBRs and the building approval process 2-12
  2.3 Complying with the provisions of the Home Building Manual 2-18
    2.3.1 Structure of the Home Building Manual 2-18
    2.3.2 Performance framework 2-20
    2.3.3 Plans 2-25
    2.3.4 Appointment of certification bodies and listed competent persons 2-26
    2.3.5 Enrolment process 2-28
3 The NHBRC warranty scheme ............................................................................. 3-1
  3.1 Introduction 3-1
  3.2 The warranty to rectify defects 3-1
  3.3 Amounts payable from the fund 3-3
  3.4 Home builder’s obligations 3-3
  3.5 Housing consumer’s obligations 3-5
    3.5.1 General obligations 3-5
    3.5.2 Specific obligations relating to formal complaints submitted to the NHBRC for resolution 3-6
  3.6 The NHBRC’s obligations 3-6
4 Satisfying the NHBRC Technical Requirements by means of compliance methods .... 4-1
  4.1 Introduction 4-1
  4.2 Structural strength and serviceability 4-1
    4.2.1 Foundations 4-1
    4.2.2 Floors (surface beds) 4-5
    4.2.3 Walls 4-6
    4.2.4 Glazing 4-9
    4.2.5 Roofing assemblies 4-9
  4.3 Dampness and weatherproofing 4-11
  4.4 Water and drainage installation 4-11
5 Extraordinary development conditions ................................................................ 5-1
  5.1 Introduction 5-1
  5.2 Extraordinary geotechnical conditions 5-1
5.2.1 Requirements for geotechnical investigations 5-1
5.2.2 High water tables 5-2
5.2.3 Erodibility of soil 5-4
5.2.4 Hard excavation 5-5
5.2.5 Site class designations 5-5
5.2.6 Dolomite area designations 5-16
5.2.7 Topography of the site 5-20

5.3 Mining induced and natural seismic activity 5-22
5.4 Southern Cape Coastal Condensation Areas 5-24

Annexure A: Legislation which impacts upon housing

A1 Introduction A1
A2 Legislation which impacts upon the planning of housing developments A1
A3 Legislation which informs the design and construction of homes A2
A3.1 Introduction A2
A3.2 Housing Consumers Protection Measures Act No. 95 of 1998 A3
A4 Legislation which relates to the management of established housing developments A10
A5 Legislation which relate to the safety of constructed homes A11
A6 Legislation which relates to the rental and sale of homes A12
A6.1 The basic provisions of the Act A13
A6.2 The National Housing Code A14
A6.3 Norms and standards A15

Annexure B: Legislated roles and responsibilities of participants in the design and construction of a home

B1 Objective of Acts governing the design and construction of homes B1
B2 Responsibilities in terms of the National Building Regulations and Building Standards Act B1
B3 Responsibilities in terms of the Housing Consumers Protection Measures Act B4
B4 Responsibilities in terms of the Occupational Health and Safety Act B6
1 The South African housing landscape

1.1 Introduction

Buildings provide permanent shelter for its occupants or contents. A home is a type of a building comprising one or more units which provides complete, independent living facilities for one or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

Homes or dwelling units may be separated from (detached) or linked horizontally or vertically (attached) to each other as indicated in Figure 1.1.

![Figure 1.1 – Detached and attached homes](image)

Homes are foundational to the well-being of any society. It is therefore not surprising that the Section 26(1) of Bill of Rights, which is embedded in the Constitution of the Republic of South Africa, states that “Everyone has the right to have access to adequate housing.”

Homes need to be supported by services which depending upon the location, type and income levels of its inhabitants, may include:

- systems conveying water, gas, electricity or waste; and
- mechanical or electrical systems which use energy to provide air conditioning (hot or cold air), mechanical ventilation, hot water supply, artificial lighting and vertical transport.

As a minimum, each home requires access to potable water and adequate sanitation. In rural areas, water may be provided from boreholes and sanitation facilities may be in the form of Ventilated Improved Pit (VIP) toilets or disposal systems which include septic tanks. In towns and cities, local government is tasked to provide the following infrastructure in support of housing within their areas of jurisdiction (see Figure 1.2):

- electricity and gas reticulations;
- roads;
- stormwater management systems;
- potable water supply systems; and
- domestic waste-water and sewage disposal systems.
1.2 The legislative landscape for housing

Section 24 of the Bill of Rights embedded in the Constitution of the Republic of South Africa (Act No. 108 of 1996) states that:

Everyone has the right:

a) to an environment that is not harmful to their health or well-being; and

b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:

i) prevent pollution and ecological degradation;

ii) promote conservation; and

iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

The preamble to the National Housing Act of 1997 (Act No. 107 of 1997) states that parliament “recognises that

- housing as adequate shelter, fulfils a basic human need;
- housing is both a product and a process;
- housing is a product of human endeavour and enterprise;
- housing is a vital part of integrated developmental planning;
- housing is a key sector of the national economy;
- housing is vital to the socio-economic well-being of the nation...."
It is therefore not surprising that there are several pieces of legislation which regulate various aspects of housing developments as indicated in Table 1.1 and described in Annexure A. Such legislation regulates the:

- planning of housing developments;
- design and construction of homes;
- management of established housing developments;
- aspects of safety in constructed homes; and
- the rental and sale of homes.

**Table 1.1: Acts which impact upon housing**

<table>
<thead>
<tr>
<th>Regulated aspect of housing</th>
<th>Acts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Geoscience Act of 1993 (Act No. 100 of 1993)</td>
</tr>
<tr>
<td></td>
<td>National Heritage Resources Act of 1999 (Act No. 25 of 1999)</td>
</tr>
<tr>
<td></td>
<td>National Environmental Management: Protected Areas Act of 2003</td>
</tr>
<tr>
<td></td>
<td>National Environmental Management: Biodiversity Act of 2004 (Act No. 10 of 2004)</td>
</tr>
<tr>
<td></td>
<td>Spatial Planning and Land Use Management Act of 2013 (Act No. 16 of 2013)</td>
</tr>
<tr>
<td></td>
<td>Housing Consumers Protection Measure Act of 1998 (Act No. 95 of 1998)</td>
</tr>
<tr>
<td></td>
<td>Consumer Protection Act of 2008 (Act No. 68 of 2008)</td>
</tr>
<tr>
<td></td>
<td>National Regulator for Compulsory Specifications Act of 2008 (Act No. 5 of 2008)</td>
</tr>
<tr>
<td>Management of established housing developments</td>
<td>Sectional Titles Act of 1986 (Act No. 95 of 1986)</td>
</tr>
<tr>
<td></td>
<td>• Pressure Equipment Regulations of 2009</td>
</tr>
<tr>
<td></td>
<td>• Electrical Installation Regulations of 2011</td>
</tr>
<tr>
<td></td>
<td>• Electrical Machinery Regulations of 2011</td>
</tr>
<tr>
<td></td>
<td>• Construction Regulations 2004</td>
</tr>
<tr>
<td></td>
<td>National Building Regulations and Building Standards Act of 1977 (Act No. 103 of 1977)</td>
</tr>
<tr>
<td></td>
<td>• National Building Regulations</td>
</tr>
<tr>
<td>Legislation which relates to the rental and sale of homes</td>
<td>Rental Housing Act of 1999 (Act No. 50 of 1999)</td>
</tr>
</tbody>
</table>
The three primary pieces of legislation governing the design and construction of homes are:


2) Housing Consumers Protection Measure Act of 1998 (Act No. 95 of 1998)


The roles and responsibilities of the participants in these pieces of legislation are identified in Annexure B. In essence:

1) the owner (person in whose name the land on which a building was or is erected is registered in the deeds office) is responsible for ensuring compliance with the requirements of the National Building Regulations and Building Standards Act of 1977;

2) the home builder is responsible for compliance with the NHBRC Technical Requirements established in terms of the Housing Consumers Protection Measure Act of 1998; and

3) the client (any person for whom construction work is being performed) and the contractor are responsible for ensuring compliance with the provisions of the Occupational Health and Safety Act of 1993.

1.3 Planning and design of housing developments

The Guidelines for Human Settlement Planning and Design for (Red Book), compiled by the Council for Scientific and Industrial Research (CSIR), provides performance based guidelines for informed decision making in addition to providing guidance on appropriate practices and technologies. As such it:

- provides a framework for both “human-centred” and “nature-centred” settlement-making;
- establishes spatial and structural principles for achieving well performing settlement-making;
- describes planning methods and participative processes;
- provides planning guidelines for movement networks, public transport, hard open spaces, soft open spaces, public facilities, land subdivision, public utilities and cross-cutting issues including fire safety; and
- provides guidelines for stormwater management, roads, water supply, sanitation, solid waste management and energy.

In urban areas, municipal infrastructure is required to support housing developments as indicated in Table 1.2 and Figure 1.1.

Township developments change the natural drainage characteristics of the landscape. Pervious layers are rendered less pervious or impervious by the footprints of homes, paved
areas and roads. Depressions are raised to reduce ponding. Surfaces and conduits are constructed to drain runoff more efficiently and concentrate the runoff. Natural vegetation is often removed, allowing reduced interception and transpiration. Limited vegetation cover exposes the soil to the impact of rain, which may lead to increased erosion. Natural meandering watercourses may be canalised to more effectively route flows through the development. The net result is that stormwater runoff is increased significantly and needs to be managed.

The main function of urban roads is the carrying of vehicular, cycle and pedestrian traffic. However, they also have a stormwater management function. During minor storms (1-5 year recurrence interval), the roads can form part of the stormwater management function without disrupting traffic. During major storms (50 year recurrence interval), the traffic function will be interrupted as the flood control function becomes more important.

Table 1.2: Municipal services which support township development

<table>
<thead>
<tr>
<th>Infrastructure type</th>
<th>Need</th>
<th>Description of required performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical supply system</td>
<td>Electricity purchased from bulk generators needs to be distributed to end users</td>
<td>The power supply shall be constant, stable and sufficient to satisfy the demand</td>
</tr>
<tr>
<td>Roads</td>
<td>Roads need to accommodate the safe travel of vehicles and pedestrians, and provide a means to drain storm water</td>
<td>Roads shall:\n  a) provide access to erven;\n  b) accommodate traffic; and\n  c) convey stormwater to the major stormwater system.</td>
</tr>
<tr>
<td>Stormwater management system</td>
<td>The risks associated with flood hazards, which might affect the health, welfare and safety of the public, damage property or the environment, needs to be kept within acceptable limits.</td>
<td>Stormwater from storms (which are likely to occur at different recurrence intervals) shall be controlled, safely routed and discharged from townships without unduly eroding land, unsurfaced roads or water courses, contaminating water resources or compromising environmentally sensitive areas.</td>
</tr>
<tr>
<td>Sewer mains</td>
<td>The sewer mains need to convey sewage from the waterborne sanitation system to the bulk sewer infrastructure.</td>
<td>The sewer mains shall:\n  a) withstand all the loads to which it is likely to be subjected to;\n  b) be capable of receiving sewage from the waterborne sanitation system, carrying the design hydraulic load, and discharging into the local authority’s bulk sewer infrastructure;\n  c) be watertight;\n  d) prevent rain water from entering the system; and\n  e) be easy to clean and maintain.</td>
</tr>
<tr>
<td>Water supply system</td>
<td>The water supply system needs to convey safe drinking water to a point within each erf, be compatible with the sanitation system that is provided, and serve the fire fighting needs of the community.</td>
<td>The water supply system shall:\n  a) withstand all the loads to which it is likely to be subjected;\n  b) be capable of supplying water for consumption and fire fighting purposes;\n  c) be watertight; and\n  d) be easy to operate and maintain.</td>
</tr>
</tbody>
</table>

1.4 The organisational landscape for housing

1.4.1 National and provincial departments, local authorities and public entities
Housing is in terms of the Constitution of the Republic of South Africa (Act No. 108 of 1996) both a national and provincial competence. The Department for Human Settlements determines finances, promotes, communicates and monitors the implementation of housing and sanitation programmes in South Africa. This national department has identified the following areas of priority to meet government’s objectives for sustainable human settlements and improved quality of household life:

- accelerated delivery of housing opportunities;
- access to basic services;
- more efficient land use; and
- an improved property market.

The provincial departments of human settlements are responsible for developing sustainable integrated human settlements in their respective provinces. They are as such tasked with creating human settlements that allow its residents to access social and economic opportunities close to where they live.

The Housing Consumer Protection Measures Act of 1998 (see Annexures A and B) establishes the National Home Builders Registration Council (NHBRC) as a regulator body of the home building industry. This statutory body assists and protects housing consumers who are exposed to contractors who deliver housing units of substandard design, workmanship or material. The services that the National Home Builders Registration council (NHBRC) offer are described in Table 1.3.

All buildings including homes are required in terms of the National Building Regulations and Building Standards Act of 1977 to be erected in accordance with the provisions of the National Building Regulations (NBR) (See Annexures A and B). This Act makes building control officers appointed by the local authority responsible for:

1) making the relevant recommendations for approval by the Local Authority of building plans, specifications, certificates, etc.;

2) ensuring that the requirements of the Local Authority regarding approvals are carried out; and

3) inspecting buildings under construction or completed to confirm compliance with approved plans and specifications and conditions of approval including defined usage, location on site, etc.

It should be borne in mind that the local authorities who administer these regulations have been exempted from any liability for failures of buildings or structures erected in accordance with the National Building Regulations which have been approved by a local authority. This means that owners have no recourse to these bodies in the event of failures or poor quality work.

The National Regulator for Compulsory Specifications (NRCS) is a public entity established in terms of the National Regulator for Compulsory Specifications Act of 2008 (Act No. 8 of 2008). The NRCS is responsible to the Minister of Trade and Industries for the administration of technical regulations including compulsory specifications based on standards that protect human health and safety, and the environment. The NRCS is also mandated to advise the Minister on possible amendments and changes to the National Regulations.
Building Regulations (NBR), to promote uniformity in understanding and implementation of the NBRs, provides technical advice on the application of NBRs and administers a Review Board which deals with disputes regarding the decisions of local authorities in the administration of the NBRs and the National Building Regulations and Building Standards Act of 1977 (see Annexures A and B).
### Table 1.3: Services provided by the NHBRC

<table>
<thead>
<tr>
<th>Service</th>
<th>Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home builder registration</td>
<td>Every home builder is required by law to be registered with the NHBRC. Registration allows access to funding from financial institutions, access to NHBRC home building information, training programmes and interventions by the NHBRC to maintain a healthy working relationship between the home builder and the housing consumer.</td>
</tr>
<tr>
<td>Enrolment of new homes</td>
<td>The Housing Consumers Protection Measures Act 1998 requires all new homes to be enrolled with the NHBRC 15 days prior to construction. Home enrolment insures consumers against poor building practices, particularly those relating to the structure and the roof, and permits the NHBRC to conduct building inspections at key stages of construction. Enrolment of homes is subject to a fee which is scaled according to the value of the home.</td>
</tr>
<tr>
<td>Home inspection</td>
<td>NHBRC inspections are designed to mitigate building risks for the consumer and to protect against poor workmanship during construction. Depending on the enrolment values of the home, a newly enrolled home can be subject to a minimum of four and a maximum of eight inspections. Where necessary, the NHBRC will provide dispute resolution on site between the builder and consumer. The home builder will be obligated to rectify such non-compliance within a given timeframe. If the home builder is unable or unwilling to rectify it, the NHBRC has the mandate to stop construction and undertake disciplinary action against the builder.</td>
</tr>
<tr>
<td>Complaints and conciliation</td>
<td>The complaint procedure aims to resolve disputes between housing consumers and builders by ensuring that home builders meet their obligations. The NHBRC deals with three types of complaints, namely: 1. Three month non-compliance period 2. One year roof leak period 3. Five-year major structural defects period.</td>
</tr>
<tr>
<td>Suspension of home builders</td>
<td>The NHBRC may withdraw the registration of a home builder where it has found that the builder is guilty of failing to meet obligation in terms of the Act or where the home builder has been placed under voluntary liquidation. Following an investigation and/or reasonable time to afford the builder an opportunity to affect corrective measures, the NHBRC may suspend a builder’s registration and/or the right to enrol homes. Suspended home builders are subject to the NHBRC Disciplinary Hearing Process which can result in disciplinary action or prosecution.</td>
</tr>
<tr>
<td>Advisory services</td>
<td>The NHBRC working with the Department of Human Settlements the NHBRC is able to provide advisory services on: industry developments, securing land for housing development, the design and construction of homes, environment services and engineering.</td>
</tr>
<tr>
<td>Home builder training and development</td>
<td>The NHBRC provides free technical training to emerging builders.</td>
</tr>
</tbody>
</table>

The South African Bureau of Standards (SABS) is a statutory body that was established in terms of the Standards Act of 1945 and continues to operate in terms of the Standards Act of 2008 (Act No. 8 of 2008) as the national standardisation institution in South Africa mandated to:

1) develop, promote and maintain South African national standards;

2) promote quality in connection with commodities, products and services; and

3) render conformity assessment services and assist in matters connected therewith.

SABS develops South African national standards on a consensus basis together with representatives of valid national interests such as organs of state, industry associations, consumer organizations or associations, non-governmental organizations, organized labour...
and professional and technical and trade organizations. South African National Standards are voluntary in that there is no obligation to apply them or to comply with them except where their application is demanded by regulatory instruments or contractual obligations. They are in essence tools devised for the convenience of those who wish to use them or prescribe their use in terms of legislation or contracts that are entered into.

The Board of Agrément South Africa is an independent body operating under a ministerial delegation of authority from the Minister of Public Works. The Board’s Agency (Agrément South Africa) is operated by the Council for Scientific and Industrial Research (CSIR) Building and Construction Technology Division. A bill has been prepared to establish as a statutory body.

Agrément South Africa assesses and certifies the fitness for purpose of systems, elements and components intended for use in the construction of buildings or infrastructure which fall outside of the scope of existing standards established by the SABS. Fitness for purpose in this context means the ability of a system, element or component to be consistently developed, manufactured, applied and installed such that it fulfils its intended purpose.

The product cycle for the development of new products, processes and services commences with research and development, followed by a fitness for purpose certification by an assessment body such as one which is a member of the World Federation of Technical Assessment Organisation (e.g. Agrément South Africa). Once the product and system becomes well known, national and international standards and related testing protocols can be developed to establish and confirm compliance with requirements (e.g. in accordance with the provisions of the Standards Act of 2008). Figure 1.3 illustrates the product development cycle of new products.

![Product development cycle](image)

**Figure 1.3 – The product development cycle on new products**

The Department of Labour administers the Occupational Health and Safety Act of 1993 (Act No. 85 of 1993) through inspectors in its employ who perform specific functions in terms of the Act and its associated regulations.

### 1.4.2 Professional councils

There are a number of professions that are involved in various aspects of the design and construction of housing as indicated in Table 1.4. Each of these professions are regulated by a statutory council which ensures the quality of professional services in the public interest.
Table 1.4: Work undertaken by the professions in a housing context

<table>
<thead>
<tr>
<th>Council</th>
<th>Founding Act</th>
<th>Work undertaken by the profession in a housing context</th>
</tr>
</thead>
<tbody>
<tr>
<td>South African Council for the Architectural Profession (SACAP)</td>
<td>Architectural Profession Act of 2000 (Act No. 44 of 2000)</td>
<td>The planning and design of homes for the use of people by the creative organization of materials and components with consideration to mass, space, form, volume, texture, structure, light, shadow, materials and the project brief</td>
</tr>
</tbody>
</table>
The management of housing projects from inception to completion  
Construction management  
The management of the physical construction process including the co-ordination, administration, and management of resources. |
| Engineering Council of South Africa (ECSA),                  | Engineering Profession Act of 2000 (Act No. 46 of 2000)                       | Civil engineering:  
The planning and design of roads, water and sewer reticulations and storm water systems  
Electrical engineering  
The planning and design of electrical reticulations and street lighting  
Geotechnical engineering  
The evaluation of the geotechnical character of a site and the provision of specialist advice on the risks posed by geotechnical site conditions to humans, property and the environment and the design of earthworks and foundations for structures  
Structural engineering  
The designing of the structure of the home to withstand the loads that it is likely to subjected to safely and without loss of function  
Fire engineering  
The planning and designing of fire protection system to protect people and their environments from the destructive effects of fire and smoke. |
| South African Council for the Quantity Surveying Profession (SACQSP) | Quantity Surveying Profession Act of 2000 (Act No. 49 of 2000).               | The provision of independent and impartial estimation and control of the cost of constructing homes by means of one or more of the following:  
- accurate measurement of the works,  
- comprehensive knowledge of various construction systems and the costs of alternative design proposals, construction methods and materials, or  
- the application of expert knowledge of costs and prices of work, labour, materials, plant and equipment required |
| South African Council for Professional and Technical Surveyors (PLATO) | Professional and Technical Surveyor’s Act, 1984 (Act 40 of 1984)              | The collection, collation, assessment and presentation of geographic information gathered from surveys which are required to:  
- enable architectural and engineering designs to be undertaken;  
- enable construction works to be set out; and  
- confirm the accuracy of the setting out of aspects of the works |
The evaluation of the geotechnical character of a site and the provision of specialist advice on the risks posed by geotechnical site conditions to humans, property and the environment |
The regulation of a profession involves:

1) the setting of standards of professional qualifications and practice;
2) the keeping of a register of qualified persons and the award of titles;
3) determining the conduct of registered persons;
4) the investigation of complaints; and
5) disciplinary sanctions for professional misconduct.

1.4.3 Professional bodies and trade associations

There are a number of professional bodies and trade associations that have an interest in housing developments. These include:

- Association of Architectural Aluminium Manufacturers of South Africa (AAAMSA) promotes commercial and group interests of the architectural aluminium industry, glass, ceiling and partitioning and insulation industries represented by a number of associations;
- Association of Quantity Surveyors of South Africa whose objective is to advance and promote the science and practice of quantity surveying as well as construction project management and construction management matters;
- Concrete Society of Southern Africa which promotes excellence and innovation in the use of concrete and related products and services;
- Clay Brick Association of Southern Africa whose mission is to develop and grow competitive awareness, knowledge and support of clay masonry and to maintain consistent standards in the use of clay brick and pavers for good value and performance in the construction of buildings and paving surfaces;
- Concrete Manufacturer’s Association which promotes the interests and general advancement of factory produced precast concrete products;
- Consulting Engineers South Africa (CESA) which promotes the professional business interests of its member firms, excellence in serving the public in matters connected with technology-based intellectual services and a high standard for the conduct of consulting engineers and allied professionals;
- Institution of Municipal Engineering of Southern Africa (IMESA) which promotes excellence in the engineering profession for the benefit of municipalities and their communities;
- Institute of Timber Construction – South Africa which provides inspection and certification services for compliance with National Building Regulations;
- Master Builders South Africa which represents contractors and employers in the building and construction industry, whose primary role is to promote the viewpoints and interests of the industry, to promote the highest quality and standards through excellence in service to its members, engaging government and legislative bodies on
national policies that affect the industry, for the purpose of creating a sustainable building industry in South Africa;

- South African Federation of Civil Engineering Contractors whose objectives include the promoting, encouraging and protecting of the interests of its members, the promotion of construction of civil engineering works, the maintenance of a high standard of conduct in the civil engineering construction industry and the participation in regulation of rates of payment, conditions of employment and other measures affecting employees in the civil engineering contracting industry;

- South African Institute of Architecture (SAIA) which is committed to maintaining the highest standards of professionalism, integrity and competence in architecture;

- South African Institute of Architecture Technologists (SAIAT) whose vision is to stimulate the expression of design and the application of technology in architecture;

- South African Institution of Civil Engineering (SAICE) whose objective is the growth and development of its members and the promotion of the science and practice of civil engineering and the advancement of the civil engineering profession;

- Southern African Institute of Steel Construction whose mission is to promote the holistic vigour and prosperity of the people and companies in South Africa that provide steel-related products or services to the building and construction industry;

- Thatchers Association of South Africa which strives to uphold high standards of practice for the industry, members and their customers; and

- The Concrete Institute which provides technical services to the concrete and related industries including technical information and training and advisory services.
2 The design and construction of homes

2.1 Introduction

There are a number of attributes (or characteristics) that need to be considered in the design and construction of a home. Table 2.1 identifies a number of common attributes and their considerations. Not all of the attributes listed in Table 2.1 are of concern to all housing consumers. Some attributes are, however, pertinent if homes are joined vertically or horizontally as indicated in Figure 1.1, e.g. “acoustics.” Some attributes are linked e.g. the thermal performance of the envelope of a home impacts on “contributions to sustainable development” (energy usage) and “hygrothermal”. Some components and elements can impact on a number of attributes e.g. glazing has an impact upon “acoustics”, contributions to sustainable development” (energy usage), “hygrothermal”, “safety in use”, “security”, “tightness” and “visual.”

National Building Regulations are concerned with:

1) the protection of property and the general safety, health and convenience of the public in relation to the erection of homes;

2) the design and construction of homes which are not harmful to the health or well-being of users and occupiers; and

3) ensuring that certain solutions that are adopted for homes contribute positively to environmental sustainability.

National Building Regulations are accordingly concerned with only some of the attributes and not all of the considerations associated with an attribute. They establish minimum requirements for areas within attributes which are of concern to the regulator as indicated in Table 2.1. They do not necessarily establish desirable standards. They also address other issues such as demolitions, site operations and excavations.

The National Home Builders Registration Council is mandated to provide housing consumers with warranty protection in new homes against major structural defects and roofing leaks and to assist housing consumers in the enforcement of agreements concluded with home builders (see Section 5). This regulator has an extremely narrow focus and only deals with a limited number of considerations in attributes which impact upon its warranty scheme as indicated in Table 2.1.

2.2 Applying the National Building Regulations

2.2.1 Performance framework

The National Building Regulations are based on the 4 level performance framework set out in Figure 2.1. Objectives (level 1) are captured in Section 24 of the Bill of Rights of the Constitution of South Africa (Act 108 of 1996) and the National Building Regulation and Building Standards Act of 1977 (Act 107 of 1977) while functional (qualitative) requirements in the form of functional regulations (level 2) are provided in the National Building Regulations issued in terms of the aforementioned Act. SANS 10400 establishes the level of performance (quantitative requirements) and deemed-to-satisfy provisions and the means by which the functional requirements established in the regulations may be satisfied, namely by the application of a set of rules, rational assessments or rational designs performed by a competent person and Agrément certification (levels 3 and 4).
## Table 2.1: Attributes and considerations in the design and construction of a home

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Typical considerations</th>
<th>Regulator’s requirements for attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>National Building Regulations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NHBRC Technical Requirements</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Access and ease of movement for a range of users e.g. the elderly and people</td>
<td>Part M: Stairways</td>
</tr>
<tr>
<td></td>
<td>with disabilities or obesity</td>
<td>Part S: Facilities for people with disabilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not regulated</td>
</tr>
<tr>
<td>Adaptability</td>
<td>Inherent ability of a home to be altered or extended or have its use changed</td>
<td>Not regulated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not regulated</td>
</tr>
<tr>
<td>Acoustics</td>
<td>Control of external and internal noise (continuous and intermittent)</td>
<td>Not regulated</td>
</tr>
<tr>
<td></td>
<td>Intelligibility of sound</td>
<td>Not regulated</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>Appearance of a home</td>
<td>Not regulated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not regulated</td>
</tr>
<tr>
<td>Air purity</td>
<td>Ventilation of spaces</td>
<td>Part O: Lighting and ventilation</td>
</tr>
<tr>
<td></td>
<td>Control of odours</td>
<td>Not regulated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contributions to</td>
<td>• Usage of resources such as energy and water e.g. greenhouse gas emissions,</td>
<td></td>
</tr>
<tr>
<td>sustainable development</td>
<td>use of renewable and non-renewable resources and consumption of fresh water)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Choice of building materials e.g. use of renewable and non-renewable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>resources, use of harmful substances, potential to generate business and employment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>opportunities for targeted groups and formation of waste hazards)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Choice of construction methods and resources e.g. potential to generate business and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>employment opportunities for targeted groups and health and safety during construction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Methods of waste disposal, e.g. recycling and disposal of hazardous waste</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Resilience (ability to recover / bounce back from extreme hazards / disasters)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constructability</td>
<td>Transportation to site and erection and health safety considerations..</td>
<td>Not regulated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not regulated</td>
</tr>
<tr>
<td>Durability</td>
<td>Retention of performance of components and elements over required service life</td>
<td>A15 Maintenance and operation</td>
</tr>
<tr>
<td></td>
<td>subject to regular maintenance</td>
<td>Part B: Structural design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part 2.1 Structural strength and serviceability (2.1.1.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part 2.2 Dampness and weatherproofing (2.2.1.1)</td>
</tr>
<tr>
<td>Economics</td>
<td>Initial capital and running and maintenance costs</td>
<td>Not regulated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not regulated</td>
</tr>
<tr>
<td>Attribute</td>
<td>Typical considerations</td>
<td>Regulator's requirements for attribute</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Fire safety                       | Risks of outbreak and of spread of fire  
Physiological effects of smoke and heat  
Alarm time (detection and alarm systems)  
Evacuation time (escape routes)  
Survival time (fire compartmentation). | Part A: Administration  
Part J: Floors  
Part K: Walls  
Part L: Roofs  
Part M: Stairs  
Part O: Lighting and ventilation  
Part S: People with disabilities  
Part T: Fire protection  
Part V: Space heating  
Part W: Fire installation |
| Hygiene                           | Facilities for human body care and cleaning  
Water supply  
Cleanability  
Evacuation of waste water and waste materials  
Limitation of emission of contaminants | Part P: Drainage  
Part Q: Non-waterborne means of sanitary disposal  
Part U: Refuse disposal |
| Hygrothermal (humidity and temperature) | Control of air temperature, thermal radiation, air velocity and relative humidity  
(limitation of variation in time and in space, response of controls)  
Control of condensation | Part B: Structural design  
Part O: Lighting and ventilation  
Part XA: Energy usage |
| Maintainability                   | Ease / practicality of carrying out cleaning, routine repairs, periodic maintenance, maintenance of services | Part B: Structural design  
Part R: Stormwater disposal |
| Safety in use                     | Safety in respect of aggressive agents (protection against explosions, burning, sharp points and edges, moving mechanisms, electrocution, or contact with poisonous substances, infection)  
Safety during movements and circulation (limitation of floor slipperiness, unobstructed passage, guard rails, etc.)  
Security against human or animal intrusion | Part D: Public safety  
Part M: Stairways  
Part N: Glazing  
Part U: Refuse disposal  
Part V: Space heating |

National Building Regulations

NHBRC Technical Requirements

Part 2.1 Structural strength and serviceability (2.1.2.6)
<table>
<thead>
<tr>
<th>Attribute</th>
<th>Typical considerations</th>
<th>Regulator’s requirements for attribute</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>National Building Regulations</td>
</tr>
<tr>
<td>Security</td>
<td>Protection against unwanted human or animal intrusion and vandalism</td>
<td>Not regulated</td>
</tr>
<tr>
<td>Structural safety</td>
<td>Mechanical resistance of components and elements to static and dynamic actions, both individually and in combination</td>
<td>Part B: Structural design</td>
</tr>
<tr>
<td></td>
<td>Resistance of components and elements to impacts, intentional and unintentional abuse, accidental actions and cyclic (fatigue) effects</td>
<td>F3: Unstable soil conditions</td>
</tr>
<tr>
<td></td>
<td>Resistance of components and elements subjected to actions to loss of function and damage, and avoidance of user discomfort</td>
<td>Part G: Excavations</td>
</tr>
<tr>
<td></td>
<td>The number, size, configuration, subdivision, and interrelation of spaces</td>
<td>Part H: Foundations</td>
</tr>
<tr>
<td></td>
<td>Circulation patterns</td>
<td>Part J: Floors</td>
</tr>
<tr>
<td></td>
<td>Accommodation of services and equipment</td>
<td>Part K: Walls</td>
</tr>
<tr>
<td></td>
<td>Furnishability</td>
<td>Part L: Roofs</td>
</tr>
<tr>
<td></td>
<td>Water tightness (rain, ground water, drinking water, waste water, etc.)</td>
<td>Part M: Stairways</td>
</tr>
<tr>
<td></td>
<td>Air and gas tightness</td>
<td>Part N: Glazing</td>
</tr>
<tr>
<td></td>
<td>Dust tightness</td>
<td>Part R: Stormwater disposal</td>
</tr>
<tr>
<td>Visual</td>
<td>Natural and artificial lighting (required illuminance, freedom from glare, luminance contrast and stability)</td>
<td>Part O: Lighting and ventilation</td>
</tr>
<tr>
<td></td>
<td>Sunlight (insolation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Possibility of darkness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aspect of spaces and surfaces (colour, texture, regularity, flatness, verticality, horizontality, perpendicularity, etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visual contact, internally and with the external world (links and barriers for privacy, freedom from optical distortion)</td>
<td></td>
</tr>
</tbody>
</table>
Regulation AZ4 of the National Building Regulations requires that all functional regulations be complied with by either:

1) adopting building solutions that comply with the requirements of the relevant part of SANS 10400, the *Application of National Building Regulations*; or

2) appointing a competent person to prepare a rational design or rational assessment which reliably demonstrates, or predicts with certainty, to the satisfaction of the appropriate local authority, that an adopted building solution has an equivalent or superior performance to a solution that complies with the requirements of the relevant part of SANS 10400 i.e. the benchmark for performance established in SANS 10400.

SANS 10400, *The application of National Building Regulations*, provides three methods to enable functional regulations to be satisfied i.e. by:

1) adopting design and construction rules; or

2) appointing a competent person to prepare a rational design or undertake a rational assessment and to inspect the construction or installation of buildings or components thereof to confirm that design intent has been met; or

3) using products or components that have Agrément certification strictly in accordance with the provisions of such certification.
The performance of a building or a part thereof needs to be fully described. Typically the functional requirements in the NBRs only partly describe performance. They provide qualitative statements of the ability of a building or a part thereof to fulfil objectives in terms of behaviour i.e. behaviour related to reaction to agents (e.g. forces, vibration, radiation, heat and termites), influence to human activities (e.g. differences in levels, slippery surfaces, signs or poor air quality), impact on society (e.g. use of non-renewable energy) and changes in performance over time (e.g. weather tightness and structural durability). The full description of performance requires that a group of variables be used to quantitatively describe performance of attributes or a group of indicators be used to evaluate performance is also provided. SANS 10400 completes the full description of performance (see Figure 2.1). Performance is accordingly fully described when the National Building Regulations are read together with SANS 10400.

National Building Regulations read together with SANS 10400 establish a minimum mandatory level of performance. Different solutions that have an equivalent or superior performance are permitted. Compliance with the design and construction rules contained in SANS 10400 is but one way of satisfy the minimum level of performance prescribed in law.

Sub-regulation A14(1)(a) (Construction) of the National Building regulations requires that the construction of any building or element shall be such that “the building or element as constructed does not compromise the design intent of any design solution that satisfies the requirements of a functional regulation.” This sub-regulation is deemed to be satisfied if such construction satisfies the requirements of the relevant Part of SANS 10400. SANS 10400 establishes construction rules typically by reference to the SANS 2001 construction standards (see Table 2.2).

The default requirements of SANS 2001 or the prescribed parameters contained in parts of SANS 10400 are adequate for solutions which are arrived at by applying the design rules contained in SANS 10400. They may, however, need to be modified where solutions are developed by competent persons or where the design rules are either not applied or are modified. SANS 2001 has been designed to accommodate the needs of such persons. The default requirements can be changed through specification data i.e. data, provisions and variations that makes parts of SANS 2001 applicable to a particular contract or works. Competent persons may, in order to satisfy the requirements of the National Building Regulations, either:

1) make use of the provisions of SANS 2001 by completing the relevant specification data in support of their rational designs and assessments; or

2) fully specify the construction requirements through bespoke specifications or by reference to other standard specifications.

2.2.2 Appointment of competent persons

A competent person is defined in the National Building Regulations as “a person who is qualified by virtue of his education, training, experience and contextual knowledge to make a determination regarding the performance of a building or part thereof in relation to a functional regulation or to undertake such duties as may be assigned to him in terms of these regulations.” The definitions for competent persons are made context specific in the different parts of SANS 10400 where specific types of professional registrations and contextual knowledge requirements are specified.
Table 2.2: Linkages between SANS 2001 series of standard and the SANS 10400 series of standards

<table>
<thead>
<tr>
<th>Part of SANS 2001</th>
<th>Scope</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>BE1 (Earthworks (general))</td>
<td>Covers earthworks carried out with heavy construction equipment or light construction equipment, or by hand, for general excavations, terracing, landscaping and cut and fill operations, such as in minor roads and private railway sidings. It specifies requirements for excavations for foundations for bridges, buildings and structures. It also covers excavation, filling, compaction and finishing.</td>
<td>Referenced in SANS 2001-CM2</td>
</tr>
<tr>
<td>BS1 (Site clearance)</td>
<td>Covers a) the removal of vegetation, fences, guard rails and posts, signage, litter and building rubble, boulders, and surface and subsurface obstructions, and the demolition and removal of structures (including their basements, if any) not directly associated with or incidental to any construction site; b) the cleaning out of existing hydraulic structures and the clearing and grubbing of vegetation from the inlets and outlets of these structures; and c) clearing to improve sight distances on roadways.</td>
<td>Referenced as a “where necessary” requirement in SANS 2001-CM2</td>
</tr>
<tr>
<td>CC1 – Concrete works (structural)*</td>
<td>Covers concrete works related to the structural use of concrete in buildings and structures where the design and supervision of plain, reinforced, prestressed (by means of pre-tensioning or post-tensioning) and precast concrete are under the direct control of appropriately qualified engineers and technologists.</td>
<td>Referenced as an alternative to SANS 2001-CC2 to enable concrete components and elements which are designed by the rules provided in SANS 10400 to be constructed. Typically used where concrete on a site is required for structures designed by competent persons and structures which are designed using the rules provided in SANS 10400</td>
</tr>
<tr>
<td>CC2 – Concrete works (minor works)*</td>
<td>Covers concrete works in foundations, slabs, stairways, masonry walls, pipelines, manholes, latrines, conservancy tanks, septic tanks and the like, where the design and supervision of plain, reinforced and precast concrete are not necessarily under the direct control of appropriately qualified engineers and technologists and no special finishes to the concrete are required.</td>
<td>This part of SANS 2001 provides construction rules for concrete work designed in accordance with the design rules contained in: • SANS 10400-H (Foundations) - lightly loaded surface beds; and • SANS 10400-J (floors) - water-resistant floors of concrete construction and plain concrete impervious floors of limited size; • SANS 10400-M (Stairways) - stairways • SANS 10400-P (Drainage) - conservancy and septic tanks • Q (Non-water means of sanitary disposal) - ventilated Improved Pit toilets SANS 2001-CC2 also provides rules for in-fill concrete in masonry walls This part of SANS 2001 provides only for rough finishes to the concrete. SANS 2001-CC1 is used where a different finish is required.</td>
</tr>
</tbody>
</table>

* SANS 10400-B (Structural design) states that Parts CC1 and CC2 of SANS 2001 may be used by competent persons to specify construction requirements for rational designs undertaken to satisfy requirements.
### Table 2.2 (continued)

<table>
<thead>
<tr>
<th>Part of SANS 2001</th>
<th>Scope</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG1- Installation of glazing in window and door frames*</td>
<td>Covers the installation of glass and polycarbonate panes supported in frames</td>
<td>The design rules for glazing contained in SANS 10400-CG1 (glazing) require that glazing either be installed in accordance with the requirements of SANS 10400-CG1 or in accordance with a suitable method described in SANS 10137.</td>
</tr>
</tbody>
</table>
| CM1-Masonry walling* | Covers the construction of masonry walling by using units manufactured from burnt clay, calcium silicate and concrete. | This part of SANS 2001 provides construction rules for masonry designed in accordance with the design rules contained in:  
  - SANS 10400-H (Foundations) – foundation walls  
  - SANS 10400-K - walls  
  - SANS 10400-P (Drainage) - conservancy and septic tanks  
  - Q (Non-water means of sanitary disposal) - ventilated Improved Pit toilets  
  This part of SANS 2001 requires  
  - infilling concrete to comply with the requirements of SANS 2001-CC2  
  - joints in plaster provided at the interface between a soffit and wall to be in accordance with SANS 2001-EM1.  
  The design rules for masonry walls contained in SANS 10400-K (walls) require that in-fill concrete be in accordance with SANS 2001-CM1. |
| CM2- Strip footings, pad footings and slab-on-the-ground foundations for masonry walling* | Construction requirements for strip footings, pad footings and slab-on-the-ground foundations to receive masonry walling, and the construction of lightly loaded concrete surface beds. | This part of SANS 2001 provides construction rules for foundations supporting masonry walls and surface beds / slab on the ground designed in accordance with the design rules contained in SANS 10400-H (Foundations)  
  This part of SANS 2001 references Part BE1, BS1, CC1, CC2 and CM1.  
  - Material placed beneath foundations is required to comply with the requirements of SANS 2001-BE1.  
  - Where specified by the user clearing is required to be carried out as specified in SANS 2001-BS1  
  - All concrete work in foundations and surface beds is required to comply with the provisions of SANS 2001-CC1 or SANS 2001-CC2  
  - All masonry work in foundations is required to comply with the provisions of SANS 2001-CM1 |
| CS1, Structural steelwork* | This part of SANS 2001 covers structural steelwork for buildings and other structures, excluding bridges, offshore structures, mobile equipment (stackers, reclaimers, draglines, cranes, etc.), mine shaft steelwork (buntons and guides) and mining conveyances. | This part of SANS 2001 does not cover roof and side cladding, or the detailed aspects of sundry items such as handrails, ladders, steel flooring and the like, neither does it cover protection of steelwork against corrosion or fire. |
| CT1, Structural timberwork (flooring)* | Covers the installation of timber floors in buildings | This part of SANS provides construction rules for suspended timber floors designed in accordance with the design rules contained in SANS 10400-J (Floors) |
* SANS 10400-B (Structural design) states that Parts, CG1, CM1, CM2, CS1 and CT1 of SANS 2001 may be used by competent persons to specify construction requirements for rational designs to satisfy requirements
<table>
<thead>
<tr>
<th>Table 2.2 (concluded)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CT2, Structural timberwork (roofing)</td>
<td>Covers the construction of timber roof assemblies in buildings. It includes: a) The manufacture of bolted trusses that are designed in accordance with the requirements of SANS 10400; b) The erection of prefabricated trusses; c) The fixing of rafters and purlin rafters; d) The fixing of purlins and battens; e) The fixing of brandering to roofing members to support ceilings that comprise gypsum board, fibre-cement board or similar boards.</td>
</tr>
<tr>
<td>DP2</td>
<td>Covers the supply and installation of pipelines of diameter up to 1000 mm, complete with ancillary works, for transporting water and sewerage under pressure of up to 2.5 MPa</td>
</tr>
<tr>
<td>DP6</td>
<td>Covers the installation of water pipelines of diameter up to 160 mm from a water reticulation main to the boundaries of individual erven or other specified points on erven. It covers the installation of pipework and associated specials which provide water meters and fire hydrants.</td>
</tr>
<tr>
<td>EM1, Cement plaster</td>
<td>Covers the application, to masonry and concrete surfaces, of cement plaster which: a) In its fresh state, is workable, cohesive and has water-retention properties; b) In its hardened state, is durable, has sufficient strength to hold paint, withstand local impact and abrasion, if free of unsightly cracking and adheres to substrates.</td>
</tr>
</tbody>
</table>

This part of SANS 2001 provides construction rules for soft word roofing and ceiling assemblies designed in accordance with the design rules contained in SANS 10400-L (Roofs)

SANS 10400-W (Fire installations) requires that all fire installation pipework be constructed in accordance with the relevant requirements of SANS 2001-DP2 or DP4.

Fire installation pipework installed above ground or within the structure of a building is required to be metallic pipes and fittings complying with the relevant requirements of SANS 2001-DP2 and SANS 2001-DP6.

This part of SANS 2001 provides construction rules for the plastering of masonry walls designed in accordance with the design rules contained in:
- SANS 10400-H (Foundations) – foundation walls
- SANS 10400-K - walls
- SANS 10400-P (Drainage) - conservancy and septic tanks
- Q (Non-water means of sanitary disposal) - ventilated Improved Pit toilets

The fire resistance of plaster quoted in SANS 10400-T (Fire protection) assumes that the plaster is in accordance with the provisions of SANS 2001-EM1.

Regulation A19 (Appointment of persons responsible for design, inspection and assessment duties) deals with the appointment of competent persons. The key features of this regulation are:

1) The owner is required to appoint and allocate responsibilities to competent persons using prescribed forms and competent persons are required to accept such appointments.

2) A person wishing to assume responsibility for aspects of a building in terms of the Regulations is required to apply to the local authority for acceptance as an approved competent person.

3) The local authority is permitted to decline the appointment of a person as an approved competent person for reasons stipulated in the regulations, namely:
   a) incorrect or incomplete information is provided on the prescribed form;
   b) the person does not possess professional indemnity insurance cover, if not an employee of the owner of the building;
c) the person is not professionally registered in terms of the Engineering Professions Act, 2000, the Architectural Professions Act, 2000 or the National Scientific Professions Act, 2003;
d) is in the opinion of the local authority inadequately qualified or has insufficient experience or contextual knowledge; or
e) is under investigation by a disciplinary tribunal of the council that they are registered in and the chief executive officer of such a council has expressed an opinion that they should not be approved.

4) Persons who declare to the local authority that they satisfy the definitions for competent persons in SANS 10400 in relation to the duties and responsibilities, for which approval of their credentials is applied for, are automatically deemed to have sufficient qualifications, experience and contextual knowledge.

5) An applicant, who is not approved as a competent person, may lodge an appeal with the Review Board and if upheld, the local authority is required to accept the appointment of the appellant as a competent person.

6) The person appointed as an approved competent person to design an element of the structural, fire protection, artificial ventilation, stormwater disposal or non-water borne sanitary disposal, fire installation or drainage installation system is required to:

a) assume responsibility for satisfying the functional regulation relating to that particular system in its entirety; and
b) where parts of the system are designed by other competent persons, ensure that the component designs are generally in accordance with the requirements of the regulations, will achieve the objectives of the systems and, in the case of the structural system, the interaction of the various component elements will be such that the structural adequacy of all the parts of the building and the overall stability of the building is assured; and
c) countersign copies of designs, plans and specifications prepared by other competent persons should the local authority so require and may require competent persons who design elements of the system to:
   i) complete a prescribed form and provide information and documents in respect of the work he or she has designed;
   ii) modify their designs, plans and specifications if they do not comply with the provisions of the regulations; and
   iii) certify completion on the prescribed form.

7) Approved competent persons on completion of the structural, fire protection and fire installation system for which they have assumed responsibility for or if they are responsible for the energy usage design, are required to complete a prescribed form and to submit such form to the local authority.

8) The local authority is permitted to require that an approved competent person certify on completion specifically identified work other than that relating to the structural, fire protection or fire installation.

9) Any person providing incomplete or false information is guilty of an offence. Any person who falsely claims that they satisfy the definitions contained in SANS 10400 is not only guilty of an offence in terms of the Regulations but also of fraud.

The requirement for an approved competent person to assume responsibility for an entire system as a single point of responsibility (see Regulation A19(8)(a)) has implications as parts of a system may be satisfied by others who:
apply the deemed to satisfy rules contained in SANS 10400; and

undertake rational designs or rational assessments for the design of components of a system e.g. prefabricated roof trusses.

The competent person who assumes responsibility for the system as a whole and who is not responsible for the design of all its parts, needs to satisfy himself that the components designed by other designs are acceptable in relation to the system as a whole and to coordinate the overall design.

2.2.3 Broad content of NBRs and the building approval process

The broad thrust of each of the parts of the National Building Regulations are set out in Table 2.3.

The approvals process for the erection of a typical new home is as set out in Figure 2.2.

---

**Figure 2.2 – Approval processes**
Table 2.3: An overview of requirements established in National Building Regulations and the corresponding provisions in the NHBRC’s Technical requirements

<table>
<thead>
<tr>
<th>National Building Regulations</th>
<th>Corresponding NHBRC Technical Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part</td>
<td>Broad thrust of part of Regulations</td>
</tr>
<tr>
<td>AZ</td>
<td>Definitions and reference standards</td>
</tr>
<tr>
<td></td>
<td>Means for compliance with requirements of the National Building Regulations</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>A: Administration</td>
<td>A1 to A10 - Submission requirements for plan approval</td>
</tr>
<tr>
<td></td>
<td>A11 - Requirement for an owner to appoint professional land surveyor to point out boundary beacons.</td>
</tr>
<tr>
<td></td>
<td>A12 - Requirements for levels of buildings abutting streets</td>
</tr>
<tr>
<td></td>
<td>A13 - Requirements for building materials to be fit for purpose and testing by local authority</td>
</tr>
<tr>
<td></td>
<td>A14 - Requirements for construction to meet design intent</td>
</tr>
<tr>
<td></td>
<td>A15 - Requirements for maintenance to ensure:</td>
</tr>
<tr>
<td></td>
<td>• mechanical equipment, facility or service installations remain in a safe and functional condition</td>
</tr>
<tr>
<td></td>
<td>• structural safety performance.</td>
</tr>
<tr>
<td></td>
<td>• resistance to rain penetration and the passage of moisture into the interior of a building.</td>
</tr>
<tr>
<td></td>
<td>A16 - A17 Requirements for minimum qualifications and certificate of identification of building control officers</td>
</tr>
<tr>
<td></td>
<td>A18 - Restrictions on persons undertaking plumbing work</td>
</tr>
<tr>
<td></td>
<td>A19 - Appointment of persons responsible for design, inspection and assessment duties</td>
</tr>
<tr>
<td></td>
<td>A20 - A21 Classification and designation of building occupancies and design populations</td>
</tr>
<tr>
<td></td>
<td>A22 - Requirements for notices of intention to commence erection or demolition of a building and notices of inspection</td>
</tr>
<tr>
<td></td>
<td>A23 - Requirements for temporary buildings</td>
</tr>
<tr>
<td></td>
<td>A24 - A25 Measures to enforce the Regulations</td>
</tr>
</tbody>
</table>
### Table 2.3 (continued)

<table>
<thead>
<tr>
<th>National Building Regulations</th>
<th>Corresponding NHBRC Technical Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part</strong></td>
<td><strong>Broad thrust of part of Regulations</strong></td>
</tr>
</tbody>
</table>
| **B: Structural design**      | Structural safety, serviceability and durability performance | Part 2.1 – Structural strength and serviceability  
Part 2.2 Dampness and weatherproofing (2.2.1.1)  
Part 2.6 – Dolomite land  
Part 5 – Development of dolomite land  
Part 13 – Requirements for the development of dolomite land |
| **C: Dimensions**             | Fitness of purpose of dimensions for rooms and spaces  
Accommodation of at least one habitable room and a separate room containing toilet facilities in the floor area of a dwelling unit | None |
| **D: Public safety**          | Safety of the public in use (falling from height, ramps and driveways and control of access to swimming pools and swimming baths) | None |
| **E: Demolitions**            | Safe demolitions | None |
| **F: Site operations**        | Protection of the public  
Safeguarding of damage to local authority  
Site investigations for contaminated land, potentially unstable land or movements in near-surface soil horizons  
Clearing of sites and draining of waterlogged or saturated building sites  
Soil poisoning for termite protection  
Control of unreasonable levels of dust and noise  
Ordering of the owner of a building to supply satisfactory proof, expose for inspection or test to confirm compliance with regulations and approvals granted  
Issuing of instructions to remove accumulated rubbish and waste  
Removal of surplus material and matter arising from construction operations from the site and street  
Removal of temporary and permanent structures from the site  
Provision of sanitary facilities for construction personnel | Part 4 – Geotechnical investigations to determine foundation parameters  
Part 5 – Development of dolomite land  
Part 12 – Specific requirements for greenfield site developments |
<p>| <strong>G: Excavation</strong>             | Precautionary measures to ensure that an excavation does not impair the safety or stability of any property or service | None |</p>
<table>
<thead>
<tr>
<th>Part</th>
<th>Broad thrust of part of Regulations</th>
<th>Corresponding NHBRC Technical Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>H: Foundations</td>
<td>Design and construction of foundations</td>
<td>Part 2.1 – Structural strength and serviceability</td>
</tr>
</tbody>
</table>
| J: Floors | Design and construction of floors to:  
  - support actions to which it is likely to be subjected to such that local damage and deformation does not compromise its functionality;  
  - have suitable fire resistance;  
  - be water resistant if the floor of any laundry, kitchen, shower-room, bathroom or toilet;  
  - have adequate under-floor ventilation in the case of a suspended timber floor; and  
  - prevent moisture from penetrating concrete floors on ground of filling | Part 2.1 – Structural strength and serviceability  
Part 2.2 – Dampness and waterproofing (2.2.1.1) |
| K: Walls  | Design and construction of walls to:  
  - safely sustain any actions which it is likely to be subjected to such that local damage and deformation does not compromise its functionality;  
  - adequately resist the penetration of water into any part of the building where it would be detrimental to the health of occupants or to the durability of such building; and  
  - have combustibility and fire resistance characteristics appropriate to the location and use of such wall | Part 2.1 - Structural strength and serviceability  
Part 2.2 – Dampness and waterproofing (2.2.1.1) |
| L: Roofs  | Design and construction of roof to:  
  - safely sustain any actions to which it is likely to be subjected to such that any local damage or deformation do not compromise its functionality;  
  - be adequately anchored against wind uplift;  
  - not allow the penetration of rainwater or any other surface water to its interior;  
  - not allow the accumulation of any water upon its surface;  
  - provide adequate height in any room immediately below; and  
  - have suitable fire resistance and where necessary to be non-combustible. | Part 2.1 – Structural strength and serviceability  
Part 2.2 – Dampness and waterproofing (2.2.1.2) |
| M: Stairways | Design and construction of stairways to:  
  - safely sustain any actions to which it is likely to be subjected to such that any local damage or deformation does not compromise its functionality;  
  - permit safe movement of persons from floor to floor; and  
  - have dimensions appropriate to its use | Part 2.1 – Structural strength and serviceability |
<table>
<thead>
<tr>
<th>Part</th>
<th>Broad thrust of part of Regulations</th>
<th>Corresponding NHBRC Technical Requirements</th>
</tr>
</thead>
</table>
| N: Glazing | Use of secure and durable glazing which is fixed in a manner and position such that it:  
- safely sustains any wind actions which can reasonably be expected;  
- does not allow penetration of water to the interior of the building; and  
- is apparent to any person approaching such glazing  
Selection of glazing to provide a degree of safety in the case of human impact. | Part 2.1 – Structural strength and serviceability  
Part 2.2 – Dampness and waterproofing (2.2.1.1) |
| O: Lighting and ventilation | Lighting and ventilation to rooms which enable a room to be used, without detriment to health or safety or causing any nuisance, for the purpose for which it is designed. | None |
| P: Drainage | P1: Requirement to provide a suitable means of sewage disposal  
P2: Design and construction of drainage where water-borne sewage disposal is available  
P3: Control of objectionable discharge from or into a drainage installation  
P4: Requirements for the discharge of industrial effluent into a drainage system  
P5: Sealing of disconnected fixtures and pipes from a drainage installation or a connecting sewer  
P6: Interference with connecting sewers and parts of drainage installations  
P7: Inspection and testing of drainage installations prior to commissioning | Part 2.3 – Water and drainage installations |
| Q: Non-waterborne means of sanitary disposal | Design and construction, siting of, and access to means of sewage disposal where water-borne sewage disposal is not available. | None |
| R: Stormwater disposal | Provision of suitable means for the control and disposal of accumulated stormwater which may run off from any earthworks, building or paving. | Part 2.5 – Surface water management |
| S: Facilities for persons with disabilities | Provision of facilities to accommodate the needs of persons with disabilities. | None |
| T: Fire protection | Fire safety performance in relation to the vulnerability of the building to fire ignition, the time for escape in the event of a fire, generation and spread of smoke, endangering of other buildings and detecting, fighting, controlling and extinguishing a fire. | Part 2.1 – Structural strength and serviceability (2.1.2.6) |
| U: Refuse disposal | Provision of adequate storage area for refuse containers and access for removal of refuse  
Safety of chutes discharging into refuse containers. | None |
| V: Space heating | Safe operation of flues, flue pipes and chimneys. | None |
Table 2.3 (concluded)

<table>
<thead>
<tr>
<th>National Building Regulations</th>
<th>Corresponding NHBRC Technical Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part</td>
<td>Broad thrust of part of Regulations</td>
</tr>
<tr>
<td>W: Fire installation</td>
<td>Adequacy and suitability of water installations which convey water for the purpose of firefighting and the connection of such installations to local authority pipes</td>
</tr>
<tr>
<td>XA: Energy usage</td>
<td>Contribution to the reduction of greenhouse gas</td>
</tr>
</tbody>
</table>
2.3 Complying with the provisions of the Home Building Manual

2.3.1 Structure of the Home Building Manual

The Housing Consumer Protection Measures Act of 1998 requires:

3) the Minister to prescribe Technical Requirements relating to the warranty scheme; and

4) the National Home Builders Registration Council to publish a Home Building Manual which contains the Technical Requirements prescribed by the Minister and guidelines established by the NHBRC to satisfy such requirements.

The NHBRC Technical Requirements, which comprise the first 8 parts of the Home Building Manual, are prescribed by the Minister of Human Settlements. The remaining parts in the Home Building Manual, which have backward linkages to Parts 1 to 8, are published by the National Home Builders Registration Council. The design of the Home Building Manual is such that the areas where amendments and additions may be required more frequently are located in Parts 9 to 14. This enables the Council to manage their risk more effectively.

Table 2.4 provides an overview and commentary on each of the parts of the Home Building Manual.

Table 2.4: An overview of the contents of the Home Building Manual

<table>
<thead>
<tr>
<th>Part No</th>
<th>Title</th>
<th>Overview and commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHBRC Technical Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Definitions and standards</td>
<td>The definitions that are included in this part do not repeat terms included in the Act. The definition for a “home” includes the inclusions and exclusions permitted in terms of Section 1 of the Housing Consumer Protection Measures Act of 1998. All the defined terms provide clarity on the meaning of terms used in the text of the Technical Requirements and subsequent parts in the Home Building Manual which flow out of these requirements. Section 28 of the Standards Act of 2008, permits the provisions of South African National Standards to be incorporated into law. The referencing of standards in this manner facilitates the incorporation of the provisions of a number of South African National Standards into the NHBRC Technical Requirements in the manner envisaged in the Standards Act.</td>
</tr>
<tr>
<td>2</td>
<td>Performance requirements</td>
<td>The NHBRC Technical Requirements establish both performance descriptions (performance demanded or expected to be fulfilled by an attribute) and performance parameters (a group of variables used to quantitatively describe performance of attributes) for structural strength and stability, serviceability, materials, behaviour in fire, drainage and storm water management and water installations as well as for dolomite land in relation to the warranty scheme.</td>
</tr>
<tr>
<td>3</td>
<td>Evaluation</td>
<td>Evaluation deals with the manner in which a home builder can objectively demonstrate that a solution satisfies the specified performance for a system, element or component by means of a compliance method or a performance-based method.</td>
</tr>
<tr>
<td>4</td>
<td>Geotechnical investigations to determine foundation parameter</td>
<td>Geotechnical investigations are necessary to obtain information to make informed decisions regarding the design of foundations. Requirements are established for such investigations by a certification body or a listed competent person. Such investigations are required to culminate in a site class designation where homes are located in buildings which are not higher than two storeys including a basement.</td>
</tr>
</tbody>
</table>
### Table 2.4 (continued)

<table>
<thead>
<tr>
<th>Part</th>
<th>Title</th>
<th>Overview and commentary</th>
</tr>
</thead>
</table>
| 5    | Development of dolomite land               | The provisions for the development of dolomite land provides an approach to the management of hazards (sinkholes and subsidence) on sites underlain by dolomites to within tolerable limits, based on extensive evidence based research. Geotechnical investigations on dolomite land are required to culminate in the categorisation of land in terms of inherent hazard classes and dolomite area designations.  
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 6    | Greenfield site developments               | Geotechnical investigations on greenfield sites need to be undertaken in a phased manner. This enables the NHBRC to provide in principal acceptance based on a first phase geotechnical report containing a stability investigation where land is underlain by dolomites and an investigation into the near surface foundation characteristics of the near surface horizons.  
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 7    | Approved certification schemes             | The NHBRC Technical Requirements establishes an alternative approach to certification by listed competent persons. It empowers the NHBRC to approve certification schemes proposed by juristic persons who satisfy prescribed criteria. Such schemes are required to register certification bodies (companies or organizations) who employ certifiers (suitably qualified individuals) with demonstrated ability to act in terms of the Technical Requirements to undertake the necessary certifications. Schemes are required to maintain websites which provide the public and home builders with particulars of the names, registrations and other particulars of certification bodies and certifiers and make available certificates issued in terms of the scheme accessible to housing consumers and building control officials. Home builders who require certification in terms of the NHBRC Technical Requirements can contract a certification body (company) who, if required, maintains professional indemnity cover, and allocates an employee who is a certifier to undertake certification activities. The certifier issues a certificate of compliance which is made then available to the NHBRC, home builders and housing consumers.  
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 8    | Council list of competent persons          | The NHBRC Technical Requirements establishes an alternative approach to certification by certification bodies. Competent persons (registered professionals) are required to present their credentials to the NHBRC for listing in a specific category in order for them to be able to certify compliance with performance requirements, certify sites in terms of site class designations or inherent hazard classes or certify township services on sites underlain by dolomites for compliance with requirements. Applicants need to satisfy certain criteria before being admitted to the list.  
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 10   | Performance based methods                  | Part 3 permits compliance with the performance requirements established in Part 3 to be satisfied by means of performance based methods. Part 10 establishes additional requirements for satisfying performance requirements by such a method. It also empowers the NHBRC to request the reasoning of the listed competent person or the certification body for determining that the design of a system, element or component complies with the performance requirements of Part 2 for review prior to enrolment. The provisions in Part 10 for the certification of the design, fabrication and erection by a certification body of prefabricated trusses, timber framed homes, light steel framed homes and glass facades by a certification body enables those who are not necessarily registered with the Engineering Council of South Africa but have relevant professional designations granted in terms of the National Qualifications Framework Act of 2008 to do so.  
Part 10 requires the uploading of applicable Agrément certificates and certifications by certification bodies or listed competent persons for each system, element or component, as relevant, on the NHBRC’s website.  
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
Table 2.4 (concluded)

<table>
<thead>
<tr>
<th>Part</th>
<th>Title</th>
<th>Overview and commentary</th>
</tr>
</thead>
</table>
| 11   | Additional particulars on plans                                      | Part 3 establishes basic requirements for plans. Part 11 establishes requirements for additional particulars on plans. These particulars relate to the provision of the following information above the title block on the plan, if applicable:  
  - a list of the systems, elements and components which are the subject of an Agrément certificate, the numbers of such certificates and the names registration numbers of the accredited contractors who are to manufacture, install and erect the certificated construction;  
  - a list which identifies the systems, elements and components which are to be certified by a certification body or a listed competent person and the names and reference numbers of the such persons who will do so;  
  - the site class class designation;  
  - dolomite area designation;  
  - the names and registration number of the listed competent persons or certification bodies who certify compliance with requirements on sites having a dolomite area designation of D2 and higher;  
  - the category of expected damage in the case of homes with masonry walling elements;  
  - the descriptor of the solution that is adopted for the foundations in the case of single storey homes with masonry walling elements; and  
  - the names and registration numbers of listed competent persons or certification bodies who certify compliance with requirements in interconnected complexes. |
| 12   | Specific requirements for geotechnical investigations                | Part 12 establishes additional NHBRC procedures for geotechnical investigations described in Parts 4 and 6 for greenfield site developments and for homes in existing townships. It specifies the variations which are necessary to align SANS 634 with NHBRC requirements and introduces requirements for gathering of data to support subsidy variations associated with subsidy housing schemes. |
| 13   | Requirements for the development of dolomite land                    | Part 13 establishes additional NHBRC procedures for the development of dolomite land described in Parts 5 and 6. It specifies the variations which are necessary to align parts of SANS 1936 with NHBRC requirements. It requires a recommendation from the Council for Geoscience on the appropriateness of dolomite area designations prior to enrolment and establishes a new requirement for this council to express an opinion on the independent reviews provided for in Part 5 relating to the development of sites having a D4 site class designation. |
| 14   | Professional indemnity cover                                        | Part 14 establishes requirements for professional indemnity cover in a manner which enables the NHBRC to recover expenses incurred in rectifying defects covered by such insurance. It specifies the minimum level of professional indemnity cover and empowers the NHBRC to increase the level of cover to manage the NHBRC’s risk exposure where homes are connected vertically and horizontally or where homes are located on sites having a dolomite area designation of D4 or a site class designation of P. |

2.3.2 Performance framework

The requirements of the Home Building Manual for the design and appraisal of a structural system and the roof of a home are based on the 4 level performance framework set out in Figure 2.3. This framework is similar in concept to that described in 2.2.2.1.

Objectives (level 1) are inferred from the Housing Consumer Protection Measures Act of 1998. The Technical Requirements establish both performance descriptions (performance demanded or expected to be fulfilled by an attribute) and performance parameters (a group of variables used to quantitatively describe performance of attributes) for structural strength and stability, serviceability, materials, behaviour in fire, drainage and storm water management and water installations in relation to the warranty scheme, taking into account
overlaps in requirements with the functional regulations contained in the National Building Regulations. Both performance descriptions and performance parameters are required to fully describe performance. This approach not only enables design rules to be formulated but also establishes the benchmark against which solutions not covered by the design rules can be objectively assessed in a fair and equitable manner.

The Technical Requirements also establish the manner in which a home builder can objectively demonstrate that a solution satisfies the specified performance for a system, element or component by means of one or more of the following:

1) adopting compliance methods prescribed by the NHBRC subject to the solution being within the scope of such rules; or

2) performance based methods involving either:
   a) Agrément certification; or
   b) certification by a certification body or a listed competent person whose name appears on the NHBRC’s list in the required category

---

Figure 2.3 – The performance framework for the design and appraisal of a structural system and the roof of a home in terms of the NHBRC warranty scheme

Table 2.5 indicates the means by which compliance with the requirements of the NHBRC Technical Requirements can be achieved.
Table 2.5: Means of demonstrating compliance with performance requirements

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Compliance method provided for in Part 9 including compliance with one or more of the following South African National Standards</th>
<th>Performance based methods</th>
<th>Certification bodies</th>
<th>Listed competent persons</th>
<th>Agrément certification</th>
</tr>
</thead>
</table>
| Structural strength and serviceability | - Foundations supporting masonry walls and lightly loaded surface beds or retaining walls – SANS 10400-H and SANS 2001-CM2  
- Slabs supported on the ground which do not form part of an integral foundation system - SANS 10400-J, SANS 2001-CC1 and SANS 2001-CC2  
- Suspended timber floors – SANS 10400-J and SANS 2001-CT1  
- Concrete and masonry staircases – SANS 10400-M, SANS 2001-CM1, SANS 2001-CC1 and SANS 2001-CC2  
- Timber staircases – SANS 10400-M | Certification body in the following categories, as applicable:  
- structural system (whole or part if not covered);  
- prefabricated timber truss roofing system;  
- steel frame homes;  
- timber frame homes  
- fills, terraces and subsurface drains  
- roof glazing installations | Agrément certification for structural system as a whole, an element (foundation, wall, floor or roof) of the structural system or a component of the structural system | Listed competent person in the following categories, as applicable:  
- structural system (whole or part if not covered);  
- prefabricated timber truss roofing system;  
- steel frame homes;  
- timber frame homes  
- fills, terraces and subsurface drains  
- roof glazing installations | Agrément certification for:  
- roofing system or a component of the roof, eg roof covering  
- moisture barriers in masonry walls (vertical and horizontal) and beneath concrete slabs;  
- ridges, valleys and flashings |
| Walls (masonry walls) | - Masonry walls - SANS 10400-K  
| Roof | Roofing assemblies - SANS 10400-L (and SANS 2001-CT2) |                                                                                                          |                                                                                                             |                                                                                                               |                                                                                                                   |
| Dampness and weatherproofing | - Concrete floors and impervious floors laid on the ground - SANS 10400-J and SANS 10400-H,  
- Walls - SANS 10400-K  
- Roofs SANS 10400-L  
- Ridges, valleys and flashings - SANS 10400-R |                                                                                                          |                                                                                                             |                                                                                                               |                                                                                                                   |
Table 2.5 (concluded)

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Compliance method provided for in Part 9 including compliance with one or more of the following South African National Standards</th>
<th>Performance based methods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Certification bodies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listed competent person who certifies a system, element or component</td>
</tr>
</tbody>
</table>
| Water and drainage installation     | • Drainage installations – SANS 10400 P and SANS 2001-DP7  
• Water installations – SANS 2001-DP6  
• Conservancy tanks, sceptic tanks and french drains – SANS 10400-P  
• Ventilated improved toilets -SANS 10400-Q | Certification body (water and drainage installations and stormwater disposal systems) | Listed competent person (water and drainage installations and stormwater disposal systems) | Agrément certification for water and drainage systems, elements or components |
| Materials and components            | • Materials falling within the scope of a South African National Standard | Certification body who certifies a system, element or component | Listed competent person who certifies a system, element or component | Agrément certification of element or component |
| Surface water management            | Not applicable                                                                                                               | Certification body (water and drainage installations and stormwater disposal systems) | Listed competent person (water and drainage installations and stormwater disposal systems) | Not applicable |
| Dolomite land                       | Not applicable                                                                                                               | Certification body (services for dolomite land) | Listed Competent Persons (services for dolomite land) | Listed competent person (water and drainage installations and stormwater disposal systems) |
Different methods for demonstrating compliance can be adopted in respect of a system, an element (a major functional part of a home) and a component (product manufactured as a distinct unit to serve a specific function or functions). For example: a home builder may elect to satisfy the NHBRC requirements for the design and construction of a home by only using compliance methods. Alternatively, a home builder may elect do so as follows:

1) performance-based methods:
   a) the structural system (the system of constructional elements and components of a home which is provided to resist the loads acting upon it and to transfer such load to the ground upon which the home is founded) certified by a certification body; and
   b) wall panels which are the subject of an Agrément certificate;

2) compliance methods:
   a) glazing;
   b) surface beds;
   c) roof coverings; and
   d) water and drainage installations;

or

1) performance-based methods:
   a) a foundation system certified by a listed competent person,
   b) a structural steel frame certified by a certification body;
   c) wall panels which are the subject of an Agrément certificate; and
   d) water and drainage installations certified by a certification body; and

2) Compliance methods
   a) glazing;
   b) timber roofing assembly; and
   c) roof covering.

There are several permutations that may be used to satisfy requirements.

Compliance methods can, however, only be applied within the limitations specified in the Home Building Manual. Accordingly, proposed solutions need to be compared against the limitations imposed on the use of a compliance method before compliance using such a method can be claimed. Likewise Agrément certification can only be used to claim compliance with the NHBRC requirements if:

1) the system, element or component falls within the scope, conditions and limitations set out in the certificate;

2) the element or component is compatible with other elements or components of the home; and

3) such system or element is erected by the Agrément certificate holder or a licensee of the holder.

Certification by a certification body or a listed competent person is based on:
1) the application of well-established engineering principles, relevant international or national standards or suitable authoritative publications;

2) test results from a SANAS accredited laboratory which confirm in a test report that an element or components satisfies the performance requirements established in Part 2 and are interpreted in accordance with the relevant provisions of SANS / ISO 2394, *General principles on reliability of structure*; and

3) experimental models which test the structural system or elements or components thereof in accordance with the provisions of SANS / ISO 2394.

Reliability is an important concept in the design of a system, element or component. It speaks to the ability of a system to accomplish a required function in given conditions during a given period.

Agrément certification is required for a solution where:

1) a certification body or a listed competent person cannot demonstrate compliance with performance requirements, based on assumptions, levels of reliabilities, data, practices, procedures and methods which would lead peer reviewers to arrive at substantially similar conclusions, by means of one or more of the following:

   a) the application of well-established engineering principles, relevant international or national standards or suitable authoritative publications; or

   b) the interpretation of tests results or experimental models; or

2) the performance of a solution is sensitive to the quality of the manufacture, construction or installation of a component, element or system.

2.3.3 Plans

Plans for homes need in the first instance to satisfy the requirement of the National Building Regulations for submission to the local authority for plan approval. In addition, they need to include:

1) sections through the home showing details of the foundation reinforcement;

2) working drawings of the foundations complete with dimensions;

3) the location and details of all movement joints as well as the size and location of all reinforcement in masonry;

4) particulars relating to specific construction procedures and precautionary measures; and

5) the relevant information contained in Table 2.6 above the title block on the plan layout.

It will be assumed that a compliance method has been used to satisfy the NHBRC requirements where any system, element or component is not identified in the block above the title as indicated in Table 2.6.
The design and construction of homes

Table 2.6 Information to be included in the block above the title on a plan layout of a home

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Information which is required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Means of compliance</td>
<td></td>
</tr>
<tr>
<td>Agrément certification</td>
<td>The identity of the systems, elements or components which are the subject of an Agrément certification, the numbers of such certificates as well as the names and registration numbers of the accredited contractors who are to manufacture, install and erect the certificated construction.</td>
</tr>
<tr>
<td>Certification by a certification body or a listed competent person</td>
<td>The identity the systems, elements or components which are certified for compliance with requirements by a certification body or listed competent person as well as the names and reference numbers of such persons</td>
</tr>
<tr>
<td>Homes are not more than two storeys in height</td>
<td>The site class designations as certified by the listed competent person or certification body responsible for certification together with the names and reference numbers of such persons</td>
</tr>
</tbody>
</table>
| Dolomite land (having a dolomite area designation of D2 or higher) | The names and reference numbers of the listed competent person or certification body who is to certify that:  
  a) the homes and surrounding infrastructure has been or will be designed and constructed in accordance with the provisions of SANS 1936-3, Development of dolomite land – Part 3: Design and construction of buildings, structures and infrastructure as modified by the Home Building Manual; and  
  b) the precautionary measures in addition to those contained in SANS 1936-3 in the case of a site having a D4 dolomite area designation will enable the NHBRC requirements to be satisfied. |
| Homes with masonry walling elements         | The category of expected damage (see Table 4.3)  
  The type of foundation solution in the case of a single storey (see Table 4.1) |
| Interconnected complexes (a complex of multiple homes where management of common property usually resides with, (but is not limited to) a management body | The names and reference numbers of the listed competent person of certification body who is to certify that the:  
  a) water installation;  
  b) sewer installation  
  c) stormwater arrangements  
  are in accordance with the NHBRC requirements. |

2.3.4 Appointment of certification bodies and listed competent persons

2.3.4.1 General

A home builder is required to appoint a certification body or listed competent persons to:

1) undertake geotechnical investigations to determine foundation parameters in accordance with the provisions of Parts 4, 6 and 12 of the Home Building Manual;

2) conduct suitable geotechnical investigations to determine and certify the inherent hazard class of a site on dolomite land in accordance with the provisions of Parts 5 and 13 of the Home Building Manual;

3) certify that homes on sites and surrounding infrastructure on dolomite land having a site class designation of D2 or D3 have been or will be designed and constructed in accordance with the provisions of Parts 5 and 13 of the Home Building Manual;
4) certify that the precautionary measures adopted on dolomite land having a site class designation a D4 satisfy the requirements established in Parts 5 and 13 of the Home Building Manual; and

5) certify compliance with the requirements of the NHBRC’s Technical Requirements if a performance based method is selected by the home builder to satisfy requirements in accordance with the provisions of Part 10 of the Home Building Manual.

2.3.4.2 Listed competent persons

The Housing Consumer Protection Measures Act of 1998 defines a competent person as a "registered person in terms of the Engineering Professions of South Africa Act, 1990 (Act No. 114 of 1990), or a person registered in terms of section 11 of the Natural Scientific Professions Act, 1993 (Act No. 106 of 1993), and holding the indemnity insurance prescribed by the Council." A listed competent person is a person who satisfies this definition and applies to the NHBRC to be listed in one or more of the following categories:

a) the structural system;
b) prefabricated timber truss roofing system;
c) steel frame homes;
d) timber frame homes;
e) water and drainage installations and storm water disposal systems;
f) services on dolomite land;
g) roof glazing installations;
h) fills, terraces and subsurface drains;
i) certification of sites in terms of site class designations;
j) certification of sites in terms of inherent hazard classes; and
k) certification of township services on sites underlain by dolomites.

The NHBRC may decline to admit a competent person to the list on the grounds that the person does not satisfy the prescribed registration and professional indemnity insurance cover requirements, the persons has insufficient education, experience and contextual knowledge to provide the required services, the application is incomplete or the applicant has been found to have failed to meet the standard of service specified in the NHBRC Technical Requirements, or the applicant is under investigations for misconduct by the Engineering Council of South Africa or the South African Council for Natural and Scientific Professions. The NHBRC may furthermore remove the name of a person from the lists should they fail to provide the prescribed standard of service.

Admission to the list is valid for three years.

2.3.4.3 Certification bodies

The NHBRC’s Technical Requirements makes provision for an alternative approach to certification by competent persons. It empowers NHBRC to approve certification schemes.
proposed by juristic persons who satisfy prescribed criteria. Such schemes are required to register certification bodies (companies or organizations) who employ certifiers (suitably qualified individuals) with demonstrated ability to:

- certify compliance with the Technical Requirements where performance based methods other than Agrément certification are employed,
- certify sites in terms of site class designations or inherent hazard classes; and
- certify township services on sites underlain by dolomites for compliance with requirements.

Schemes are required to maintain websites which provide the public and home builders with particulars of the names, registrations and other particulars of certification bodies and certifiers and make certificates issued in terms of the scheme accessible to owners and building control officials. Home builders who require certification in terms of the NHBRC Technical Requirements can contract a certification body (company) who, if required, maintains professional indemnity cover, and allocates an employee who is a certifier to undertake certification activities. The certifier issues a certificate of compliance which is then made available to the NHBRC, home builders and housing consumers.

This approach links companies to certifiers. The obligations placed on the certifier is no different to that placed on a listed competent person. All that changes is that the company for whom the certifier works is responsible for providing the service and the scheme is responsible for assessing the qualifications and experience of the person who makes the determination that a system complies with the NHBRC’s Technical Requirements. The scheme can take disciplinary action against the certification body if necessary. Professional indemnity resides with the certification body. Accordingly, if the certifier leaves the employ of the certification body, the certification body remains liable for the service provided.

The schemes also enable those who have professional designations granted in terms of the National Qualifications Framework Act of 2008 to certify compliance with requirements in respect of components instead of persons who are in terms of the Engineering Professions of South Africa Act, or a person registered in terms of the Natural Scientific Professions Act, e.g. the erection of roof trusses.

Approved certification schemes will be established as and when industry comes forward with a proposal to establish a scheme, provided that such proposals are acceptable to the NHBRC. Such schemes will operate in parallel to lists of competent persons. Home builders are free to appoint either a certification body or a listed competent person. Market forces will inform their decisions.

### 2.3.5 Enrolment process

#### 2.3.5.1 Non-subsidy housing

The starting point in the enrolment process is for the home builder to appoint a suitable listed competent person or certification body to undertake the necessary geotechnical investigations as indicated in Figure 2.4. The Home Building Manual provides for two types of geotechnical investigations, namely for green field site developments (an undeveloped site earmarked for a housing development project) and for homes in established townships.

The NHBRC may grant conditional approval for a greenfield site development scheme based on a first phase of a geotechnical investigations.
The home builder notifies the NHBRC on prescribed forms of any change in the means of achieving compliance or changes in site class designations during construction.

**Figure 2.4: Enrolment process for non-subsidy housing**

The design and construction of homes 2-29
2.3.5.2 Subsidy housing

The geotechnical investigations for subsidy housing are the same as those for non-subsidy housing expect that the geotechnical investigations include the identification of the following parameters that enable variations to the subsidies to be assessed to provide additional finance to for extraordinary development conditions (see 4 and A6.2):

- seepage / ground water;
- erodability of soil;
- hard excavation;
- dolomite area designations;
- site class designations;
- seismic activity; and
- topography of the site.

The enrolment process for the subsidy sector is the same for the non-subsidy sector with the exception that MEC for housing enters into agreement with the NHBRC for such projects.
3 The NHBRC warranty scheme

3.1 Introduction

The Housing Consumers Protection Measures Act (Act 95 of 1998) makes provision for the protection of housing consumers through the establishment of the National Home Builders Registration Council (NHBRC) and a warranty scheme. The Act prohibits any person from carrying out the business of a home builder, or receiving any consideration in terms of an agreement with a housing consumer in respect of a sale or construction of a home unless that person is a registered home builder. The scheme requires that home builders, subject to specific exclusions, rectify and/or repair specified defects at their own cost within prescribed time limits. Should they, for whatever reason, fail to do so they will be deregistered and a fund established by the NHBRC, subject to certain limitations, will be called upon to make good.

State subsidised housing falls within the ambit of the Act. For this reason, developers (provincial housing departments or municipalities who undertake state subsidised housing projects) need to be registered to satisfy the requirements of section 10(1)b of the Act and may only subcontract work relating to the construction of homes to registered home builders.

The National Home Builders Registration Council Rules issued under section 7(1) of the Act establishes procedures for:

1) the conditional approval of subsidies;

2) in-principle enrolment of housing development projects;

3) enrolment of housing development projects;

4) confirmation of subsidies and subsequent agreements with the home builder; and

5) enrolment of homes.

3.2 The warranty to rectify defects

The warranty to rectify defects is linked to the enrolment certificate issued by the NHBRC. This certificate cannot be cancelled after the occupation date, but can be cancelled during construction and prior to the occupation date. The Act makes provision for the cancellation or suspension of enrolment of a home prior to the occupation date of the home if:

1) the home is not being constructed in accordance with the NHBRC Technical Requirements;

2) the home builder fails to complete the construction of that home and another home builder continues that construction without notifying the NHBRC and making appropriate undertakings;

3) the granting of an order by a court for the provisional liquidation or the sequestration of a home builder;

4) on the withdrawal of the registration of the home builder; and

5) on the suspension of the registration of a home builder.
Should enrolment not be reinstated, the NHBRC is obliged to repay the enrolment fees less the reasonable costs incurred.

The warranty does not cover the housing consumer's contractual risk associated with the construction of the home.

The limitations, qualifications and exclusions to the warranty in respect of which a home builder is not liable for loss, damage, destruction or threat of collapse are:

1) wilful acts or wilful omissions of the housing consumer or persons residing in the home;
2) fire, explosion, lightning or damage caused by a third party;
3) storm, flood or earthquake or any other convulsion of nature;
4) structural alterations, repairs, modifications or alterations to the home as originally constructed and which affected the original structure of the home;
5) inadequate maintenance or abnormal use of the home or the imposition of any load greater than that for which the structure of the home was designed or the use of the home for any purpose other than that for which it was designed;
6) subsidence or landslip from any cause not related to non-compliance with the NHBRC’s Technical Requirements;
7) any change in colour, texture, opacity or staining or other aging process;
8) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds or the impact of aircraft or other aerial devices or articles dropped or falling there from;
9) destruction of or damage to the home or any loss of expense arising there from, or any liability of whatsoever nature related to ionising radiations or contamination by radioactivity from whatever cause or from nuclear weapons material;
10) war, invasion, act of foreign enemy, hostilities (whether declared or not), civil war, revolution, rebellion, insurrection or military or usurped power, strike, riot, civil commotion;
11) loss or damage to any finishes unless they must be repaired or replaced due to a major structural defect in the residential structure;
12) wear and tear, deterioration caused by neglect or damage occasioned by the failure of the housing consumer timeously to notify a home builder of any defects;
13) any costs, loss or liability for which compensation is provided by other legislation;
14) anything which is of a petty nature which any reasonable home owner or housing consumer could be expected to rectify him or herself; and
15) misuse or abnormal use of private drainage system.
3.3 **Amounts payable from the fund**

The maximum amount that may be expended by the NHBRC in terms of the Act in the event that the home builder fails to meets its obligations is the selling price of the home as declared by the home builder at the time of the enrolment of the home, up to a maximum of R 500 000.

The maximum amount that may be expended may include:

1) any professional fee incurred by the NHBRC in investigating and determining a cost effective method of rectification;

2) the necessary cost for rectification of any major structural defect and for making good any finishes necessarily damaged by the rectification process; and

3) reasonable accommodation costs where, in the opinion of the NHBRC, it would be unreasonable for a housing consumer to remain in occupation of the property due to the extensive nature of the remedial works, prescribed at maximum daily rates by the NHBRC up to a maximum of five percent of the selling price, or R25 000, whichever is the lesser.

No amount shall be paid out of the fund in relation to:

1) any limitation or exclusion identified in 5.2;

2) consequential or economic loss of any kind or description whatsoever, including damages and penalties for and losses due to delay, breach of contract, loss of rental income or default in mortgage loan repayments; and

3) any costs, loss or liability for which compensation is covered under an insurance policy.

Should the costs of rectification, as estimated by the NHBRC, in any particular case be less than five percent of the selling price of the home or R4 000, whichever is the lesser, the cost of such repairs is for the account of the housing consumer.

3.4 **Home builder's obligations**

The home builder undertakes to:

1) enter into a written agreement with the housing consumer;

2) construct foundations and superstructures appropriate to the site class designation (see 5.2.5) and degree of expected damage (see 5.2.5) indicated on plans;

3) inform the housing consumer of the contents of the risk management plan where the site is underlain by dolomites (see 5.2.6.4);

4) ensure that the home is constructed in a workmanlike manner and is fit for habitation;

5) only subcontract the construction of the home to a builder who is registered as a home builder with the NHBRC.
6) satisfy the NHBRC’s Technical Requirements by constructing homes in accordance with the requirements of the latest edition of the Home Building Manual and, where required, appoint listed competent persons or certification body to perform duties assigned in the Home Building Manual relating to the determination of site class designations and dolomite area designations and confirming compliance with the NHBRC’s Technical Requirements;

7) not proceed with the construction of the home without obtaining the necessary home enrolment certificate issued by the NHBRC;

8) adhere to all conditions laid down by the NHBRC associated with the granting of the home enrolment certificate;

9) afford NHBRC inspectors all reasonable access to undertake inspections which are necessary to confirm compliance with the NHBRC's requirements;

10) respond in writing within 7 (seven) days of receiving a complaint relating to a roof leak and within 21 (twenty one) days of receiving any other complaint from a housing consumer, indicating whether or not liability is accepted or denied, and if accepted, confirm when the work will commence and finish;

11) seek resolution of differences with a housing consumer in a reasonable manner prior to referring the complaint to the NHBRC;

12) rectify at his or her cost non-compliance with, or deviation from, the contract with a housing consumer or any deficiency related to design, workmanship or material within a 90 (ninety) day period from the occupation date, subject to the housing consumer notifying the home builder of such deficiencies within this period;

13) rectify any major structural defect (i.e. a defect which gives rise or which is likely to give rise to damage of such severity that it affects or is likely to affect the structural integrity of a home and which requires complete or partial rebuilding of the home or extensive repair work to it) in the home caused by the non-compliance with the NHBRC’s technical requirements occurring within five years from the occupation date, subject to the provisions of 5.2 and the housing consumer notifying the home builder of such defects within this period;

14) repair roof leaks attributable to workmanship, design or materials occurring with a housing consumer or any deficiency related to design, workmanship or material within a 90 (ninety) day period from the occupation date, subject to the housing consumer notifying the home builder of such deficiencies within this period;

15) lodge a complaint with the NHBRC, in the event that differences cannot be resolved with a housing consumer, only after obtaining written consent of the housing consumer and payment of the prescribed conciliation fee; and

16) respond to complaints raised by housing consumers within the time frames and in the manner indicated in Table 3.1.
3.5 Housing consumer’s obligations

3.5.1 General obligations

The housing consumer undertakes to:

1) fulfil all contractual obligations to the home builder;

2) retain a record and proof of all payments made to the home builder;

3) seek resolution of differences with a home builder in a reasonable manner prior to referring the complaint to the NHBRC;

4) notify the home builder in writing of his or her complaint, listing all items requiring attention, prior to submitting a complaint to the NHBRC;

Table 3.1: Fundamentals of the warranty

<table>
<thead>
<tr>
<th>Period commencing from the occupation date</th>
<th>Time period to respond from receipt of a complaint by the housing consumer</th>
<th>Written action by home builder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three month non-compliance</td>
<td>Within 21 days</td>
<td>1) Confirm whether the home builder denies or accepts liability for the complaint.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) Confirm when any rectification work will commence and finish.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Request, where necessary, access to effect the rectification.</td>
</tr>
<tr>
<td>Five year Major Structural Defects</td>
<td>Within seven days</td>
<td>1) Confirm whether the home builder denies or accepts liability for the complaint;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) Confirm when any rectification work will commence and finish.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Request, where necessary, access to effect the rectification.</td>
</tr>
<tr>
<td>One year roof leakage</td>
<td>Within seven days</td>
<td>1) Confirm whether the home builder denies or accepts liability for the complaint;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) Confirm when any rectification work will commence and finish.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Request, where necessary, access to effect the rectification.</td>
</tr>
</tbody>
</table>

5) retain a copy of the letter of complaint and proof of the date that it was sent to the home builder;

6) afford the home builder reasonable access to effect rectification that may be required;

7) ensure that he or she has met his or her financial obligations to the home builder prior to reporting a complaint to the NHBRC;

8) pay the prescribed refundable conciliation deposit should a complaint be lodged with the NHBRC and the NHBRC requires that such a deposit be paid;

9) ensure that the surface water drainage arrangements are not altered to the extent that water ponds within 1.5 metres of the perimeter of the home;

10) ensure that any leaks in plumbing and drainage pipes are repaired promptly;

11) ensure that garden beds in close proximity to the perimeter of the home are not over watered;
12) ensure that trees and large shrubs are not planted closer to the perimeter of homes than the distances described in 5.2.5.4; and

13) where the site is underlain by dolomites, to adhere to the provisions of the risk management plan pertaining to housing consumers.

3.5.2 Specific obligations relating to formal complaints submitted to the NHBRC for resolution

The housing consumer needs to:

1) lodge a complaint on an official complaint form;

2) deposit any retention monies with the NHBRC when requested to do so;

3) honour any findings of the NHBRC arising from a complaint relating to retention monies;

4) respond to requests by the NHBRC for further particulars and reasonable proof to substantiate the claim.

3.6 The NHBRC’s obligations

The NHBRC is required by the Act to:

1) carry out a preliminary investigation on receipt of a complaint lodged by a housing consumer, provided that due process has been followed;

2) refund conciliation deposits once the complaint has been dealt with, unless the complaint is found by the NHBRC to be frivolous;

3) accept the complaint, refer the parties to arbitration by a single arbitrator in terms of the Arbitration Act or refuse to deal with the complaint and refer the parties to their rights under section 13 (2) of the Act for the matter to be resolved through normal court proceedings; and

4) refund conciliation deposits once the claim has been dealt with unless the claim is found to be frivolous.
4 Satisfying the NHBRC Technical Requirements by means of compliance methods

4.1 Introduction

The compliance methods provided in the Home Building Manual can be applied to single storey homes constructed on soil horizons which:

1) are founded on soil horizons which have negligible or low total soil movements (i.e. a site which has in terms of the Home Building Manual a site class designation of R, C, H, S, C1, H1 or S1);

2) are either not underlain by dolomite land or are underlain by dolomite land and have a dolomite area designation of D1 or D2; and

3) comprises concrete surface beds, masonry walls and timber roof trusses.

It should be noted that no compliance methods for light steel framed homes and timber homes are provided. Such methods of construction need to be certified in terms of the requirements for performance based methods.

This section illustrates how the compliance methods can be applied to a 100 m² basic home shown in Figure 4.1 and which is located in Pietermaritzburg.

4.2 Structural strength and serviceability

4.2.1 Foundations

Clause 9.2.1.1 of the Home Building Manual permits a home builder to satisfy the NHBRC’s Technical Requirements for foundations supporting masonry walls to be satisfied if:

1) the design of the foundations is in accordance with the provisions of SANS 10400-H, (Foundations)

2) the construction of the foundations is in accordance with the provisions of SANS 2001-CM2 (Strip footings, pad footings and slab-on-the ground foundations for masonry walling.)

provided that the home satisfies certain criteria.

The criteria for the abovementioned design and construction rules to apply are that:

1) the homes are of single storey construction;

2) fall within the limitations of the design rules provided in SANS 10400-H;

3) the walls are not supported on steel, concrete or masonry columns;

4) are located on class R, C, H, S, C1, H1 or S1 sites and are not underlain by dolomite land having a dolomite area designation of D3 or D4.
Figure 4.1 – Basic 100 m² home single storey home of masonry construction

Table 4.1 tests the parameters of the home shown in Figure 4.1 against the applicable limitations imposed by SANS 10400-H in order to determine whether or not the rules apply. Table 4.1 indicates that the rules apply. Accordingly, strip foundations, with or without thickened floors to support internal walls as indicated in Figure 4.2 may be used. Furthermore, the floor area of the home is less than 200 m², the home has no chimneys, and there are no level changes in excess of 400 mm. As a result, the slab-on-the-ground foundation shown in Figure 4.2 may be used as an alternative to a strip foundation.

SANS 10400-H also requires that the foundations be in accordance with the provisions of SANS 2001-CM2. SANS 2001-CM2 requires that all concrete and masonry work in foundations and surface beds be in accordance with the relevant requirements of SANS 2001-CC1 (Concrete works (structural)) or SANS 2001-CC2 (concrete works (minor works)) and SANS 2001-CM1 (masonry walling) (see Table 2.2).
Figure 4.2 – Strip footing and slab-on-the-ground foundation solution
Table 4.1: Testing the applicability the compliance methods for foundations to the proposed home

<table>
<thead>
<tr>
<th>Relevant limitations relating to the applicability of the design rules contained in SANS 10400-H</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Height of wall from floor level to top of gable end ≤ 5 m | Height of wall from floor level to top of gable end  
  \[ 2.5 + 7.175 / 2 \times \tan 17.5 \]
  \[ = 3.63 \text{ m} < 5.0 \] |
| The span of the roof trusses between supporting walls ≤ 8 m | Maximum span = 7.175 < 8.0 m |
| The dead load of the roof covering ≤ 80 kg/m² | Concrete tiles weigh about 55 kg/m² < 80 kg/m² |
| The height of the foundation wall ≤ 1.5 m | The slope across the site = square root of \(14.72^2 + 7.175^2\)  
  \[ = 16.4 \text{ m} \]
  The fall across the site = 16.4 x 1.5 / 100 = 0.25 m  
  The foundation depth will not be deeper than 0.7 m below ground level and the floor of the house needs to be at least 0.15m above ground level  
  The maximum height of the foundation wall assuming that the foundations are 0.2 m thick = 0.25 + 0.7 – 0.2 + 0.15  
  \[ = 0.90 \text{ m} < 1.5 \text{ m} \] |
| The height of the fill beneath the floor ≤ 1.0 m | Maximum fill height = 0.25 + 0.075 = 0.33 m if 75 mm floor slab  
  \[ = 0.25 + 0.05 = 0.30 \text{ m} \text{ if 100 mm floor slab} \] |

SANS 2001-CM2 specifies that the grade of concrete (see Table 4.2 which is an extract of the contents of SANS 2001-CC2 (Concrete works (minor works)) be:

1) grade 10 in unreinforced strip and thickened slab foundations; and

2) grade 25 in slab-on-the-ground foundations.

SANS 2001-CM2 permits step to be formed in the foundations to reduce the height of foundation walls on sloping sites (see Figure 4.3). Steps as shown in Figure 4.3 can be made in the foundations to reduce the height of the masonry in the foundations.

![Step in strip footing](image)

Dimensions in mm

**Figure 4.3 – Detail of step in strip foundations**
Table 4.2: Mix designs for different grades of concrete (see SANS 2001-CC2)

<table>
<thead>
<tr>
<th>Grade of concrete</th>
<th>Cement kg</th>
<th>Sand Wheelbarrows</th>
<th>Stone Wheelbarrows</th>
<th>Water L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Class 42,5 N or R cement with 19 mm stone</td>
<td>100 (2 bags)</td>
<td>290</td>
<td>4.5</td>
<td>290</td>
</tr>
<tr>
<td>Class 32,5 N or R cement with 19 mm stone</td>
<td>100 (2 bags)</td>
<td>200</td>
<td>3.0</td>
<td>200</td>
</tr>
<tr>
<td>Class 42,5 N or R cement with 13 mm stone</td>
<td>100 (2 bags)</td>
<td>260</td>
<td>4.0</td>
<td>260</td>
</tr>
<tr>
<td>Class 32,5 N or R cement with 13 mm stone</td>
<td>100 (2 bags)</td>
<td>160</td>
<td>2.5</td>
<td>160</td>
</tr>
<tr>
<td>Class 42,5 N or R cement with 13 mm stone</td>
<td>100 (2 bags)</td>
<td>330</td>
<td>5.0</td>
<td>230</td>
</tr>
<tr>
<td>Class 32,5 N or R cement with 13 mm stone</td>
<td>100 (2 bags)</td>
<td>200</td>
<td>3.0</td>
<td>160</td>
</tr>
<tr>
<td>Class 32,5 N or R cement with 13 mm stone</td>
<td>100 (2 bags)</td>
<td>290</td>
<td>4.5</td>
<td>200</td>
</tr>
<tr>
<td>Class 32,5 N or R cement with 13 mm stone</td>
<td>100 (2 bags)</td>
<td>160</td>
<td>2.5</td>
<td>130</td>
</tr>
</tbody>
</table>

a A standard wheelbarrow for concrete (SANS 795 type 5 wheelbarrow) has a capacity of between 60 L and 70 L with no projection of material above the rim of the wheelbarrow.

b Only sufficient water should be added to produce a workable mix. The quantities of water are for guidance only as the actual quantity required will depend on a number of factors, including the moisture content and quality of the sand and the type of cement used.

4.2.2 Floors (surface beds)

Clause 9.2.1.2 of the Home Building Manual permits a home builder to satisfy the NHBRC’s Technical Requirements for concrete slabs supported on the ground or filling (surface bed) where the height of fill beneath the floor at any point does not exceed 400 mm using two different approaches.

The height of the fill for the home is 0.33 m which is less than 0.4 m. As a result, a competent person is not required to confirm the suitability of the filling below fills. The construction rules for compacting fills in SANS 2001-CM2 may be applied.

Where the slab does not form an integral part of a foundation system and does not pass over or are supported on foundation walls, a plain concrete slab having a panel dimension not exceeding:

- 3.5 m where floors are covered with carpets and flexible floor coverings; or
- 2.5 m where floors are covered with semi-flexible floor covering,

complying with the relevant provisions of SANS 10400-J (Floors) and SANS 2001-CC1 (Concrete works structural), or SANS 2001-CC2 (Concrete works (minor works)) will suffice. In this solution, the floors of each room are cast after the walls have been built above floor height. All floors other than those in the kitchen, living area and main bedroom have dimensions falling within the aforementioned limits. According plain concrete floors may be provided in these areas as shown in Figure 4.4. The floors to the kitchen, main bedroom and living area need to be reinforced in accordance with the provisions of SANS 10400-H (Foundations) to control cracking as shown in Figure 4.4.

Where the floor forms an integral part of the foundations, or passes over or are supported on foundation walls, such slabs are required to comply with the provisions of SANS 10400-H and SANS 2001-CM2. In the slab-on-the-ground foundation, the floor is an integral part of Satisfying the NHBRC Technical Requirements 4-5 by means of a compliance method.
the foundation and needs to be reinforced as indicated in Figure 4.2. Where the strip footings are provided with thickened slabs to support internal load bearing walls, the floor slab needs to be reinforced as shown in Figure 4.5.

75 plain concrete slab (grade 10) in all areas except main bedroom, kitchen and living areas

100 reinforced concrete (grade 25) with fabric ref 193 reinforcement in main bedroom, kitchen and living area

Polyolefin membrane in accordance with the provisions of SANS 10400-J

Surface bed details where slabs are cast after the masonry walling has been raised above floor level

Surface bed details where thickened slab footings are provided

Figure 4.4 – Compliant details of surface beds for basic home

4.2.3 Walls

Clause 9.2.2.1 of the Home Building Manual permits a home builder to satisfy the NHBRC’s Technical Requirements for masonry walls that fall within the limitations of design rules provided in SANS 10400-K (Walls) by complying with the provisions of SANS 10400-K.

Table 4.3 tests the parameters of the home shown in Figure 4.1 against the applicable limitations imposed by SANS 10400-K in order to determine whether or not the rules apply. Table 4.3 indicates that the rules do apply.

The window sizes, which are required to determine the size of openings in walls, are as indicated in Table 4.4.

The longest external wall panel is in the living room. It has a length of 6.6 m and has two openings with a combined area of 5.0 m² (2.0 x 1.540 + 1.511 x 1.245) or 30% of the wall area. Table 1 of SANS 10400-K permits a maximum wall panel length of 8.0 m for a 190 mm

Satisfying the NHBRC Technical Requirements 4-6
by means of a compliance method
solid masonry walls having openings $\geq 15\%$. The edge distances in all external wall panels are not less than 150 mm from the edge of the panel. The distance between window openings in the largest panel is more than 300 mm and the sum of the openings in this panel is less than 4,5 m ($2,0 + 1,511$) (see Figure 5 of SANS 10400-K).

**Table 4.3: Testing the applicability the compliance methods for masonry walls to the proposed home**

<table>
<thead>
<tr>
<th>Relevant limitations relating to the applicability of the design rules contained in SANS 10400-K</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single storey building</td>
<td>Yes</td>
</tr>
<tr>
<td>Foundations comply with the provisions of SANS 10400-H</td>
<td>Yes</td>
</tr>
<tr>
<td>Span of roof truss between supporting walls does not exceed 8,0m in single leaf and collar jointed walls</td>
<td>Maximum span = 7,175 &lt; 8,0 m</td>
</tr>
<tr>
<td>The nominal height of masonry above the top of openings is 0,4 m</td>
<td>Floor to ceiling height is 2,5 m, Therefore have 0,5 m above openings &gt; 0,4 m</td>
</tr>
<tr>
<td>The average compressive strength of hollow and solid masonry units is not less than 3,0 MPa and 4,0 MPa respectively</td>
<td>Yes will purchase masonry units which have this compressive strength</td>
</tr>
<tr>
<td>The mortar is a class II mortar that complies with the requirements of SANS 2001-CM1.</td>
<td>Yes will construct using this mortar class</td>
</tr>
<tr>
<td>The mass of the roof covering does not exceed 80 kg / m$^2$</td>
<td>Concrete tiles weigh about 55 kg / m$^2$ &lt; 80 kg/m$^2$</td>
</tr>
<tr>
<td>Foundation walls are not thinner than the walls that they support</td>
<td>Yes</td>
</tr>
<tr>
<td>The height of the foundations does not exceed 1,5 m</td>
<td>Height = 0,90 &lt; 1,5 m (see Table 4.1)</td>
</tr>
</tbody>
</table>

**Table 4.4: Window sizes**

<table>
<thead>
<tr>
<th>Window size</th>
<th>W</th>
<th>H</th>
<th>Sketch</th>
<th>Thickness of monolithic annealed glass in a pane (mm) (SANS 10400-N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND4F</td>
<td>1 511</td>
<td>1 245</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>NC1</td>
<td>533</td>
<td>950</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>NC2</td>
<td>1 022</td>
<td>950</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ND511FS</td>
<td>2 000</td>
<td>1 540</td>
<td></td>
<td>3 in side panels 5 in central panel</td>
</tr>
<tr>
<td>ND11F</td>
<td>2 000</td>
<td>1 245</td>
<td></td>
<td>3 in side panels 4 in central panel</td>
</tr>
</tbody>
</table>
Table 6 of SANS 10400-K permits a maximum base width for 190 mm collar jointed gable end wall with a 17 degree pitch of 8,0 m. The gable end wall for the home has a base length of 7,175. Table 5 of SANS 10400-K restricts the length of a panel in 190 mm collar jointed gable end wall with a 17 degree pitch to 7,5 m. This limitation is greater than the sum of the lengths of the two panels forming the gable end. Accordingly, the external walls for the home shown in Figure 4.1 satisfies the requirements of Part K.

The longest internal wall panel which is 90 mm thick is 4,8 m. This panel separates the kitchen from the living room. The next longest wall panel separates the main bedroom from another bedroom and has a length of 4,437 m. Table 3 of SANS 10400-K limits the length of an internal 90 mm single leaf wall panel with openings to 4,5 m. Accordingly the wall thickness in the passage needs to increase to 190 mm or a return wall having a depth of at least 0,48 m (greater of 2,5 / 8 and 4,8 / 10) needs to be provided within the length of the panel as indicated in Figure 4.5 (see also Figure 8 of SANS 10400-K).

Table 19 of SANS 10400-K requires that the maximum spacing of control joints in a concrete masonry buildings be 8,0 m or, where bedjoint reinforcement is provided at centres not exceeding 450 mm, 12,0 m. Control joints will be provided at centres not exceeding 8 m and since there is a return in the south wall, a single control (butt) joint will be provided at the interface between the main bedroom and the bedroom on the north side wall as shown in Figure 4.5. This joint will result in the external walls to the bedroom being supported on one side only. The maximum length of an external wall panel with openings supported on one side only is according to Table 14 of SANS 10400-K limited to 2,7 m. This is less than the width of the room which is 3,11 m. The control joint therefore needs to be positioned 400 mm in from the end of the panel.

The minimum length of an opening above doors is 0,9 m. The maximum length is 2,0 m. There are 5 courses of masonry above the window or 4 courses of masonry above a prestressed concrete lintel. Table 27 of SANS 10400-K requires a minimum of 4 courses above a lintel complying with the provisions of SANS 1504 (Prestressed concrete lintels).

![Figure 4.5: Addition of return wall to kitchen and control joints to satisfy the requirements of SANS 10400](image-url)
Accordingly, lintels complying with the requirements of SANS 1504 will be provided above all openings as shown in Figure 4.6.

![Precast concrete lintel](image)

**Figure 4.6:** Precast concrete lintel

SANS 10400-K requires that masonry walls complying with the design rules be constructed in accordance with the provisions of SANS 2001-CM1 (*Masonry walling*).

### 4.2.4 Glazing

Clause 9.2.2.2 of the Home Building Manual permits a home builder to satisfy the NHBRC’s Technical Requirements for glazing in external and internal walls by complying with the provisions of SANS 10400-N (*Glazing*) and installed in accordance with the provisions of SANS 2001-CG1 (*Installation of glazing in window and door frames*) or a suitable method described in SANS 10137 (*The installation of glazing in buildings*).

The approximate pane areas in the windows range from 0.5 to 1.54 m² (see Table 4.3). The thickness of glass in each panel can be determined from Table 1 of SANS 10400-N. Glass having the thickness shown in Table 4.4, which if installed in accordance with the provisions of SANS 2001-CG1, satisfies the NHBRC Technical Requirements.

### 4.2.5 Roofing assemblies

Clause 9.2.3 of the Home Building Manual permits a home builder to satisfy the NHBRC’s Technical Requirements for roofing assemblies by complying with the provisions of SANS 10400-L (*Roofs*) provided that such assembly falls within the limitations of the design rules contained in SANS 10400-L.

A roofing assembly comprises the roof covering and the supporting structure and a ceiling. SANS 10400-L:

1) limits the angle of slope (pitch) of a tiled roof with an underlay, laid strictly in accordance with the provision of the manufacturer’s instructions, to a minimum of 17 degrees; and
2) provides design rules for bolted trusses of the Howe type which have a span not exceeding 8.0 m, are fully triangulated, used in gable end to end construction, are only supported at the heel joint and are constructed in accordance with the requirements of SANS 2001-CT2 (*Structural timberwork (roofing)*).
The parameters of the home are such that the design rules provided in SANS 10400-L apply. Accordingly, the roof truss details based on the provisions of SANS 10400-L are as shown in Figure 4.7.

Pietermaritzburg is a municipal area which is required in terms of SANS 10400-L to be treated against the effects of rot, fungus and insect attack in accordance with the requirements of SANS 10005 (*The preservative treatment of timber*) and SANS 1288 (*Preservative-treated timber*).

The trusses need to be supported on wall plates of minimum size 38 mm x 76 mm and anchored to masonry by means of two strands of 2.4 mm galvanised wire embedded at least 300 mm into the masonry (see roof fixing provision in clause 4.2.11 of SANS 10400-K).

**Figure 4.7 Details of Howe Truss**

The manufacture and erection of the trusses needs to be in accordance with the provisions of SANS 2001-CT2. The bracing of the roofs needs to be in accordance with the relevant figures provided in SANS 10400-L.
4.3 Dampness and weatherproofing

Clause 9.3 of the Home Building Manual establishes the means by which a home builder may satisfy the NHBRC’s Technical Requirements for dampness and weatherproofing. The home shown in Figure 4.1 satisfies these requirements if:

1) the external masonry walls satisfy the relevant rain penetration requirements of SANS 10400-K, namely if it is a collar jointed, solid unit, solidly bed-jointed masonry wall that have a thickness of at least 190 mm;

2) the concrete floors supported on ground or filling are laid on top of a polyolefin underfloor membrane in accordance with the provisions of SANS 10400-J to provide resistance to moisture penetrating from the outside of a home;

3) the floor slab projects at least 150 mm above finished ground level;

4) the roof is covered with a concrete roof tile laid at a slope of not less than 17 degrees in accordance with the manufacturers instructions and is provided with a suitable underlay to resist rain penetration and to avoid the accumulation of rainwater thereon;

5) the ridges and flashings and gutters are in accordance with the relevant provisions of SANS 10400-L and SANS 10400-R (Stormwater disposal).

The proposed home satisfies the masonry walling requirements of SANS 10400-K as it has a 190 mm plastered wall which exceeds the minimum requirements, the concrete slab on the ground requirements is provided with underfloor membranes (see Figure 4.2) and the roof tiles are in accordance with requirements of SANS 10400-L. The site is such that the requirement for the slab to project at least 150 mm above finished ground can be readily achieved.

100 mm diameter down pipes and 100 x 75 mm wide square gutters will be provided. A down pipe can serve 44 m² of roof area. A 100 x 75 mm gutter can according to SANS 10400-R serve an area in a summer rainfall location of 53 m² (100 x 75 / 140 ). If roof overhang of 700 mm is provided, the roof area of the home is approximately 125 m².

3 down pipes on the southern wall and two down pipes on the northern wall will suffice.

4.4 Water and drainage installation

Waterborne sanitation is available for the home.

Clause 9.4 of the Home Building Manual establishes the means by which a home builder may satisfy the NHBRC’s Technical Requirements for water and drainage installations. These requirements are satisfied if:

a) the drainage installations is designed in accordance with the design rules contained in SANS 10400-P (Drainage) and installed in accordance with the provisions of SANS 2001-DP7: Sewers for buildings.

b) water installations are constructed in accordance with the provisions of SANS 2001-DP6: Below ground water installations.
by means of a compliance method
5 Extraordinary development conditions

5.1 Introduction

Single storey homes having concrete foundations and floors, masonry walls and timber roof trusses are the most commonly encountered form of house construction in South Africa. The design and construction of such homes are standardised across South Africa. Standard regional adjustments are however necessary to accommodate different environmental conditions to provide suitable indoor climates in different climatic zones. In addition, site specific adjustments may need to be made to the standard technologies and construction methods which are used in the provision of infrastructure which supports housing or the erection of a home to accommodate extraordinary development conditions to ensure satisfactory performance. Accordingly, extraordinary development conditions refer to site characteristics which necessitate that some measures over and above the “norm” are required to ensure satisfactory housing outcomes. Although the benchmark or “norm” is set by regulators for single storey homes of masonry construction, extraordinary development conditions frequently necessitate that changes in the design and construction techniques in other housing technologies are required to ensure the satisfactory performance of a home over its lifetime.

Extraordinary development conditions relate to climatic, topographic (natural ground slope of the site) and geotechnical (inherent geology) conditions. The National Housing Code 2009 (see A6.2 of Annexure A) recognises that state housing subsidies need to be adjusted for such conditions i.e. more money needs to be made available to address “conditions that require intensive precautionary measures to ensure a durable product with investment value”.

Extraordinary geotechnical conditions (geologically related conditions) typically relate to:

1) seepage / groundwater (high water tables);
2) erodibility of the soil;
3) hard excavation;
4) site class designations (movement in near surface soil horizons);
5) dolomite area designations (subsidence associated with sinkhole formation) in areas underlain by dolomite land;

Certain geographic areas are subjected to mining induced or natural seismic activity or fall within the Southern Cape Coastal Condensation Areas where condensation can occur on the underside of metal roofing sheets, at ceiling level, or interstitially (e.g. in spaces and gaps between components).

5.2 Extraordinary geotechnical conditions

5.2.1 Requirements for geotechnical investigations

The NHBRC’s Home Building Manual requires that site specific geotechnical investigations be undertaken by a listed competent person or a certification body to enable decisions to be made as to whether or not the design and construction of homes may be in accordance with the “norm” and if not, to identify what additional measures need to be taken to compensate for the site specific conditions.
Listed competent persons or certification bodies usually design the precautionary measures that are required. They do so by observing all relevant statutes, by-laws and associated regulations, standards of professional conduct and industry norms established in relevant South African national standards published in terms of the Standards Act of 2008 or standards recommended by professional associations. No attempt is made to describe professional practice in sections 5.2.2 to 5.2.7. These subsections merely alert the home builder and the housing consumer to the issues that need to be identified and addressed.

5.2.2 High water tables

5.2.2.1 Introduction

On certain sites, the level of the water table (which is defined as the depth measured from ground surface to the level to which water will rise in an excavation) can detrimentally affect homes constructed on such sites. In extreme cases, water may rise to the surface at times, in which case the soil is considered to be waterlogged.

High water tables can increase construction costs as subsurface drainage and improved damp proofing measures may be required. Service trenches may also have to be dewatered during construction.

5.2.2.2 Causes of high water tables

The level of the water table is dependent on a number of factors including rainfall, topography and soil profile. Areas with high rainfall are more likely to be subject to high water tables. Problems may also be experienced in low-lying areas where the permanent water table could be close to or above the ground surface.

Even where the permanent water table is deep, a high ground water level can occur in situations where permeable surface soils (e.g. sands) are underlain by a less permeable layer such as clay, rock or ferricrete. Water that infiltrates the ground “ponds” on the impermeable layer forming a perched water table. This ground water flows through the permeable soil above the impermeable layer at shallow depth in the down-slope direction. Where the less permeable layer rises to the surface, the ground water emerges in the form of seepage. Obstructions to the down-slope flow of groundwater such as long foundations resting on the low permeability horizon and orientated at right angles to the slope can also cause the ground water to rise to the surface.

5.2.2.3 Impact of high water tables on homes

Where the water table is very high (less than 1 metre from the surface) ground water can rise due to capillary action and penetrate into the overlying structure. This is evidenced by the presence of rising damp, manifesting as efflorescence, in the lower portions of walls and as damp or wet spots in floors. In addition, a high moisture content in the soil can reduce the bearing capacity of foundations. It can also lead to excessive settlements or soil movements, in the case of soils that are prone to collapse or heave movements in expansive soils (see 5.2.5).

Where the water table is more than 1 metre below the surface, but usually within 1,5 metre of the surface, capillary rise is unlikely to effect the structure of a home, but the aforementioned moisture-induced soil movements (collapse and heave) are still likely to occur. It is therefore essential that the site soils investigation determines the water table position and the soil type in order to determine whether or not significant soil movements should be anticipated and provision made to counteract these movements.
5.2.2.4 Provision of sub-surface drainage

The primary purpose of sub-surface drainage is to lower the water table to a level such that it is unlikely to influence the overlying structures. The provision of a properly designed sub-surface drainage system should reduce the water table to a height of 300mm above the top (overt) of the drains.

Sub-surface drainage systems can also be utilised to cut off and divert the flow of sub-surface water from higher lying areas and to intercept underground flow routes and convey this water across the development to an acceptable discharge point. This will result in a lowering of the water table in the site under consideration.

Interceptor drains should be placed to cut-off water from higher lying areas or to remove water from underground drainage paths. As such, they should be placed to intercept seepage that typically flows from a higher-lying area, in a pervious layer on top of an impervious layer (as found in a perched water table situation).

Correct placement of the interceptor is most important. It should intercept the seepage flow along the full length of the development, and be placed approximately at right angles to the flow of groundwater. The interceptor should have a continuous grade towards its outlet. The interceptor should be placed at such depth that the bottom (invert) of the drain is set into the impervious layer as indicated in Figure 5.1. The installation of one or more interceptor drains will usually lower the water table by the desired amount.

![Diagram of sub-surface drainage system](image)

**Figure 5.1 – Typical installation detail for interceptor drain.**

Where there is a generally high water table, as may typically be found in low-lying areas and depressions, a drainage field should be provided. This comprises a network of drains, either placed parallel to each other or in a herringbone pattern, at the spacing of between 15 and 50 m depending upon the permeability of the soil. Typical parallel and herringbone drainage field layouts are shown in Figure 5.2. Drain layouts may need to be adjusted to suit the layout of homes.

In order to prevent the ingress of sand or soil particles into the sub-surface drain system, the drain should be wrapped with a proprietary geofabric that is capable of filtering out soil particles.
Soil erosion occurs when the soil is ‘gnawed away’ by the forces of raindrop impact, water flow, wind and gravity. These forces detach particles of soil, carry or transport the particles and deposit the soil particles. When the velocity of the water or wind carrying soil particles is reduced, heavier soil particles drop out as sediment.

Soil erodibility is the soil's susceptibility to erosion. It is determined by how easily soil particles can be detached and transported from the soil surface. Larger soil particles such as sand are more easily detached. Smaller particles such as clay are more easily transported. Highly erodible soils can be up to 10 times more susceptible to erosion than less erodible soils. Water erosion increases with steepness and slope length. The steeper the slope, the faster and more forceful the runoff. The longer the slope, the greater the volume of water in the runoff.

Erosion can lower the ground surface and lead to the undermining of the foundations of a house. It is therefore essential that erosion is avoided in soils which have are highly erodible. This can be achieved by:

1) planting grass and ground covers to assist in retaining the soil;
2) protecting slopes through the planting of vegetation or the provision of stone pitching;
3) providing surface drainage to reduce the overland flow; and
4) flattening slopes by performing earthwork activities to reshape the site and where necessary constructing retaining walls.

5.2.4 Hard excavation

Hard rock excavation (material that cannot be removed without blasting or wedging and splitting) and boulder excavation (material containing boulders ranging in size between 0.03m³ and 20m³) increases excavation costs. Generally the increased costs are confined to the provision of services to homes. In large homes which are located on slopes, excavation in such material to achieve the desired floor levels can increase construction costs.

Shallow rock within parts of the footprint of a home can also lead to differential settlement, which in turn can lead to cracking in walls and floors (see 5.2.5).

5.2.5 Site class designations

5.2.5.1 Introduction

Masonry is a brittle material with limited tensile strength which is susceptible to cracking arising from movements (small dimensional changes) which cannot be prevented but can be accommodated. Movements in masonry usually arise from one or more of the following:

- changes in temperature;
- changes in moisture content which results in irreversible expansion in clay masonry units and drying shrinkage in concrete masonry units;
- absorption of water vapour which results in small reversible movements;
- deflection under loads; and
- ground movements and differential settlement.

Movements arising from changes in temperature and moisture content and the absorption of water vapour can be accommodated by providing movement joints in walls. Suitably positioned joints relieve the build-up of stresses and avoid cracking. Masonry members can be designed to limit deflections within tolerable limits.

Foundation movements are normally associated with changes in moisture content. Expansive soils undergo changes in volume due to changes in moisture content which manifests as swelling (heave) when the moisture content increases and shrinks when the moisture content decreases. Saturated compressible soils when loaded settle rapidly if the soil is free-draining, and gradually if it is not free-draining. Collapsible soils are stiff when dry but lose their ability to support loads when wet leading to sudden or collapse settlement.

Uniform ground movements generally do not cause damage to homes, but may detrimentally affect service (water and sewer) pipe entries at the perimeter of structures. Non-uniform movements in soil tend to cause a “doming” profile or a “dishing” profile underneath a home as illustrated in Figure 5.3 or loss of support at a corner or along a perimeter of a home.

Ground movements induce separations in masonry walls at damp proof courses with doming (hogging) and dishing (sagging) ground movements as shown in Figure 5.3. Masonry will span, or in the case of sagging (dishing) movements tend to arch, across the separation if it has adequate strength to resist the induced tensile stresses. If not, it will crack and form a movement joint.
Damage caused by heave or shrinkage movements differs from that due to collapse or consolidation settlements. Generally, if no precautions are taken to reduce differential movements or to prevent conditions promoting potential movement from occurring in homes of masonry construction, foundation movements will tend to result in:

1) on expansive soils
   - damage occurring throughout the home, the severity of the damage being greatest in the external walls or internally in the central portions of the home, depending on the moisture content of the soil preceding construction; and
   - cracks alternately opening and closing as a result of seasonal and climatic changes in the water content of the founding material.

2) on compressible soils
   - damage manifesting itself in a particular portion of the home, e.g. along a line traversing the home; and
   - cracks opening in time as subsequent settlement occurs.

3) on collapsible soils
   - damage is localised in portions of the home as and when collapse settlement occurs, e.g. beneath foundations adjacent to leaking water pipes or adjacent to areas of poor drainage where surface ponding of rainwater occurs.

In the case of expansive soils, differential movements can also lead to the sticking or jamming of doors and windows.

**5.2.5.2 Measures to accommodate ground movements**

The normal foundations for single storey masonry homes are indicated in Figure 5.4. In normal construction, all walls can be founded on strip footings. Alternatively, some or all of the internal walls can be founded on thickened footings and external walls on edge beams.
Figure 5.4 – Normal foundations for single storey homes of masonry construction

Normal construction as illustrated in Figure 5.4 can only tolerate a small amount of differential ground movement without the masonry walls cracking or doors and windows jamming. On sites where expansive, compressible and collapsible soils occur or where homes are founded partly on rock, precautionary measures need to be taken to avoid such damage. There are two types of precautionary measures which may be used in isolation or in conjunction with each other, namely geotechnical solutions or structural solutions.

Geotechnical solutions generally eliminate or reduce the total soil movements to an acceptable level by means of one of the following:

1) the removal of the soil horizons giving rise to unacceptable differential movements and the replacement of these horizons with inert material suitably compacted or the re-use of the excavated material as founding material in a compacted form (soil raft);

2) founding of the wall footings at a deeper level than is commonly associated with normal construction, i.e. on a competent horizon founding horizon below the problem
3) the densification of the soil horizons giving rise to unacceptable differential movement by means of surface compaction.

Structural solutions, on the other hand, depending upon the nature and magnitude of the differential movements, are aimed at:

1) allowing movement within masonry walls to take place through the provision of joints (see Figure 5.5)

2) lightly reinforcing masonry walls, particularly at the top and bottom of wall panels and above and below openings (see Figure 5.6)

3) reinforcing strip foundations to withstand tensile forces (see Figure 5.6);

4) creating a stiffened footing by reinforcing not only the strip foundation but also the masonry above the footing to slab or window height (see stiffened strip footing and split construction sketches in Table 5.1);

5) providing foundations which are:
   a) sufficiently stiff to limit any cracking of the masonry walls they support to within tolerable limits (see cellular raft and stiffened raft foundations shown in Table 5.1); or
   b) restrained from moving vertically in response to ground movements (see pier and piled foundations in Table 5.1).

The provision of articulation joints and the lightly reinforcing of masonry is frequently used in conjunction with cellular and stiffened raft and pier and piled construction to make the foundations more economical.

Rules are provided in the deemed-to-satisfy provision of the National Building Regulations (see SANS 10400-H, *The application of National Building Regulations – Part H: Foundations*) for normal construction and modified normal construction. Suitably qualified persons are required to take responsibility for the design and implementation of geotechnical solutions and other types of structural solutions.

### 5.2.5.3 Appropriate foundation solutions for particular sites

Expansive clays and collapsible soils are spread across South Africa as indicated in Figure 5.7. Horizons with potentially collapsible fabrics are commonly encountered across Gauteng and the North West Province, in the Bloemfontein and Durban environs and in a corridor in the Free State north of Bloemfontein stretching to the Vaal River. Expansive soils, on the other hand, are more widely distributed across South Africa and have been reported to occur in most parts of the country with the exception of the Little Karoo, the extreme Northern Cape, the northern portion of the Limpopo Province and the extreme eastern regions of the Mpumalanga Province. The areas most affected by expansive soils include the Free State gold fields, the North West Province and the Pretoria Witwatersrand Vereeniging complex, which are some of the most densely populated areas in South Africa.
Figure 5.5 – Examples of articulation joints

Figure 5.6 – Lightly reinforced masonry walls and reinforced strip footings
### Table 5.1: Different types of foundation systems for single storey homes of masonry construction

<table>
<thead>
<tr>
<th>Construction type</th>
<th>Description</th>
<th>Sketch and / or comments</th>
</tr>
</thead>
</table>
| **Cellular raft:**      | A foundation system which comprises two horizontal reinforced concrete slabs interconnected by a series of web beams that by virtue of its stiffness:  
  a) enables a home to tolerate differential movements or localized loss of support (soft spots); or  
  b) reduces the differential heave movements to a level that can be tolerated by the superstructure without significant damage occurring. | ![Cellular raft foundation sketch](image)                                                                                                                                                                                                                                          |
| **Deep strip foundation** | Normal construction where the foundations are founded at a greater depth than normal, on a competent horizon below the soil horizon which exhibits compressible or collapsible characteristics.  
  Typical details are shown in Figure 5.4 with a deeper founding level and more foundation brickwork. | Same as strip footing foundation shown in Figure 5.4 with a deeper founding level and more foundation brickwork.                                                                                                                                                                      |
| **Modified normal construction** | Normal construction with precautions, articulation joints at doors and openings, light reinforcement in masonry and reinforcement in concrete strip footings.  
  Typical details are shown in Figure 5.5 | Typical details are shown in Figure 5.5                                                                                                                                                                                                                                           |
| **Pier foundation**     | Masonry, reinforced concrete or mass concrete column with or without a pad footing, designed to transfer structural loads to a suitable founding horizon.  
  See pile foundation - ground beams on compressible and collapsible soils. A pier with or without a pad is constructed in place of a pile. | ![Pier foundation sketch](image)                                                                                                                                                                                                                                                |
<table>
<thead>
<tr>
<th>Construction type</th>
<th>Description</th>
<th>Sketch and / or comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pile</td>
<td>A reinforced concrete or steel column-shaped member designed to transfer structural loads to a suitable founding horizon</td>
<td><img src="image" alt="Sketch of Piled foundations – slab on expansive soils" /></td>
</tr>
<tr>
<td></td>
<td><strong>Piled foundations – slab on expansive soils</strong></td>
<td><img src="image" alt="Sketch of Piled foundations – ground beams on compressible and collapsible soils" /></td>
</tr>
<tr>
<td></td>
<td>(Note: The void underneath the suspended slab and the anchoring of the piles prevent movements in the soil being reflected in the floor slab and the masonry walls)</td>
<td></td>
</tr>
<tr>
<td>Split construction</td>
<td>A construction technique, in which the structure of the home is provided with sufficient flexibility to accommodate the differential movements of the founding horizon, by means of a combination of full movement joints, reinforced masonry, stiffened strip-footings and floating/suspended floors, without significant damage occurring.</td>
<td><img src="image" alt="Sketch of Split construction" /></td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Full movement joints are articulation joints that are designed to accommodate movements both in and out of the plane of the wall</td>
<td></td>
</tr>
<tr>
<td>Construction type</td>
<td>Description</td>
<td>Sketch and / or comments</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------</td>
</tr>
</tbody>
</table>
| **Stiffened raft** | A foundation system that comprises a grid of reinforced/post tensioned concrete beams cast integrally with the floor slab, which by virtue of its stiffness:  
  a) enables a home to tolerate differential movements or localized loss of support (soft spots), or  
  b) reduces the differential heave movements to a level that can be tolerated by the superstructure without significant damage occurring. | ![Sketch of Stiffened raft - widely spaced beams](image)  
Stiffened raft - widely spaced beams  
![Sketch of Stiffened raft - closely spaced beams](image)  
Stiffened raft – closely spaced beams |
| **Stiffened strip footings** | A foundation system which, by means of reinforced stiffening beam elements, enables a home to tolerate differential movements or localized loss of foundation support (soft spots) without significant damage occurring. | ![Sketch of Stiffened strip footings](image)  
Stiffened strip footings |
The founding soli horizons on a site can be described as stable, expansive, compressible or potentially collapsible in character. Sites can further be designated in terms of the magnitude of the predicted differential soil movements experienced by single storey homes. Site class designations which link the aforementioned descriptors to a range of predicted differential movements can then be linked to appropriate geotechnical and structural foundation solutions which limit cracking in masonry walls and floors to within tolerable limits (see Table 5.2). Site class designations enable the risks of structural defects in homes arising from differential movements in founding horizons to be mitigated.

### 5.2.5.4 Acceptable damage to masonry walls and concrete floors

It is widely recognised that the costs to prevent damage to masonry walls and concrete floors in a home can be more expensive than repairing the damage in the event that cracking or distortion occurs. As a result, the NHBRC Technical Requirements and the deemed-to-satisfy provisions of the National Building Regulations establish categories of acceptable damage and permit the housing consumer to choose the level of acceptable damage for their home. Three categories of expected damage are permitted as indicated in Table 5.3.

The rules for normal and modified normal construction for single storey masonry buildings provided in SANS 10400-H limit expected damage to that of category 1 (see Table 5.3) provided that:

1) leaks in all plumbing and drainage are repaired promptly;
2) no water ponds within 1,5 m of walls;
3) trees and shrubs are not closer than:
a) 0.5 m where the mature height of the tree is between 8 and 15 m and 1.2 m where the height is greater than 15 m in the case of sites having a site class designation other than H1, H2 or H3; and

b) the distances indicated in Figure 5.8 in the case of sites having a site class designation other than H1, H2 or H3

Table 5.2: NHBRC site classification designations linked to construction types

<table>
<thead>
<tr>
<th>Site class designations</th>
<th>Typical founding material</th>
<th>Character of founding material</th>
<th>Single storey masonry house construction type</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Rocks</td>
<td>Stable</td>
<td>Normal</td>
</tr>
<tr>
<td>H</td>
<td>Clays, silty clays, clayey silts and sandy clays.</td>
<td>Expansive soils</td>
<td>Normal</td>
</tr>
<tr>
<td>H1</td>
<td></td>
<td>Modifed normal / soil raft</td>
<td></td>
</tr>
<tr>
<td>H2</td>
<td></td>
<td>Stiffened or cellular raft / piled or split construction / soil raft</td>
<td></td>
</tr>
<tr>
<td>H3</td>
<td></td>
<td>Stiffened or cellular raft / piled construction / soil raft.</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Silty sands, sands, sandy and gravelly soils</td>
<td>Compressible and potentially collapsible soils</td>
<td>Normal</td>
</tr>
<tr>
<td>C1</td>
<td></td>
<td>Modified normal / compaction of in-situ soils below individual footings / deep strip foundations / soil raft.</td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td></td>
<td>Stiffened strip footings, stiffened or cellular raft / deep strip foundations / compaction of in-situ soils below individual footings / piled or pier foundations / soil raft.</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Contaminated soils, controlled fill, dolomitic areas, landslip, landfill, marshy areas, mine waste fill, mining subsidence, reclaimed areas, uncontrolled fill, very soft silts / silty clays.</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>S</td>
<td>Clayey silts, clayey sands of low plasticity, sands, sandy and gravelly soils</td>
<td>Compressible soils</td>
<td>Normal</td>
</tr>
<tr>
<td>S1</td>
<td></td>
<td>Modified normal / compaction of in-situ soil below individual footings / deep strip foundations / soil raft.</td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td></td>
<td>Stiffened strip footings, stiffened or cellular raft / deep strip foundations / compaction of in-situ soils below individual footings / piled or pier foundations / soil raft.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 5.3 Permissible categories of damage in masonry walls and floors

<table>
<thead>
<tr>
<th>Category of expected damage</th>
<th>Expected damage in masonry walls</th>
<th>Damage with reference to concrete surface beds</th>
<th>Damage caused by ground floor slab settlement and ground movements</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Negligible</td>
<td>Hairline cracks less than 0.25 mm wide, classed as negligible.</td>
<td>Hairline cracks having a crack width of less than 0.3 mm. Insignificant tilt of floor or change in level. Less than 5 mm deviation of any point from a 3 m straight edge.</td>
<td>Hairline cracks between the floor and skirting. Approximate gap less than 1.0 mm.</td>
</tr>
<tr>
<td>1 Very slight</td>
<td>Fine internal cracks which are isolated, localised, less than 1.0 mm wide and can easily be treated during normal decoration. Cracks rarely visible in external masonry.</td>
<td>Fine but noticeable cracks having a crack width of less than 1.0 mm. Floor reasonably level. Less than 8 mm deviation of any point from a 3 m straight edge.</td>
<td>Settlement of the floor slab, either at a corner or along a short wall, or possibly uniformly, such that a gap opens up below the skirting boards, where provided, but which can be masked by resetting the skirting boards. No cracks in floor slabs, although there may be negligible cracks in the floor screed and finish. Slab reasonably level. Approximate gap less than 5 mm.</td>
</tr>
<tr>
<td>2 Slight</td>
<td>Internal cracks which are less than 5 mm wide and can easily be filled. Recurrent cracks can be masked by suitable linings. Cracks not necessarily visible externally. Doors and windows might stick slightly.</td>
<td>Distinct cracks having a crack width of less than 2.0 mm. Floor noticeably curved or changed in level. Less than 10 mm deviation of any point from a 3 m straight edge.</td>
<td>Larger gaps below skirting boards; some obvious, but limited local settlement leading to slight slope of the floor slab. Gaps can be masked by resetting skirting boards and some local re-screeding might be necessary. Fine cracks appear in internal walls which might require some redecoration; slight distortion in door frames which might result in sticking of the doors. No cracks in the floor slab although there may be very slight cracks in the floor screed and finish having a width of not more than 1.0 mm. Slab reasonably level. Approximate gap less than 15 mm.</td>
</tr>
</tbody>
</table>

![Figure 5.8 – Location of trees on sites with expansive soil horizons](image)

Extraordinary development conditions
5.2.6 Dolomite area designations

5.2.6.1 Introduction

A sinkhole is a feature in the landscape that occurs suddenly and manifests itself as a hole in the ground and can occur with little warning. A subsidence, on the other hand, is a slow forming shallow enclosed depression. Sinkholes and subsidences in South Africa occur in ground underlain by dolomites, a type of carbonate rock. Sinkholes are generally circular, up to 125 m in diameter, steep sided and deep (up to 50m). Subsidences can range from metres to kilometres in surface expression and centimetres to metres in depth.

Rain water takes up carbon dioxide in the atmosphere and soil to form a weak carbonic acid. The weakly-acidic groundwater circulating along tension fractures, faults and joints in the dolomitic succession causes leaching of the carbonate minerals. The carbonates are removed in the form of bicarbonates by groundwater. This leaching is most pronounced in the first few tens of metres within bedrock or below the water table. This ultimately results in the formation of cavities in the bedrock as illustrated in Figure 5.9.

Sediments in the overburden (soil above the bedrock) spall into the cavity as indicated in Figure 5.9. The soil forms an arch over the cavity in the bedrock. Given sufficient time and the correct triggering mechanisms, instability and the eventual breaching of the ground surface may occur naturally. Human activities, particularly that relating to urban development, can greatly accelerate the formation of sinkholes as such activity disturbs the meta-stable conditions in the dolomite environment.

![Diagram of sinkhole formation](image)

**Figure 5.9 – The formation of sinkholes within carbonate rocks**

Topography and drainage, the thickness, erodibility and strength of the transported soils and residuum, the nature and topography of the underlying strata, the depth and expected fluctuations of the water table, and the presence of structural features such as faults, fractures and dykes are all factors which influence the susceptibility of sinkhole and subsidence formation taking place.

5.2.6.2 Triggering mechanisms

The primary trigger mechanisms for sinkhole and subsidence formation include:

1) ingress of water from leaking water-bearing services,
2) poorly managed surface water drainage; and
3) groundwater level drawdown.
A major study on state land south of Pretoria examined 650 sinkhole events over the 20-year period prior to the implementation of a risk management strategy. 643 (99%) of these sinkholes were found to be directly attributable to leaking services or humans’ negative influence. The introduction of a comprehensive risk management strategy reduced the annual incidence of sinkhole formation by approximately 90%.

### 5.2.6.4 Risk management strategies

The risk of sinkhole formation may be managed on dolomite land by:

1) placing restrictions on land use;
2) ensuring appropriate development;
3) establishing requirements for:
   - a) the installation of below ground infrastructure, particularly water bearing services;
   - b) the construction of above ground water bearing structures;
   - c) the management and control of surface water; and
   - d) design requirements for buildings and structures to allow the safe evacuation of occupants in the event of a hazard occurring.
4) establishing requirements for:
   - a) the management and monitoring of surface drainage and dewatering;
   - b) the maintenance of water-bearing structures and services; and
5) developing risk management systems to mitigate the hazards associated with the developments on such land that are implemented by local authorities and owners of buildings and infrastructure.

Dolomite land (land underlain by dolomites or limestone residuum or bedrock, typically at depths of no more than 60 m in areas where no de-watering has taken place and 100 m in areas where de-watering has taken place) is classified in terms of its susceptibility of a sinkhole of a certain size occurring i.e. its inherent hazard class. Dolomite land can also be categorised in terms of precautionary measures relating to the installation of water bearing services, the management and control of stormwater and the safe evacuation of occupants in the event of a hazard occurring as indicated in Table 5.4.

Permissible housing developments, based on the inherent risk characterisation of the site, the anticipated size of sinkhole, the density of homes and the precautionary measures required to support development are indicated in Table 5.5 on the assumption that suitable risk management systems are implemented.

It may be possible in some instances to develop sites having a dolomite area designation of D4 should developers be prepared to pay a premium for the development of such sites and extraordinary measures which are supported by independent reviewers are taken to mitigate risks. Table 5.6 identifies the possible opportunities for housing developments which satisfy all the additional NHBRC requirements required to develop such sites.

Note: Table 5.5 and 5.6 are based on the information contained in Table 10 of the NHBRC Home Building Manual. Table 10 links the inherent hazard class, which is based on the inherent susceptibility of a sinkhole of a certain size developing, to three basic types of housing developments (attached homes in buildings exceeding three storeys, attached homes in buildings not exceeding 3 storeys and detached homes on their own site or an effective site). Tables 5.5 and 5.6 presents the information...
contained in Table 10 in terms of the inherent susceptibility characterization of the site and the maximum diameter of surface manifestation of sinkhole rather than in terms of the inherent risk class. This presentation of Table 10 allows the reader to visualise the implications of the requirements of Table 10. Table 5.6 allows the reader to identify the threshold for housing development which have site class designations of D4 and as a result, require NHRC acceptance of proposals to mitigate the risk of sinkhole formation to within tolerable limits. Table 5.5 also allows the reader to understand which kinds of housing development are possible on dolomite utilising standard options.

Note 2: Inherent hazard class is based on two parameters namely the inherent susceptibility to sinkhole formation and the maximum size of surface manifestation of a sinkhole as follows:

<table>
<thead>
<tr>
<th>Inherent hazard class</th>
<th>Inherent susceptibility of sinkhole formation</th>
<th>maximum size of surface manifestation of a sinkhole (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt; 2</td>
</tr>
<tr>
<td>1</td>
<td>Low (up to 1 event per hectare per 200 years)</td>
<td>●</td>
</tr>
<tr>
<td>2</td>
<td>Medium (between 1 and 10 events per 200 years)</td>
<td>●</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>High (greater than 10 events per 200 years)</td>
<td>●</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.4: Dolomite area designations

<table>
<thead>
<tr>
<th>Dolomite area designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>No precautionary measures are required to support development.</td>
</tr>
<tr>
<td>D2</td>
<td>General precautionary measures that are intended to prevent the concentrated ingress of water into the ground are required to support development.</td>
</tr>
<tr>
<td>D3</td>
<td>Precautionary measures in addition to those pertaining to the prevention of concentrated ingress of water into the ground are required.</td>
</tr>
</tbody>
</table>
| D4                        | Precautionary measures:  
• in addition to that described for dolomite area designation D3 are required to reduce the hazard rating to tolerable levels so as to support development; or 
• are considered to be uneconomic or impractical to reduce the hazard rating to tolerable levels so as to support development. |
Table 5.5: Permissible development of homes on sites having a dolomite area designation of D2 or D3

<table>
<thead>
<tr>
<th>Inherent susceptibility characterization of the site</th>
<th>Maximum diameter of surface manifestation of sinkhole (m)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>small (less than 2 m diameter)</td>
<td>medium (2 – 5 m diameter)</td>
<td>large 5 – 15 m diameter</td>
<td>very large (greater than 15 m diameter)</td>
</tr>
<tr>
<td>Low - up to and including 1 events per hectare per 200 years</td>
<td>Up to 300 attached homes per hectare in buildings exceeding 3 storeys with D2 precautions and FPI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>More than 120 attached homes per hectare in buildings not exceeding 3 storeys with D3 precautions and FPI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up to 120 attached homes per hectare in buildings not exceeding 3 storeys with D2 precautions and FPI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detached home on own site or an effective site having an area not less than 150 m² with D2 precautions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium – between 1 and 10 events per hectare per 200 years</td>
<td>Up to 160 attached homes per hectare in buildings exceeding 3 storeys with D3 precautions and FPI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>More than 120 attached homes per hectare in buildings not exceeding 3 storeys with D3 precautions and FPI</td>
<td>none</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up to 120 attached homes per hectare in buildings not exceeding 3 storeys with D2 precautions and FPI</td>
<td></td>
<td>Up to 80 attached homes per hectare in buildings not exceeding 3 storeys with D3 precautions and FPI</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detached home on own site or an effective site having an area greater than 150 m² with D3 precautions</td>
<td></td>
<td>Detached home on own site or an effective site having an area not less than 300 m² with D3 precautions</td>
<td></td>
</tr>
<tr>
<td>High - greater than 10 events anticipated per hectare per 200 years</td>
<td>Up to 160 attached homes per hectare in buildings exceeding 3 storeys with D3 precautions and FPI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Up to 80 attached homes per hectare in buildings not exceeding 3 storeys with D3 precautions and FPI</td>
<td>none</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detached home on own site or an effective site having an area not less than 1 000 m² with D3 precautions and FPI</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: FPI = footprint investigation
### Table 5.6: Development characteristics dependent upon NHBRC accepting proposed precautionary measures for sites with dolomite area designation D4

<table>
<thead>
<tr>
<th>Inherent susceptibility characterization of the site</th>
<th>Description of proposed development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inherent susceptibility characterization of the site</strong></td>
<td><strong>Description of proposed development</strong></td>
</tr>
<tr>
<td>Low - up to and including 1 events per hectare per 200 years</td>
<td>Maximum diameter of surface manifestation of sinkhole (m)</td>
</tr>
<tr>
<td>Low - up to and including 1 events per hectare per 200 years</td>
<td>Small (less than 2 m diameter)</td>
</tr>
<tr>
<td>Low - up to and including 1 events per hectare per 200 years</td>
<td>More than 300 attached homes per hectare in buildings exceeding 3 storeys</td>
</tr>
<tr>
<td>Medium - greater than 1 and less than and equal to 10 events per hectare per 200 years</td>
<td>More than 160 attached homes per hectare in buildings exceeding 3 storeys</td>
</tr>
<tr>
<td>Medium - greater than 1 and less than and equal to 10 events per hectare per 200 years</td>
<td>All attached homes in buildings not exceeding 3 storeys and all detached homes permitted with standard precautions</td>
</tr>
<tr>
<td>High - greater than 10 events anticipated per hectare per 200 years</td>
<td>More than 160 attached homes per hectare in buildings exceeding three storeys</td>
</tr>
<tr>
<td>High - greater than 10 events anticipated per hectare per 200 years</td>
<td>More than 80 attached homes per hectare in buildings not exceeding three storeys</td>
</tr>
<tr>
<td>High - greater than 10 events anticipated per hectare per 200 years</td>
<td>Detached home on own site or an effective site having an area less than 1000 m²</td>
</tr>
</tbody>
</table>

**Note:** FPI= footprint investigation

### 5.2.6.4 Affected areas

The areas underlain by dolomites which are known to be susceptible to sinkhole formation and which require that risk mitigation measures be undertaken fall within the Malmani Subgroup and Campbell Rand Subgroup (see Table 5.7).

### 5.2.7 Topography of the site

The topography of the site affects the cost of infrastructure and the cost of services. For example, flat sites may require sewer pump stations to enable sewers to drain while steep undulating sites may require extensive cut to fill operations to construct roads.

The topography also affects the construction of a home. It may be necessary to construct terraces to provide a level platform for homes. Where cut to fill operations are required to provide these platforms, foundations may be founded within the fills as indicated in Figure 5.10. Such fills need to be engineered to limit differential settlements in foundations.
Table 5.7: Areas underlain by dolomites which are known to be susceptible to sinkhole formation

<table>
<thead>
<tr>
<th>Common name</th>
<th>New name</th>
<th>Common name</th>
<th>New name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barberton</td>
<td>Umjindi</td>
<td>Lebowakgomo</td>
<td>Lepelle-nkumpi</td>
</tr>
<tr>
<td>Barkley west</td>
<td>Thusanang municipality</td>
<td>Lichtenbrug</td>
<td>Lichtenburg local municipality</td>
</tr>
<tr>
<td>Belfast</td>
<td>Highlands</td>
<td>Mafikeng</td>
<td>Mafikeng local municipality</td>
</tr>
<tr>
<td>Benede</td>
<td>Benede</td>
<td>Marble hall</td>
<td>Greater marble hall municipality</td>
</tr>
<tr>
<td>Bo karoo</td>
<td>Bo karoo</td>
<td>Meyerton</td>
<td>Midvaal local municipality</td>
</tr>
<tr>
<td>Brits</td>
<td>Nw372 local council</td>
<td>Mogwase</td>
<td>Mankwe-madikwe local municipality</td>
</tr>
<tr>
<td>Bronkhorstspruit</td>
<td>Kungwini local municipality</td>
<td>Nelspruit</td>
<td>Mbombela</td>
</tr>
<tr>
<td>Bruiersfort/ohtagstad/eastern tubatse</td>
<td>Greater tubatse municipality</td>
<td>Nylstroom</td>
<td>Modimolle</td>
</tr>
<tr>
<td>Bushbuckridge</td>
<td>Bushbuckridge municipality</td>
<td>Parys</td>
<td>Ngwawhe local municipality</td>
</tr>
<tr>
<td>Carltonville</td>
<td>Merafon city local municipality</td>
<td>Pietersburg</td>
<td>Polokwane</td>
</tr>
<tr>
<td>Danielskuil</td>
<td>Dan-lime municipality</td>
<td>Pomfret</td>
<td>Molopo local municipality</td>
</tr>
<tr>
<td>Delmas</td>
<td>Delmas</td>
<td>Postmasburg</td>
<td>Re a ipela municipality</td>
</tr>
<tr>
<td>Diamondfields</td>
<td>Diamondfields</td>
<td>Potchefstroom</td>
<td>Potchefstroom local municipality</td>
</tr>
<tr>
<td>Dma lowveld</td>
<td>Dma lowveld</td>
<td>Potgietersrus</td>
<td>Mogalakwena</td>
</tr>
<tr>
<td>East Rand</td>
<td>Ekhurleni Metropolitan Municipality</td>
<td>Pretoria</td>
<td>Tshwane metropolitan municipality</td>
</tr>
<tr>
<td>Ellisras</td>
<td>Lephalale</td>
<td>Prieska</td>
<td>Priemanday municipality</td>
</tr>
<tr>
<td>Elukwatini/carolina</td>
<td>Albert luthuli</td>
<td>Randfontein</td>
<td>Randfontein local municipality</td>
</tr>
<tr>
<td>Ganyesa</td>
<td>Kagisano local municipality</td>
<td>Reivilo</td>
<td>Greater taung local municipality</td>
</tr>
<tr>
<td>Griekwastad</td>
<td>Siyancuma municipality</td>
<td>Rustenburg</td>
<td>Rustenburg local municipality</td>
</tr>
<tr>
<td>Groblersdal</td>
<td>Greater groblersdal municipality</td>
<td>Sabie</td>
<td>Thaba chweu</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>Lesedi local municipality</td>
<td>Sasolburg</td>
<td>Metsimaholo local municipality</td>
</tr>
<tr>
<td>Hoedspruit</td>
<td>Drakensberg municipality</td>
<td>Schuinsdraai nature reserve</td>
<td>Schuinsdraai nature reserve</td>
</tr>
<tr>
<td>Hopetown</td>
<td>Oranje-karoo municipality</td>
<td>Sterkfontein</td>
<td>Sterkfontein</td>
</tr>
<tr>
<td>Johannesburg</td>
<td>City of Johannesburg</td>
<td>Thabazimbi</td>
<td>Thabazimbi</td>
</tr>
<tr>
<td>Kalahari cbdc</td>
<td>Kalahari cbdc</td>
<td>Tzaneen</td>
<td>Greater tzaneen municipality</td>
</tr>
</tbody>
</table>
Table 5.7 (concluded)

<table>
<thead>
<tr>
<th>Common name</th>
<th>New name</th>
<th>Common name</th>
<th>New name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kathu</td>
<td>Gammagara municipality</td>
<td>Venterdorp</td>
<td>Venterdorp local municipality</td>
</tr>
<tr>
<td>Kgalagadi</td>
<td>Segonyana municipality</td>
<td>Vereeniging</td>
<td>Emfuleni local municipality</td>
</tr>
<tr>
<td>Klerksdorp</td>
<td>Klerksdorp local municipality</td>
<td>Vryburg</td>
<td>Naledi local municipality</td>
</tr>
<tr>
<td>Koster</td>
<td>Nw374 local municipality</td>
<td>Warmbath</td>
<td>Bela bela</td>
</tr>
<tr>
<td>Kroonstad</td>
<td>Moohaka local municipality</td>
<td>Westonaria</td>
<td>Westonaria local municipality</td>
</tr>
<tr>
<td>Krugersdorp</td>
<td>Mogale city local municipality</td>
<td>Zeerust</td>
<td>Zeerust local municipality</td>
</tr>
<tr>
<td>Kuruman</td>
<td>Kuraman-mothibistad municipality</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.10 – Fill and foundations for low side of sloped sites on engineered fill

5.3 Mining induced and natural seismic activity

South Africa is a country which experiences relatively low seismic activity. The most severe seismic events which have been recorded are at St Lucia (1932), Ceres (1969) and Welkom (1976). These events fell between 5.2 and 6.5 on the Richter Scale. On the other hand, between 40 and 60 earth tremors a monthly occur primarily in the gold mining areas of Gauteng and Free State. These mining induced seismic events range in magnitude with the highest recorded event measuring 5.5 on the Richter Scale.

Table 5.8 indicates the typical effects of earthquakes of differing magnitude. Figure 5.11 indicates the location of seismic hazards in South Africa.
### Table 5.8: The average effects of earthquake of a particular magnitude

<table>
<thead>
<tr>
<th>Magnitude (Richter scale)</th>
<th>Average earthquake effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 2.0</td>
<td>Micro earthquakes, not felt, or felt rarely by sensitive people. Recorded by seismographs.</td>
</tr>
<tr>
<td>2.0–2.9</td>
<td>Felt slightly by some people. No damage to buildings.</td>
</tr>
<tr>
<td>3.0–3.9</td>
<td>Often felt by people, but very rarely causes damage. Shaking of indoor objects can be noticeable.</td>
</tr>
<tr>
<td>4.0–4.9</td>
<td>Noticeable shaking of indoor objects and rattling noises. Felt by most people in the affected area. Generally causes none to minimal damage. Moderate to significant damage very unlikely. Some objects may fall off shelves or be knocked over.</td>
</tr>
<tr>
<td>5.0–5.9</td>
<td>Can cause damage of varying severity to poorly constructed buildings. At most, none to slight damage to all other buildings. Felt by everyone.</td>
</tr>
<tr>
<td>6.0–6.9</td>
<td>Damage to a moderate number of well-built structures in populated areas. Earthquake-resistant structures survive with slight to moderate damage. Poorly designed structures receive moderate to severe damage. Felt in wide areas up to hundreds of kilometres from the epicenter. Strong to violent shaking in epicentral area.</td>
</tr>
<tr>
<td>7.0–7.9</td>
<td>Causes damage to most buildings, some to partially or completely collapse or receive severe damage. Well-designed structures are likely to receive damage. Felt across great distances with major damage mostly limited to 250 km from epicenter.</td>
</tr>
<tr>
<td>8.0–8.9</td>
<td>Major damage to buildings, structures likely to be destroyed. Will cause moderate to heavy damage to sturdy or earthquake-resistant buildings. Damaging in large areas. Felt in extremely large regions.</td>
</tr>
<tr>
<td>9.0 and greater</td>
<td>Near or at total destruction - severe damage or collapse to all buildings. Heavy damage and shaking extends to distant locations. Permanent changes in ground topography.</td>
</tr>
</tbody>
</table>

**Figure 5.11 – Seismic hazard zones**
Earthquakes generate horizontal forces which shake the home back and forth. The magnitude of such horizontal forces depends on the underlying geology of the area experiencing seismic activity. The geological setting of sites may be categorised into the following four categories:

Type 1: Rock or other rock-like geological formation, including at most 5 m of weaker material at the surface

Type 2: Deposits of very dense sand, gravel, or very stiff clay, at least several tens of m in thickness, characterised by a gradual increase of mechanical properties with depth

Type 3: Deep deposits of dense or medium dense sand, gravel or stiff clay with thickness from several tens to many hundreds of m

Type 4: Deposits of loose-to-medium cohesion-less soil (with or without some soft cohesive layers), or of predominantly soft-to-firm cohesive soil.

The magnitude of the ground surface seismic induced horizontal forces increases with the increasing number assigned to the geological settings. “Soft” ground amplifies ground shaking. For example, the horizontal force applied to a masonry wall in a single storey non-gable end wall is 1.8 times higher in Type 4 geological settings than in Type 1 geological settings.

The horizontal forces generated by seismic activity in zones I and II (see Figure 5.11) in single and double storey houses of masonry construction are of a similar magnitude to the design wind forces. Homes of masonry construction which are located on Type 4 geological settings, where the seismic forces are highest, typically coincide with site class designations of C1, C2, S1 and S2. Such homes have lightly reinforced masonry walls to mitigate the risk of cracking due to ground movements. Such reinforcement also enhances the capacity of walls to resist horizontal forces.

The analysis of earthquake forces single and double storey houses involves a number of variables and permutations. Homes which are built strictly in accordance with the provisions of the design and construction rules of SANS 10400-H (Foundations), SANS 10400-K (Walls), SANS 10400-L (Roofs) and SANS 10400-N (Glazing) are likely to withstand seismic activity with occasional and isolated damage. Wide spread damage may be expected where homes are not designed and built in accordance with the provisions of these compliance methods or in terms of the performance methods provide in the NHBRC’s Home Building Manual.

The geometry of buildings and the weight and type of material also impacts upon the magnitude of seismic forces applied to buildings. The lighter the building, the lower the forces. The geometry of the buildings can be such that the seismic forces are magnified. Seismic forces need to be considered in the performance methods used to assess the performance of homes other than single and double story construction in zones I and II shown in Figure 5.11.

5.4 Southern Cape Coastal Condensation Areas

Condensation is caused when water vapour comes into contact with cold surfaces and condenses to form dampness or water droplets. Air can contain varying amounts of water vapour; warm air can hold more water vapour than cold air. When warm air comes into contact with a colder surface, it cools down and can’t retain the same amount of water vapour. The excess water vapour is released and forms condensation.
Normal daily activities such as taking showers and baths, washing and drying clothes, cooking and boiling kettles, produce warm air containing a large amount of water vapour. If the warm air can’t escape through an open window or air vent, it moves around until it finds a cold surface where it cools and forms condensation.

Under severe climatic conditions, such as occur in the Southern Coastal Condensation Problem Area (see Figure 5.12 and Table 5.9), condensation in building cavities such as cavity walls or in roof spaces, can over a prolonged period, be detrimental to the structural system unless appropriate protective measures are taken. The factors that give rise to such condensation in homes include overcrowding, poor thermal performance of the wall and roof construction, inadequate ventilation, the use of paraffin or gas (or both) heating for cooking and the indoor washing and drying of laundry. All of these factors contribute to the generation of excessive water vapour in the indoor atmosphere, which condenses on walls and ceilings when the surface temperature falls below the dew point. Such moisture might also be transferred into building cavities by air movement where, in turn, it condenses on cold surfaces.

Table 5.9: Towns that fall within the Southern Coastal Condensation Problem area

<table>
<thead>
<tr>
<th>Town</th>
<th>Town</th>
<th>Town</th>
<th>Town</th>
<th>Town</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addo</td>
<td>Dana Bay</td>
<td>Kalbaskraal</td>
<td>Puppiesvlei</td>
<td>Stellenbosch</td>
</tr>
<tr>
<td>Alexandria</td>
<td>Despatch</td>
<td>Kareedouw</td>
<td>Paradise Beach</td>
<td>St Francis Bay</td>
</tr>
<tr>
<td>Amsterdamhoek</td>
<td>Droë Vlakte</td>
<td>Kariega</td>
<td>Paterson</td>
<td>Still Bay</td>
</tr>
<tr>
<td>ASKAAL</td>
<td>Elgin</td>
<td>Kasuka</td>
<td>Pearly Beach</td>
<td>Storms River</td>
</tr>
<tr>
<td>ASTON BAY</td>
<td>Elim</td>
<td>Kenton on Sea</td>
<td>Philadelphia</td>
<td>Strand</td>
</tr>
<tr>
<td>ATLANTIS</td>
<td>Fairfield</td>
<td>Kleinmond</td>
<td>Plettenberg Bay</td>
<td>Struis Bay</td>
</tr>
<tr>
<td>BAARDSKEERDERSBOS</td>
<td>Firgrove</td>
<td>Klipdale</td>
<td>Pniel</td>
<td>Sunland</td>
</tr>
<tr>
<td>BELLEVUE</td>
<td>Fish Hoek</td>
<td>Knysna</td>
<td>Port Beaufort</td>
<td>Swartkops</td>
</tr>
<tr>
<td>BETHELSDORP</td>
<td>Gans Bay</td>
<td>Kommetjie</td>
<td>Port Elizabeth</td>
<td>The Crags</td>
</tr>
<tr>
<td>BETTY'S BAY</td>
<td>George</td>
<td>Kruisfontein</td>
<td>Protem</td>
<td>Vermaaklikeheid</td>
</tr>
<tr>
<td>BLIOUBERGSTRAND</td>
<td>Gordon’s Bay</td>
<td>Kuilsrivier</td>
<td>Riethuiskraal</td>
<td>Vlijenskroon</td>
</tr>
<tr>
<td>BLUECLIFF</td>
<td>Gouritsmond</td>
<td>Kylemore</td>
<td>Rietpoel</td>
<td>Vlees Bay</td>
</tr>
<tr>
<td>BOESMANSRIVIER-</td>
<td>Grabouw</td>
<td>Loerie</td>
<td>Rondeveli</td>
<td>Waenhuiskraans</td>
</tr>
<tr>
<td>MOND</td>
<td>Groot Brakriver</td>
<td>Malgas</td>
<td>Salem</td>
<td>Wilderness</td>
</tr>
<tr>
<td>BOKNESSTRAND</td>
<td>Groot</td>
<td>Melkbosstrand</td>
<td>Scarborough</td>
<td>Windmill</td>
</tr>
<tr>
<td>BOTRIVIER</td>
<td>Jongensfontein</td>
<td>Milnerton</td>
<td>Sea View</td>
<td>Witsand</td>
</tr>
<tr>
<td>BRANDWAG</td>
<td>Hartenbos</td>
<td>Mossel Bay</td>
<td>Sedgefield</td>
<td>Wittedrif</td>
</tr>
<tr>
<td>BREDASDORP</td>
<td>Hawston</td>
<td>Muizenberg</td>
<td>Simon’s Town</td>
<td>Witteklopf</td>
</tr>
<tr>
<td>CALEDON</td>
<td>Hermanus</td>
<td>Napier</td>
<td>Sinksabrug</td>
<td>Woodlands</td>
</tr>
<tr>
<td>CAPE TOWN</td>
<td>Hermon</td>
<td>Noanaha</td>
<td>Skipskop</td>
<td>Wydgeleê</td>
</tr>
<tr>
<td>CLARKSON</td>
<td>Herold’s Bay</td>
<td>Onrus</td>
<td>Slangrivier</td>
<td></td>
</tr>
<tr>
<td>COEGA</td>
<td>Hout Bay</td>
<td>Oukraal</td>
<td>Somerset West</td>
<td></td>
</tr>
<tr>
<td>COERNEY</td>
<td>Humansdorp</td>
<td>Oyster Bay</td>
<td>Southwell</td>
<td></td>
</tr>
<tr>
<td>COLCHESTER</td>
<td>Jeffreys Bay</td>
<td>Pacaltsdorp</td>
<td>Stanford</td>
<td></td>
</tr>
</tbody>
</table>

Preventative measures that can be taken include:

a) improving the thermal performance of the building by, for example, by providing insulation in ceilings and thicker masonry walls or walls of cavity construction; and
b) the provision of effective vapour barriers in appropriate positions so as to prevent rotting of timber studs or timber roof truss components, or corrosion of steel studs and wall ties.

Figure 5.12 — The Southern Coastal Condensation Problem (SCCP) area
Annexure A: Legislation which impacts upon housing

A1 Introduction

There are a number of pieces of legislation which deal with or have an impact upon housing. These may be broadly categorised as follows:

- legislation which impacts upon the planning of housing developments;
- legislation which informs the design and construction of homes;
- legislation which relates to the management of established housing developments;
- legislation which relates to the safety of constructed homes; and
- legislation which relates to the rental and sale of homes.

There is also an Act which is dedicated to the provision by the state of housing, namely the Housing Act of 1997 (Act No. 107 of 1997).

A2 Legislation which impacts upon the planning of housing developments

The Spatial Planning and Land Use Management Act of 2013 (Act No. 16 of 2013) provides the framework for spatial planning and land use management. As such it specifies the relationship between spatial planning and the land use management systems and other kinds of planning. It redresses past spatial and regulatory imbalances and promotes greater consistency and uniformity in the application procedures and decision making by authorities responsible for land use decisions and development applications. It also establishes Municipal Planning Tribunals.

The Spatial Planning and Land Management Act seeks to extend the benefits of spatial planning to urban and rural areas which do not have spatial planning and land use management legislation and as a result are excluded from such benefits. In has also been developed to address sustainable development of land which requires the integration of social, economic and environmental considerations in both forward planning and ongoing land use management to ensure that development on land serves present and future generations. It is designed to promote social and economic inclusion.


Other pieces of legislation that may impact upon housing developments include the:

- Environmental Conservation Act of 1989 (Act No. 73 of 1989) which provides for the effective protection and controlled utilization of the environment;
- Geoscience Act of 1993 (Act No. 100 of 1993) which establishes the Council for Geoscience and permits this Council to review and evaluate all geotechnical reports in respect of geohazards that may affect infrastructure and development;
National Environmental Management Act of 1998 (Act No. 107 of 1998) which provides for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment;

National Heritage Resources Act of 1999 (Act No. 25 of 1999) which introduces an integrated and interactive system for the management of the national heritage resources; and


National Environmental Management: Integrated Coastal Management Act of 2008 (Act No. 24 of 2008) which establishes a system of integrated coastal and marine management in order to promote the conservation of the coastal environment, maintains natural attributes of the coastal landscape and seascapes and ensures that development and the use of natural resources within the coastal zone is socially justifiable and ecologically sustainable.


A3 Legislation which informs the design and construction of homes

A3.1 Introduction

The primary pieces of legislation that shape and inform the design and construction of homes are as follows:

- National Building Regulations and Building Standards Act of 1977 (Act No. 103 of 1977);
- Housing Consumers Protection Measure Act of 1998 (Act No 95 of 1998);
- Occupational Health and Safety Act of 1993 (Act No. 85); and

The Consumer Protection Act of 2008 (Act No 68 of 2008) also has an impact upon the design of homes. This Act gives every consumer the right to receive goods (tangible objects) that are not only reasonably suitable for the purposes for which they are generally intended but also comply with any applicable standards set under the Standards Act of 2008 (Act No. 8 of 2008) or any other public regulation.

The National Regulator for Compulsory Specifications Act of 2008 (Act No. 5 of 2008) enables the National Regulator for Compulsory Specifications (NCRS) to issue compulsory specifications (technical regulations) that require conformity of a product or service to health,
safety or environmental protection requirements of a standard, or specific provisions of a standard. No person may import, sell or supply a commodity, product or service to which a compulsory specification applies unless such commodity, product or service complies with and / or has been manufactured in accordance such specification and, if applicable, marked in the prescribed manner with a distinctive mark, which constitutes a declaration of conformity to requirements. The Compulsory Specification List as on 29 May 2014 includes the following products which may be incorporated into a home:

- Safety glass and other safety glazing materials (VC 9003);
- Hot water storage tanks for domestic use (VC 9006);
- Cement (VC 9085);
- Preservative treated timber (VC 9092);
- Circuit-breakers (VC 8036);
- Earth leakage protection units (VC 8035);
- Starters for tubular fluorescent lamps (VC 8039); and
- Incandescent lamps (VC 8043).

A3.2 Housing Consumers Protection Measures Act No. 95 of 1998

The Housing Consumers Protection Measures Act of 1998 makes provision for the protection of housing consumers and provides for the establishment and functions of the National Home Builders Registration Council. The objects of the Council as set out in the Act include:

- represent the interests of housing consumers by providing warranty protection against defects in new homes;
- regulate the home building industry;
- provide protection to housing consumers in respect of the failure of home builders to comply with their obligations in terms of the Act;
- establish and promote ethical standards in the home building industry.
- Improve structural quality in the interests of housing consumers and the home building industry;
- promote housing consumer rights and provide housing consumer information;
- communicate with and assist home builders to register in terms of the Act; and
- assist home builders, through training and inspection, to achieve and maintain satisfactory technical standards of home building.

The Housing Consumer Protection Measures Act requires that:
• the NHBRC establish a fund for the purpose of providing assistance to housing consumers where a home builder fails to rectify major structural defects or a roof leak attributable to workmanship, design or materials which has manifested itself within 5 years or 12 months from the date of occupation, respectively;

• the Minister prescribe technical requirements “applying to a home builder for the design and construction of prescribed homes in respect of structural strength and stability, serviceability, materials, behaviour in fire, drainage and storm water management;”

• the NHBRC publish a Home Building Manual which contains “the NHBRC Technical Requirements and guidelines prescribed by the Council to comply with the NHBRC Technical Requirements;”

• registered home builders construct homes in a workmanlike manner which are fit for habitation and comply with the NHBRC Technical Requirements; and

• registered home builders rectify at their own cost major structural defects in a home caused by the non-compliance with the NHBRC Technical Requirements and occurring within a stipulated period.

The Act enables the NHBRC to make rules governing the application of NHBRC Technical Requirements to homes financed by a state housing subsidy.”

The Act does not exempt a person from any provision of the National Building Regulations and Building Standards Act, 1977.

The Act requires a home builder to enter into a written agreement with a housing consumer that, as a minimum:

• is signed by the parties;

• sets out the material terms including the financial obligations of the housing consumer;

• contains the specifications pertaining to materials to be used in the construction of the home; and

• plans that reflect the dimensions and measurements of the home, as approved by the local authority.

The Act deems such an agreement to include warranties enforceable by the housing consumer against the home builder in any court of law.

Any person in the business of home building is required to register with the NHBRC. Failure to register constitutes an offence and, on conviction, the home builder is liable for a fine or a prison term on each charge. A home builder is not permitted to commence with the construction of a home which is the subject of the Act unless the home is enrolled with the NHBRC. The home builder is responsible for submitting documents and information required by the Act. The home builder pays the enrolment fees unless the home is financed solely from the proceeds of a state housing subsidy, in which case the relevant MEC pays the enrolment fee. The NHBRC is responsible for accepting the submission and entering the submission into their records.
The home builder may expect one or more site visits from a NHBRC inspector during the building of any home. If the inspector finds that the home is not being built in accordance with the NHBRC technical standards, the inspector will issue a certificate of non-compliance obligating the home builder to rectify the defects within a specified time frame.

On receipt of a complaint by a consumer or in response to continued non-compliance reports from an inspector, the NHBRC will seek to ensure that the home builder complies with his obligations in terms of the 3 month non-compliance period, the one year roof leak period and the 5 year structural defect period. If the home builder fails to respond to the complaints within a specified period, the NHBRC will suspend the home builder’s registration. Thereafter the NHBRC may decide to offer on-site conciliation following which a report will be prepared detailing the items requiring rectification and specifying the dates by when the work must be completed. Thereafter if the home builder continually refuses or is unable to complete his obligations, the builder may be deregistered or fined. The NHBRC may then engage another registered builder to rectify the defects, complete the building of the homes and sue the errant home builder for all costs involved.

Mortgagees, conveyancers and provincial housing development boards are not permitted to lend money, effect transfers or allow development to proceed unless the home builder in each case is registered in terms of the Act and the home has been enrolled with the NHBRC and the prescribed fees have been paid.

A3.3 National Building Regulations and Building Standards Act of 1977 (Act No. 103 of 1977)

National Building Regulations and Building Standards Act of 1977 provides for the promotion of uniformity in the law relating to the erection of buildings in the areas of jurisdiction of local authorities and the prescribing of building standards. The Act empowers the Minister of Trade and Industries to make regulations on the advice of the National Regulator for Compulsory Specifications. Local authorities are responsible for the correct application and administration of the regulations.

Owners are required to:

- obtain approval for the erection of any building or structure;
- notify the local authority when building work is to be commenced to enable it to carry out the required inspections of foundations and other works as specified in the regulations;
- ensure that building work is proceeded with within the stipulated time limits or failing that, to apply for extension of such time limits;
- where applicable appoint the required architect, professional engineer or competent person for the design and supervision of various aspects of the building as prescribed in the Act and the regulations,
- obtain certificates of occupancy for completed buildings prior to moving in; and
- notifying the local authority if a building or earthworks has become dangerous and, if so instructed by the local authority, appoint an architect or registered person to investigate the matter and report to the local authority what remedial or preventative measures must be taken to safeguard the building or earthworks.
In the case of existing buildings the owner needs to take appropriate action to prevent such buildings from becoming derelict or dangerous or face the possibility of being ordered to demolish the building by the local authority.

In practice most owners delegate some or all of these obligations and responsibilities to professionals appointed by them or in the case of smaller buildings or alterations not requiring professional input, to the contractor carrying out the work. However such delegation does not relieve the owner of ultimate responsibility for the required actions. It also important for owners to be aware of the fact that the National Regulator for Compulsory Specifications and local authorities have been exempted from any liability for failures of buildings or structures erected in accordance with the national building regulations and that have been approved by a local authority. This means that owners have no recourse to these bodies in the event of failures or poor quality work.

The Act defines a “building” as “includes:

a) any other structure, whether of a permanent or a temporary nature and irrespective of the materials used in the erection thereof, erected or used for in connection with:

  • the accommodation or convenience of human beings or animals;
  • the manufacturing, processing storage, display or sale of any goods;
  • the rendering of any service;
  • the destruction or treatment of refuse or other waste material;
  • the cultivation or growing of any plant or crop;

b) any wall, swimming bath, swimming pool, reservoir or bridge or any other structure connected therewith;

c) any fuel pump or any tank used in connection therewith;

d) any part of a building including a building as defined in paragraph a), b) or c); and

e) any facilities or system, or part or portion thereof, within or outside but incidental to a building, for the provision of water supply, drainage, sewerage, stormwater disposal, electricity supply or other similar services in respect of the building.”

The Act defines an owner “in relation to a building or land, means the person in whose name the land on which the building was or is erected, or such land, as the case may be, is registered in the deeds office in question; provided that:

a) such person, in the case of a natural person, is deceased or has been declared by any court to be incapable of managing his own affairs, or a prodigal or is a patient as defined in section 1 of the Mental Health Act, 1973 (Act No. 18 of 1973), or if his estate has been sequestrated, is the executor or curator concerned, as the case may be;

b) such person, in the case of a juristic person, has been liquidated or placed under judicial management, the liquidator or judicial manager concerned, as the case may be;

c) such person is absent from the Republic or his whereabouts are unknown, any person who as agent or otherwise, undertakes the management, maintenance, or collection of rentals or other monies in respect of such land or building or who is responsible therefor; or
d) the local authority in question is unable to determine the identity of such person, any person who is entitled to the benefit of the use of such building or land or who enjoys such benefit shall be deemed to be the owner of such building or land.

The Act also defines the term erection in relation to a building in such a manner that it “includes the alteration, conversion, extension, rebuilding, re-erection, subdivision of or addition to, or repair of any part of the structural system of, any building.” The structural system in relation to a building is defined as “the system of constructional elements and components of any building which is provided to resist the loads acting upon it and to transfer such loads to the ground upon which the foundation of the building rests.” Accordingly, the provisions of the National Building regulations applies not only to the construction of a building but also to any changes or repairs to the structural system.

The provisions of the Act apply in the area of jurisdiction of any local authority. Any laws that empowered local authorities to make building regulations or by-laws prior to the promulgation of the Act, have been repealed, with the exception of those regulations or by-laws that are not replaced or are not repugnant to the National Building Regulations. The Act stipulates that a local authority must submit any proposed new building bylaw to the Minister for approval before it is promulgated and that any new bylaw not so approved is void.

The Act contains a presumption that where an accused is charged with failure to comply with the requirements of the Act relating to standards or quality of material, design or workmanship, an allegation in the charge sheet is sufficient proof of such failure unless the contrary is proved.

Section 17 of the Act establishes the framework within with the Minister may make regulations. The framework deals mainly with administrative matters, the protection of property and the general safety, health and convenience of the public in so far as they relate to the erection of buildings and of users and occupiers of buildings. Regulations have also been recently issued to deal with energy usage in order to reduce greenhouse gases i.e. environmental reasons. Any person who feels aggrieved by the refusal of a local authority to grant approval for the erection of a building or the issuing of a notice of prohibition, or who disputes the interpretation of a regulation or by-law may appeal to a Review Board established by the Minister in terms of the Act.

The Regulations consist of 21 parts namely Part A (Administration), Part B (Structural Design), Part C (Dimensions), Part D (Public Safety), Part E (Demolition Work), Part F (Site Operations), Part G (Excavations), Part J (Floors), Part K (Walls), Part L (Roofs), Part M (Stairways), Part N (Glazing), Part O (Lighting and Ventilation), Part P (Drainage), Part Q (Non-Waterborne means of Sanitary Disposal), Part R (Stormwater Disposal), Part S (Facilities for Disabled Persons), Part T (Fire Protection), Part U (Refuse Disposal), Part V (Space Heating), Part W (Fire Installation), Part XA (Energy usage).

SANS 10400 provides “deemed-to-satisfy” provisions which if satisfied enable these Regulations to be satisfied. (The parts of SANS 10400 correlate to the aforementioned parts of the National Building Regulations.)

The Act requires that when requested to do so by an owner, any licensed electrical contractor who has installed, altered or repaired the electrical wiring system of a building must issue a certificate confirming that the wiring and other installations in such a building complies with all applicable laws. Only licensed contractors or contractors authorized by the local authority may do such work. Certificates of occupancy for completed new buildings will not be issued without the required certificate from the electrical contractor.
Any person who feels aggrieved by the refusal of a local authority to grant approval for the erection of a building or the issuing of a notice of prohibition, or who disputes the interpretation of a regulation or by-law may appeal to the Review Board established by the Minister in terms of the Act. Such appeals may be lodged together with the grounds on which the appeal is based with the Chief Executive Officer of the National Regulator for Compulsory Specifications for transmission to the chairman of the Review Board. The notice of appeal must be accompanied by such plans, specifications and documents, and any other information required by the Review Board, as will enable the Review Board to effectively deal with the appeal. A fee must be paid by the applicant before an appeal will be considered.

Should an appellant not be sure on how to set out the grounds on which his arguments are based, he has the option of appointing an attorney for advice or representation.

The Act requires that when requested to so by an owner, any licensed electrical contractor who has installed, altered or repaired the electrical wiring system of a building must issue a certificate confirming that the wiring and other installations in such a building complies with all applicable laws. The Regulations prohibit a person from performing the trade of plumbing unless he is a trained plumber or works under the adequate control of a trained plumber or approved competent person.

The Act and Regulations do not place any specific obligations on persons responsible for constructing a building. The courts have, however, accepted that a building contractor in general does have a legal duty to both the building owner and to third parties to refrain from building something which is manifestly unsafe, failing which they expose themselves to delict (wrongful and blameworthy conduct which causes harm to a person) and negligence and the consequences thereof.


The Occupational Health and Safety Act of 1993 provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery and the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work.

The Act requires the employer to bring about and maintain, as far as is "reasonably practicable" a work environment that is safe and without risk to the health of the worker. This means that the employer needs to ensure that the workplace is free of substances, articles, equipment, processes, etc. that will or may cause injury, damage or disease. Where this is not possible, the employer must inform workers of these dangers, how to avoid them and how to work safely. However, it is not expected of the employer to take sole responsibility for health and safety. The Act is based on the principle that dangers in the workplace need to be addressed by communication and co-operation between the worker and the employer. The worker and the employer need to share the responsibility for health and safety in the workplace. Both parties need to pro-actively identify dangers and develop control measures to make the workplace safe. In this way, both the employer and the worker are involved in a system where health and safety representatives may inspect the workplace regularly and then report to a health and safety committee, which in turn may make recommendations to the employer.

The Electrical Installation Regulations 2009 prohibits a person from undertaking electrical installation work as an electrical contractor unless that person has been registered as an electrical contractor in terms of these Regulations. These Regulations establish...
requirements for the design and construction of electrical installations and the issuing of compliance certificates.

The Construction Regulations 2014 are applicable to all persons involved in construction work. These regulations cover requirements for applications for construction work permits, notifications for construction works, duties of a client, duties of a designer, duties of a principal contractor and a contractor, management and supervision of construction work, risk assessment for construction work, fall protection, structures, temporary works, excavation, demolition work, tunnelling, scaffolding, suspended platforms, rope access work, material hoists, bulk mixing plants, explosive actuated fastening device, cranes, construction vehicles and mobile plant, electrical installation and machinery on construction sites, use and temporary storage of flammable liquids on construction sites, water environments, housekeeping and general safeguarding on construction sites, stacking and storage on construction sites, fire precautions on construction sites, construction employee facilities, construction health and safety technical committee, approved inspection authority and offences and penalties.

The Regulations requiring an application for a construction work permit and the duties of a client do not apply to construction work relating to a single storey dwelling for a client who intends to reside in such dwelling when completed. Contractors who construct such dwellings for such clients are nevertheless required to notify the provincial director at least 7 days before that work is carried out.


The Construction Industry Development Board Act of 2000 provides for the establishment of the Construction Industry Development Board (CIDB) to implement an integrated strategy for the reconstruction, growth and development of the construction industry. The Act creates a register of contractors linked to a best practice contractor recognition scheme and a register of projects linked to a best practice project assessment scheme. Both these registers are central to the implementation of the integrated strategy.

The Act mandates the Board to:

- promote the contribution of the construction industry in meeting national construction demand and in advancing national development objectives;
- provide strategic leadership to construction industry stakeholders to stimulate sustainable growth, reform and improvement of the construction sector;
- determine and establish best practice that promotes improved industry performance, procurement and delivery management reform and a range of national development objectives;
- promote best practice through a number of legislated instruments, the uniform application of construction industry policy throughout all spheres of Government, sustainable growth, and appropriate research;
- promote, establish or endorse uniform standards and ethical standards that regulate the behaviour of those engaged in the construction procurement process;
- implement policy on construction industry development; and
advise the Minister on policy and programmes which impact on construction industry growth and development and guidelines.

The Act and its associated Construction Industry Development Regulations:

- prohibits a contractor from undertaking, carrying out or completing any construction works or portion thereof in respect of a public sector contract, unless the contractor is registered with and is in possession of a valid registration certificate issued by the CIDB;
- requires every organ of state to apply the register of contractors to its procurement processes and as such may not award a construction works contract to an unregistered contractor or to a registered contractor who does not possess the required contractor grading designation;
- requires every organ of state, where the value of a contract is equal to or exceeds R 200 000 including VAT to advertise tenders and report the award and the cancellation or termination of contracts on the CIDB website;
- requires private sector clients where the value of a contract equals or exceeds R 3 000 000 including VAT to report the award and the cancellation or termination on the CIDB website; and
- requires persons in both the public and private sectors to comply with the provisions of the CIDB Code of Conduct for the Parties engaged in Construction Procurement.

The Construction Industry Regulations does not require the register of contractors to be applied to construction works contracts that relate solely to the construction of homes that fall under the National Home Builders Registration Council’s warranty scheme. Contracts involving the construction of services (roads, stormwater, sewers or water mains) in addition to homes are not exempt from the Regulations. The register of contractors needs to be applied to such contracts.

The Standard for Uniformity in Construction Procurement published in terms of the Act establishes a uniform framework for procurement and minimum requirements for the solicitation of tender offers, the use of standard forms of contract and the formatting and compilation of procurement documents. The Standard, which is confines the choices available to clients in the forms of contract that they may use, regulates the process of offer and acceptance and informs and shapes the development of standard documentation developed by industry stakeholders.

A4 Legislation which relates to the management of established housing developments

The Sectional Titles Act of 1986 (Act No. 95 of 1986) regulates the division of buildings into sections and common property and the acquisition of separate ownership in sections coupled with joint ownership in common property. The Act also establishes bodies corporate to control common property, prescribes the management and conduct rules that apply to every sectional title scheme and lays down the framework for running such a scheme. A body corporate for each development comprises the developer and every person who thereafter becomes an owner of a unit. The developer ceases to be a member when he ceases to own a share in common property. The body corporate is required to enforce rules for the control, management, administration, use and enjoyment of the sections and the common property.
Regulations issued in terms of the Sectional Titles Act require that where a division of a building constitutes a unit which is wholly or partly let for residential purposes a report by a registered architect or a registered professional engineer “in respect of the common property relating to the general physical condition of the building or buildings comprised in the scheme, with specific reference to any defects in the buildings and the services and facilities relating thereto” be submitted with a sectional plan to the Surveyor General.

The Share Blocks Control Act of 1980 (Act No. 59 of 1980) regulates the control of the operation of share block schemes i.e. any scheme in terms of which a share, in any manner whatsoever, confers a right to or an interest in the use of immovable property (land including buildings). This Act establishes the main object and business of any share block company, namely to “operate a share block scheme in respect of immovable property owned or leased by it.” An individual owns a block of shares in the company. This block of shares is allocated to a specific part or parts of the building, the apartment, parking bay, garden, etc. Owning the block of shares entitles the individual to the permanent and exclusive use of those parts of the building. However, the company, not the individual, owns the immovable property, the land, buildings and improvements. The directors are responsible for the management of the company.

A5 Legislation which relate to the safety of constructed homes

The Occupational Health and Safety Act of 1993 (Act No. 85 of 1993) defines a user in relation to plant or machinery as “the person who uses plant or machinery for his own benefit or who has the right of control over the use of plant or machinery, but does not include a lessor of, or any person employed in connection with, that plant or machinery.” Regulations issued in terms of this Act impose responsibilities on a user.

The Electrical Installation Regulations issued in terms of the Occupational Health and Safety Act of 1993 makes the user responsible for the safety, safe use and maintenance of the electrical installation he or she uses or leases. These Regulations require that the user or lessor be in possession of a valid certificate of compliance for the installation unless the installation existed prior to 23 October 1992 and there be no change of ownership after 1 March 1994. The user or lessor of such electrical installation is required to obtain a certificate of compliance for additions or alterations to installations (e.g. changing a light fitting, installing a ceiling fan or changing a plug) and may not allow a change of ownership if the certificate of compliance is older than two years.

The Electrical Machinery Regulations of 2011 issued in terms of the Occupational Health and Safety Act of 1993 regulates electric fence system i.e. “an electrified barrier consisting of one or more bare conductors erected against the trespass of persons or animals connected to electrical machinery arranged so as to deliver a periodic non-lethal amount of electrical energy to such barrier.” These Regulations requires that a user or lessor of an electric fence system erected after 1 October 2012 be in possession of an electric fence system certificate. Such a certificate is also required where any alteration or addition is made to a fence which was in existence prior to 1 October 2012 or where there is a change of ownership.

The Pressure Equipment Regulations of 2009 issued in terms of the Occupational Health and Safety Act of 1993 (Act No. 85 of 1993) regulates gas systems i.e. “the assembly of pipes or similar ducts, fittings and valves for the reticulation, circulation and conveyance of a gas, excluding a pressure vessel or transportable gas container connected to the system.” These Regulations require the user to ensure that an external inspection and a leak test is performed by an authorised person or an approved inspection authority after installation or re-installation and before commissioning a gas system and they obtain a
Such a certificate also needs to be obtained whenever a modification, alteration or change of user or ownership occurs.

Section 12 of the National Building Regulations and Building Standards Act of 1977 (Act No. 103 of 1977) empowers the local authority to order the owner of any building that is dilapidated or in a state of disrepair or shows signs thereof, or any building or the land on which a building was erected is dangerous or showing signs of being dangerous to life or property to demolish or to alter or secure it in order to make it safe. Where action is required forthwith to protect life or property, the local authority is empowered to take action and to recover costs from the owner.

Regulation A15 of the National Building Regulations issued in terms of the National Building Regulations and Building Standards Act of 1977 requires the owner of a building to:

a) ensure that any mechanical equipment, facility or any service installation provide in or in connection with a building is maintained in a safe and functional condition.

b) maintain the safety performance (behaviour of buildings under all actions that can be reasonably expected to occur) of the building; and

c) maintain the measures taken to resist the penetration of rain water and the passage of moisture into the interior of a building

The local authority may serve a notice on such owner or person requiring compliance with the requirements of Regulation A15 and if necessary, order the evacuation of such building.

A6 Legislation which relates to the rental and sale of homes

The Rental Housing Act of 1999 (Act No. 50 of 1999) regulates the relationship between tenants and landlords by, among other things, laying down general requirements relating to leases, making provision for the establishment of Rental Housing Tribunals in each province, and laying down general principles governing conflict resolution in the rental housing sector.

The Property Time Sharing Control Act of 1983 (Act No. 765 of 1983) regulates the selling or letting of time-sharing interests (right to or interest in the exclusive use or occupation, during determined or determinable periods during any year, of accommodation) in property timesharing schemes. Time-sharing involves the purchasing of the right to spend a fixed period each year in a specific unit of holiday accommodation. A time-sharing interest does not give ownership, but rather a right of occupancy in accordance with terms that need to be clearly set out in a contract with the seller. A time-sharing interest entitles the purchaser to exclusive use of a certain unit for the same week (or weeks) in each year of the contract, which must, in terms of the Act, be for a period of at least three years.

The Housing Development Schemes for Retired Persons Act of 1988 (Act 65 of 1988) regulates the selling, exchanging, leasing, donating, granting or otherwise disposal of certain interests in housing development schemes for retired persons i.e. persons who are 50 years of age or older. This Act protects the interests of retired persons in retirement schemes. The Act requires that, in terms of the sales contract, all details of the property, from description of and information about the site, the architectural design of the home, the seller's financial credentials, financial background of the site – such as whether there is a mortgage bond on the property and other pertinent historical information – together with a copy of the title deed, be made available to the potential buyer. A developer is prohibited from obtaining rent or the purchase price for a house in the absence of a certificate issued by a registered architect or registered quantity surveyor that the housing development scheme concerned has been
erected substantially in accordance with any applicable officially approved building plans and
town-planning scheme and applicable local authority by-laws, and is sufficiently completed
for the purposes of utilization of the housing interest concerned."

There are three main purchase options available when it comes to retirement homes, namely Life Rights whereby the purchasers does not buy a unit but has the legal right to
occupy the unit for the duration of their life, Sectional Title and Share Block. In all three of
these options the purchaser is protected by the Housing Schemes for Retired Persons Act.
This Act prohibits a developer from obtaining rent or the purchase price for a house in the
absence of a certificate issued by a registered architect or registered quantity surveyor “that
the housing development scheme concerned has been erected substantially in accordance
with any applicable officially approved building plans and town-planning scheme and
applicable local authority by-laws, and is sufficiently completed for the purposes of utilization
of the housing interest concerned.”

The Estate Agency Affairs Act of 1976 (Act No. 112 of 1976) establishes the Estate Agency
Affairs Board and an Estate Agents Fidelity Fund for the control of certain activities of estate
agents in the public interest. The Board may establish a code of conduct, appoint Inspectors
and establish committees to ensure compliance and promote the improvement of standards
of training and services rendered by estate agents. The fidelity fund may be used to
reimburse housing consumers who have suffered pecuniary loss by reason of theft of trust
money or failure of the estate agent to comply with the Act. Estate Agents who fail to comply
with requirements may be reprimanded or fined or have their fidelity fund certificate
suspended or withdrawn. Housing consumers may report non-compliant estate agents to the
board and obtain compensation for pecuniary loss.


A6.1  The basic provisions of the Act

The Housing Act of 1997 provides for the facilitation of a sustainable housing development
process. To this end, it:

• lays down general principles applicable to housing development in all spheres of
  Government;

• defines the functions of national, provincial and local governments in respect of housing
development; and

• provides for the establishment of a South African Housing Development Board, the
  continued existence of provincial boards under the name of provincial housing
development boards and the financing of national housing programmes.

Section 26 of the Constitution of the Republic of South Africa provides everyone with the
right of access to adequate housing and requires the state to “take reasonable legislative
and other measures, within its available resources, to achieve the progressive realisation of
this right.” This Act responds to this constitutional imperative and permits the Minister to
establish a funding framework for various housing assistance measures including the
housing subsidy scheme. The Act allows for the formation of various funds including The
Mortgage Indemnity Fund, The National Housing Finance Corporation and The National
Urban Reconstruction and Housing Agency.

The Act requires the Minister to publish a National Housing Code which contains details of
the National Housing Policy and the implementation thereof and to appoint an advisory panel
to advise him on any matter related to Housing Development. The Director General is required to establish and maintain a national housing data bank together with a housing information system.

A6.2 The National Housing Code

Section 3 of the Housing Act of 1997 (Act No. 107 of 1997) requires the Minister to determine national policy, including national norms and standards, in respect of housing development including those in respect of permanent residential structures. Section 4 of the Act requires the Minister to publish a National Housing Code containing national housing policy, administrative or procedural guidelines in respect of any other matter that is reasonably incidental to national housing policy. The National Housing Code is binding on the provincial and local spheres of Government.

The National Housing Code (2009) published in terms of this Act contains the following component documents:

- simplified Guide and Policy Context which provides the background and context to the guides and an overview of the current national housing programmes;
- technical and general guide which contains the framework for approved housing programmes and the rules and eligibility criteria relating thereto, beneficiary contribution requirements, national norms and standards for the construction of stand alone dwellings financed through national housing programmes, broader environmental guidelines, components of environmentally sound housing, a variation manual which provides for the variation of subsidies for extraordinary development conditions, Extended Public Works Programme (EPWP) guidelines, an outline of housing subsidy systems, a description of the multi-year planning processes for human settlement developments and the monitoring, evaluation and impact assessment strategy for the housing sector; and
- interventions which comprises:
  - incremental interventions covering Consolidation Subsidy Programme, Emergency Subsidy Programme, Integrated Residential Development Programme, Enhanced People’s Housing Subsidies, Upgrading of Informal Settlements Programme and Subsidy Quantum - Incremental Interventions;
  - rural interventions covering Communal Land Rights, Programme, Farm Resident Subsidy Programme and Subsidy Quantum – Incremental Interventions; and
  - social and rental interventions covering Community Rental Units Programme, Institutional Subsidies, Social Housing Policy and Subsidy Quantum – Social and rental Interventions;

The Housing Code also includes a Variation Manual which makes provision for variations in the subsidy amount to finance extraordinary development conditions. These variations are
based on the geo-technical and topographical conditions of the development area and the special housing needs of certain categories of disabled beneficiaries. The application for the adjustment of the subsidy amount for geotechnical conditions is based on NHBRC phased geotechnical investigations. The geo-technical conditions that will require precautionary measures to ensure a quality housing product are seepage / groundwater i.e. permanent or perched water tables, erodability of the soil, hard excavation, dolomites, expansive clays, collapsing sand, compressible soils, mining subsidence, seismic activity (mining induced and natural seismic activity) and topography of the site (average ground slope).

Variations in subsidies are also granted for the location of site in relation to major centres to reflect increased cost of materials, to cater for the needs of people with physical disabilities or special needs and sites located within the Southern Cape Coastal Condensation Area. Verification methods are provided to establish and quantify the degree of severity of these extraordinary conditions to enable subsidies to be determined.

A6.3 Norms and standards

The Minister of Housing has introduced National Norms and Standards for the construction of stand-alone houses. All houses constructed through the application of the National Housing Programmes must at least comply with these norms and standards. These National Norms and Standards apply together with the National Building Regulations and the home building prescripts of the National Home Builders Registration Council (NHBRC). The national norms and standards published in the 2009 edition of the National Housing Code not only establish requirements for floor area and room layouts but also provide minimum technical specifications, including environmentally efficient design proposals. Technical provisions include:

- minimum levels of service for water, sanitation, roads, storm water and street lighting; and

- minimum technical specifications for all stand-alone houses constructed as part of Project Linked Subsidies, Individual Subsidies, Consolidation Subsidies, Institutional Housing Subsidies and Peoples Housing Process projects based on a set of assumptions involving conventional construction technologies.

The minimum technical specifications for stand-alone houses are based on the provisions of the Home Building Manual and the relevant parts of SANS 10400 on the assumption that favourable founding conditions exist (i.e. the site class designation is H, S, R or C), the topography is level, the connection between the house and a municipal water supply or sewer is not more than 10 m and the site does not fall within the Southern Cape Coastal Condensation Area.
Annexure B: Legislated roles and responsibilities of participants in the design and construction of a home

B1 Objective of Acts governing the design and construction of homes

The objectives of the three primary pieces of legislation in regulating the design and construction of a home are as indicated in Table B.1. Each of these Acts have a distinctly different focus. The National Building Regulations and Building Standards Act of 1977 and the Occupational Health and Safety Act of 1993 have a mandate and scope that extends well beyond housing. The scope and mandate of the Housing Consumers Protection Measure Act of 1998 is limited to housing.

Table B.1: Objectives of primary pieces of legislation in regulating the design and construction of homes

<table>
<thead>
<tr>
<th>Act</th>
<th>Objective of the legislation in regulating the design and construction of homes</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Building Regulations and Building Standards Act</td>
<td>To:</td>
</tr>
<tr>
<td>of 1977 (Act No. 103 of 1977)</td>
<td>a) protect property and the general safety, health and convenience of the public in relation to the erection of homes;</td>
</tr>
<tr>
<td></td>
<td>b) design and construct homes which are not harmful to the health or well-being of users and occupiers; and</td>
</tr>
<tr>
<td></td>
<td>c) ensure that certain solutions that are adopted for homes contribute positively to environmental sustainability.</td>
</tr>
<tr>
<td>Housing Consumers Protection Measure Act of 1998</td>
<td>To:</td>
</tr>
<tr>
<td>of 1998 (Act No. 95 of 1998)</td>
<td>a) provide housing consumers with warranty protection in new homes against major structural defects and roofing leaks; and</td>
</tr>
<tr>
<td></td>
<td>b) assist housing consumers in the enforcement of agreements concluded with home builders.</td>
</tr>
<tr>
<td>Occupational Health and Safety Act of 1993</td>
<td>To:</td>
</tr>
<tr>
<td>of 1993 (Act No. 85 of 1993)</td>
<td>a) create a safe working environment for those engaged in the construction of a home; and</td>
</tr>
<tr>
<td></td>
<td>b) protect persons other than those involved in the construction of a home from the hazards to health and safety arising out of or connected with such construction.</td>
</tr>
</tbody>
</table>

B2 Responsibilities in terms of the National Building Regulations and Building Standards Act

The National Building Regulations and Building Standards Act of 1977 and the National Building Regulations (NBR) promulgated in terms of this Act establishes obligations for a number of participants in the erection of buildings in the area of jurisdiction of a local authority as indicated in Table B.2. It should be borne in mind that the National Regulator for Compulsory Specifications, a statutory body that advises the Minister on NBRs, and the local authorities who administers these regulations have been exempted from any liability for failures of buildings or structures erected in accordance with the National Building Regulations and that have been approved by a local authority. This means that owners have no recourse to these bodies in the event of failures or poor quality work.

Reference is made in the National Building Regulations to SANS 10400, the Application of National Building Regulations, and other national standards. National standards are developed, amended and withdrawn in accordance with the provisions of the Standards Act of 2008 (Act No. 8 of 2008). This Act establishes the South African Bureau of Standards as the peak national standardisation institution in South Africa responsible for the development, maintenance and promotion of South African National Standards.
### Table B.2: Main obligations imposed upon participants by the National Building Regulations and Building Standards Act in the erection of buildings

<table>
<thead>
<tr>
<th>Participant</th>
<th>Description of participant</th>
<th>Main obligations of participant</th>
</tr>
</thead>
</table>
| **Board** | The Board of the National Regulator for Compulsory Specifications | - Advise the Minister on the making of regulations and/or their possible amendments.  
- Advise the Minister on proposed exemptions of areas of jurisdiction of local authorities from the provisions of the Act, on the use of certain methods or materials and on the local authorities' proper application of the Act.  
- Permit a deviation or grant an exemption from any applicable National Building Regulation at the request of an owner and under certain circumstances as described in the Act, except those relating to the strength and stability of buildings. |
| **Building Control Officer** | The person appointed by the local authority as a building control officer | - Make the relevant recommendations for approval by the Local Authority of building plans, specifications, certificates, etc.  
- Ensure that the requirements of the Local Authority regarding approvals are carried out.  
- Inspect buildings under construction or completed to confirm compliance with approved plans and specifications and conditions of approval including defined usage, location on site, etc.  
- Exempt owners wishing to build any building classified as minor building work from the requirements of the regulations and from the need to submit plans for approval. |
| **Local Authority** | A municipality of a statutory body so designated by the Minister | - Appoint a Building Control Officer and delegate the necessary authority to such an officer in the prescribed manner.  
- Refuse approval of an application if the building is considered to be unsightly or objectionable, to disfigure the area in which it is to be built, to derogate from the value of adjoining properties or to be dangerous to life and property.  
- Grant an applicant permission in writing to be allowed to erect any building for which relevant plans etc. were submitted in terms of the Act.  
- Query the competence of a registered professional appointed by an owner to carry out his or her duties and require the owner to appoint another person if necessary.  
- Allow the erection of a temporary building.  
- Issue a certificate of occupancy for a completed building within 14 days of receipt of a written request from the owner for such a certificate, provided it is satisfied that the building has been erected according to the requirements of the Act and the conditions of approval.  
- Stop the erection of any building where work has commenced without approval having been granted.  
- May  
  o where a building has not been proceeded with within 3 months, order the owner to resume and complete the building within periods specified and if not and where of the opinion that the building is unsightly, dangerous to life and property or derogates from the value of neighbouring and adjoining properties, order the owner to demolish such building;  
  o require the owner to engage a professional land surveyor if a boundary on a site has not been accurately determined before granting approval;  
  o test or cause to be tested any material or component used or to be used in the erection of the building to determine whether they comply with the National Building Regulations; and  
  o order the owner to remove waste material from site and ensure that sanitary facilities have been provided on site.  
- Inspect the fire installation, trenches or excavations ready for the placing of concrete foundations or drainage installations. |
## Table B.2 (concluded)

<table>
<thead>
<tr>
<th>Participant</th>
<th>Description of participant</th>
<th>Main obligations of participant</th>
</tr>
</thead>
</table>
| Minister               | Minister of Trade and Industry | • Exempt an area of jurisdiction of a local authority from the application of the Act.  
• Exempt the State from the provisions of the Act.  
• Under defined conditions remove or amend any servitudes or restrictive conditions contained in title deeds.  
• Make National Building Regulations after consultation with the Board.  
• Prohibit the use of certain methods or materials.  
• Appointing the chairman of the Review Board.  
• Approve and promulgate a by-law. |
| National Regulator     | National Regulator for Compulsory Specifications | Prepare reports on the adequacy of certain measures and on certain building projects if instructed by the Minister to do so.  
NOTE: The chief executive of the NRCS may be delegated certain powers assigned to the Minister or the Board in terms of the Act who in turn may delegate such powers to a NRCS staff member. |
| Owner                  | The person in whose name the land on which a building was or is erected | • Obtain approval for the erection of any building.  
• Notify the local authority when building work is to be commenced.  
• Proceed with building work within the stipulated time limits or failing that, to apply for extension of such time limits.  
• Appoint where required registered professionals for the design and supervision of various aspects of the building or to provide professional services as prescribed in the Act and the regulations.  
• Obtain certificates of occupancy for completed buildings prior to occupation.  
• Notify the local authority if a building or earthworks has become dangerous. |
| Registered professionals | Professional persons registered with a statutory council Frequently referred to as a competent person | • Affix name and address and professional registration number to plans, specifications, documents and diagrams submitted to the local authority in terms of the Act.  
• If instructed by the owner:  
  o investigate the condition of buildings or earthworks that are considered to be dangerous to life or property and to report to the local authority any actions taken to render such building, land or earthworks safe;  
  o demonstrate or predict to the satisfaction of the appropriate local authority, that an adopted building solution has an equivalent or superior performance to a solution that complies with the requirements of the relevant part of SANS 10400;  
  o judge if an existing building is capable of carrying any additional load arising from an addition or extension to such building;  
  o certify that any apparatus to be installed has been designed to provide a standard of ventilation which complies with the regulations;  
  o undertake a rational design and inspect during construction for:  
    ▪ precautionary measures necessary to ensure the stability of any excavation and of any adjoining property, building, service or street;  
    ▪ the structural system of the building;  
    ▪ any artificial ventilation system;  
    ▪ any drainage installation;  
    ▪ any stormwater disposal system; and  
    ▪ any fire protection system;  
  o demonstrate that energy usage in a building is equivalent to or better than that which would have been achieved by compliance with the requirements of SANS 10400;  
  o certify the adequacy of the structural system of a temporary building; and  
  o specify measures necessary to stabilize slopes and accommodate movements or other effects which could be detrimental to a building founded on unstable soil; and  
• identify the boundary pegs or beacons of a site. |
| Review Board           | A chairman appointed by the Minister and two assessors appointed to deal with a particular appeal | Decide an appeal when:  
• an application has not been approved by a local authority in terms of the Act,  
• any person disputes a notice of prohibition issued in terms of the Act; or  
• any person disputes the interpretation or application by a local authority of any National Building Regulation or any other building regulation or bylaw. |
B3 Responsibilities in terms of the Housing Consumers Protection Measures Act

The Housing Consumers Protection Measures Act of 1998 establishes obligations for a number of participants in the construction of a home as indicated in Table B3. The participants in the Housing Consumer Protection Measures Act are not necessarily the same as those in the National Building Regulations and Building Standards Act of 1977.

The National Building Regulations and Building Standards Act defines an “owner” as the person in whose name the land on which a building was or is to be erected. The Housing Consumers Protection Measure Act defines a:

1) housing consumer as “a person who is in the process of acquiring or has acquired a home”; and

2) a home builder as “a person who:

a) constructs or undertakes to construct a home or to cause a home to be constructed for any person;
b) constructs a home for the purposes of sale, leasing, renting out or otherwise disposing of such a home; or
c) is an owner builder who has not applied for exemption in terms of the Act.

Accordingly, housing consumers are “owners” only if the land is in their name. Home builders are “owners” if the land is in their name.

A home builder can at one end of the spectrum be a building contractor who contracts to build a home and at the other end, a developer of housing estates.

Table B3: Principal obligations imposed upon participants in the design and construction of buildings by Housing Consumers Protection Measures Act

<table>
<thead>
<tr>
<th>Participant</th>
<th>Description of participant</th>
<th>Main obligations of participant</th>
</tr>
</thead>
</table>
| Competent person   | Person registered in terms of the Engineering Professions of South Africa Act of 2000 or the Natural Scientific Professions Act of 2003 | • When appointed to do so by a home builder, perform duties assigned in the Home Building Manual relating to the determination of site class designations and dolomite area designations and confirming compliance with the NHBRC’s Technical Requirements.  
  • Supervise the rectification by a home builder of non-compliance with the NHBRC’s Technical Requirements.  
  • Determine compliance with the NHBRC’s Technical Requirements where requested by the Council to do so. |
| Conveyancers       | Register a mortgage bond in favour of a financial institution relating to the purchase of a home from a home builder only if  
  a) the home builder is registered with the NHBRC; and  
  b) the home has been enrolled with the NHBRC. |
Table B.3 (concluded)

<table>
<thead>
<tr>
<th>Participant</th>
<th>Description of participant</th>
<th>Main obligations of participant</th>
</tr>
</thead>
</table>
| Council              | Council of the National Home Builders Registration Council | • Maintain a register of home builders.  
• Enroll and inspect homes.  
• Provide services in terms of agreements with Members of the Executive Committee in housing projects financed solely by the state.  
• Establish, maintain and administer a warranty fund to assist housing consumers where a home builder fails to meet their obligations.  
• Process complaints received from housing consumers.  
• Assist housing consumers in the resolution of disputes with home builders.  
• Make rules regarding the conduct of home builders.  
• Prescribe registration procedures, procedures for lodging of complaints, enrolment fees and the resolution of disputes.  
• Publish a Home Building Manual. |
| Home builder         | Person who carries on the business of a home builder; or an owner builder who has not applied for exemption | • Register with the NHBRC and pay the required fees.  
• Enter into a written agreement with a housing consumer.  
• Enrol a new homes by submitting a copy of the contract, the selling price, information required by the NHBRC and paying the required fees.  
• Build homes which are in accordance with NHBRC’s Home Building Manual, fit for habitation, constructed in a workmanlike manner and in accordance with the provisions of the agreement with the housing consumer.  
• Provide the standard warranty which protects the consumer during the 3-month non-compliance period, the one year roof leak period and the 5-year structural defect period.  
• In the event of a complaint, follow the complaints procedure set out in the Regulations.  
• Rectify at own cost non-compliance with, or deviation from, the contract with a housing consumer, major structural defects and roof leakages reported within the warranty period.  
• Comply with the NHBRC’s Code of Conduct for Home Builders. |
| Housing consumer     | A person who is in the process of acquiring or has acquired a home | • Enter into an agreement with the home builder and fulfil all obligations in terms of the agreement.  
• Seek resolution of differences with a home builder prior to referring the complaint to the NHBRC and afford the home builder the opportunity to make good.  
• Notify the home builder in writing of the complaint.  
• Pay the prescribed refundable conciliation deposit if a complaint is lodged with the NHBRC.  
• Repair leaks in plumbing and drainage pipes promptly, prevent water from ponding against foundations and observe provisions risks management plans, if any, where homes are on dolomite land. |
| Inspector            | Person appointed by NHBRC to inspect homes | Undertake inspections to confirm compliance with the requirements of the Home Building Manual during construction and before enrolment in the case of late enrolment. |
| MEC                  | Member of the Executive Council responsible for housing matters in a province | • Enter into agreements with the NHBRC for services relating to the construction of home financed by the state.  
• Pay the NHBRC for services rendered in terms of an agreement.  
• Approve housing development projects financed by the state, grant a state housing subsidy or pay a home builder a portion of a housing subsidy only if:  
a) the home builder is registered with the NHBRC; and  
b) the home is or has been accepted for enrolment by the NHBRC. |
| Minister             | Minister of Human Settlements | • Appoint the NHBRC’s Council for a three year term.  
• Prescribe the procedures of the NHBRC’s disciplinary committee, the keeping of a register of home builders, applicable fees for registration and enrolment, Technical Requirements and limitations on amounts payable form the warranty fund. |
| Mortgagees           | Financial institution | Lend money for the purchase of a home from a home builder only if:  
a) the home builder is registered with the NHBRC; and  
b) the home is or has been accepted for enrolment by the NHBRC. |
Annexure B:
Roles and responsibilities of participants
In the design and construction of a home

B4 Responsibilities in terms of the Occupational Health and Safety Act

The Construction Regulations issued in terms of the Occupational Health and Safety Act of 1993 is applicable to both the construction of homes and the infrastructure associated with the housing developments. Regulation 3 (Application for a construction work permit) and Regulation 5 (Duties of a client) are not, however, applicable to work carried out in relation to a single storey home for a client who intends to reside in such home when it is completed.

The Construction Regulations establishes a number of obligations for a number of participants in the construction of homes and related infrastructure as indicated in Table B4.

The Construction Regulations 2003 define a client as “any person for whom construction works is being carried out” and a principal contractor as “an employer appointed by the client to perform construction work.” Depending upon the contractual relationships in the contracts that are entered into, a housing consumer can be a client and a homebuilder can be a client or principal contractor.

Table B4: Principal obligations imposed upon participants in the design and construction of buildings by the Occupational Health and Safety Act

<table>
<thead>
<tr>
<th>Participant</th>
<th>Description of participant</th>
<th>Main obligations of participant</th>
</tr>
</thead>
</table>
| Agent       | Competent person who acts as the representative of the client | • Assume the duties of the client.  
• Manage the health and safety on a construction project for the client.  
• Carry out the necessary inspections to verify that the construction of a structure is in accordance with the design where the designer is not so mandated to do so. |
| Client      | Person for whom construction work is being performed | • Apply to the provincial director in writing for a permit where the intended construction work exceeds 180 days, will involve more than 1 800 person days of construction work, or the works contract equals or exceeds R 13,00m or that for CIDB contractor grading designation 6. *  
• Ensure that the principal contractor keeps a copy of the construction works permit and other pertinent information in the occupational health and safety file for inspection.  
• Prepare a baseline risk assessment for an intended construction works project and site specific health and safety plans for intended construction work.  
• Provide the designers with a health and safety specification and include such information in tender documents.  
• Ensure that the principal contractor who is appointed to perform the works has the necessary competencies and resources to carry out the work safety and is registered with the compensation fund or a licensed compensations insurer.  
• Appoint every principal contractor in writing.  
• Approve the principal contract’s health and safety plan following discussions and negotiations on such plans.  
• Take reasonable steps to ensure that each contractor’s health and safety plan is maintained and implemented.  
• Ensure that periodic health and safety audits and documentation verification is conducted at least once every thirty days.  
• Stop any contractor form executing a construction activity which poses a threat to the health and safety of persons.  
• Ensure that a contractor submits a report to the provincial director where a fatality or permanently disabling injury occurs.  
• Appoint an agent to act as his representative where a construction work permit is required. |

* Not applicable to a single storey home for a client who intends to reside in such home when it is completed.
### Table B.4 (continued)

<table>
<thead>
<tr>
<th>Participant</th>
<th>Description of participant</th>
<th>Main obligations of participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competent person</td>
<td>Person who has the required knowledge, training and experience to perform a task</td>
<td>Depending upon who makes the appointment and what the scope of the appointment is, a competent person can:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- act as the client's representative, the construction manager, site supervisor or designer;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- perform risk assessments or prepare a fall protection plan;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- inform, instruct and train the contractor's employees regarding any hazard and the related work procedures or control measures;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- confirm the adequacy of temporary works structures;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- check and examine all equipment used in temporary works structures prior to their use;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- inspect all temporary structures before, during and after placement of concrete until the temporary works structure is removed;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- supervise excavation work, all demolition work, scaffolding work operations, suspended platform work, rope access work, bulk mixing plants, the design and erection of tower cranes, or all stacking and storage operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- conduct daily inspections of materials hoists;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- examine daily the explosive activated fastening devices;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- control and inspect all temporary electrical installation; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- inspect fire-extinguishing equipment.</td>
</tr>
<tr>
<td>Construction manager</td>
<td>Competent person responsible for the management of the construction site</td>
<td>• Manage the physical construction processes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Manage the co-ordination, administration and management of resources on site.</td>
</tr>
<tr>
<td>Construction supervisor</td>
<td>Competent person responsible for supervising construction activities</td>
<td>Supervise construction activities on a construction site.</td>
</tr>
<tr>
<td>Contractor</td>
<td>An employer (person who employs or provides work to any person) who performs construction works i.e. subcontractor</td>
<td>• Provide and demonstrate to the principal contractor, based on the client's health and safety specification, a suitable site specific health and safety plan.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Open and keep on site a health and safety file which includes all documentation required in terms of the act and related Regulations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure that other contractors that are appointed for a part of the work have the competencies and resources necessary to perform the construction work safely.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Co-operate with the principal contractor in complying with the provisions of the Act, promptly providing health and safety information which might impact on persons carrying out construction works.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not allow or permit any employee or person to enter any site unless that person has undergone appropriate health and safety induction training.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure that all employees have a valid medical certificate of fitness specific to the construction work to be performed which is issued by an occupational health and safety practitioner.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Appoint the necessary competent persons and engineering professionals to perform prescribed tasks and activities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Notify the provincial director prior to undertaking construction works which does not require the prior issuing of a work permit but includes excavation work, working at height where there is a risk of falling, demolition of a structure or works requiring the use of explosives.</td>
</tr>
<tr>
<td>Designer</td>
<td>A competent person who prepares, checks and approves designs</td>
<td>• Ensure that safety standards incorporated in regulations are complied with and account is taken of the client's health and safety specification in the design of a structure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Make available all health and safety information including geotechnical reports and loading that the structure is to withstand to the client before a contract is put out to tender.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inform the client of known or anticipated dangers or hazards relating to the construction works, refrain from including anything in the design which can be avoided by modifying the design or by substituting materials and take account of hazards relating to subsequent maintenance and ergonomic design principles in the design.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Carry out the necessary inspections to verify that the construction of the relevant structure is carried out in accordance with the design where the mandated to do so.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• In the case of the design of temporary works, ensure that such works are capable of withstands all vertical and lateral loads that may be applied.</td>
</tr>
<tr>
<td>Health and safety officer</td>
<td>An employee of the contractor registered in terms of the Project and Construction Management professions Act of 2000</td>
<td>Assist in the control of health and safety related aspects on the site.</td>
</tr>
</tbody>
</table>
### Table B.4 (Concluded)

<table>
<thead>
<tr>
<th>Participant</th>
<th>Description of participant</th>
<th>Main obligations of participant</th>
</tr>
</thead>
</table>
| Inspector   | Employee of the Department of Labour | Visit any site at reasonable times without prior notice and:  
- question any person alone or in the presence of another person;  
- examine any book, record or other document and make copies of such documents and receive any explanations regarding such documentation;  
- inspect the works; and  
- seize any evidence which may be used in the trial of any person charged with an offence under the Act. |
| Professional certificated engineer |  | Certify the design system for a suspended platform. |
| Professional engineer or Professional engineering technologist |  | Determine the stability of an excavation.  
- Certify the design system for a suspended platform. |
| Principal contractor | An employer appointed by the client to perform construction works (main contractor) | Provide and demonstrate to the client, based on the client’s health and safety specification, a suitable site specific health and safety plan.  
Open and keep on site a health and safety file which includes all documentation required in terms of the act and related Regulations.  
Ensure that other contractors that are appointed for a part of the work (subcontractors) have the competencies, resources and information to necessary perform the construction work safely.  
Make information available to the client regarding contractors who are accountable to the principal contractor (subcontractors).  
Take reasonable steps to ensure that each contractor’s health and safety plan is maintained and implemented.  
Ensure that periodic health and safety audits and documentation verification is conducted at least once every thirty days.  
Stop any contractor form executing a construction activity which poses a threat to the health and safety of persons.  
Hand over a consolidated health and safety file to the client upon completion  
Approve each contract’s health and safety plan following discussions and negotiations on such plans  
Not allow or permit any employee or person to enter any site unless that person has undergone appropriate health and safety induction training.  
Ensure that all employees have a valid medical certificate of fitness specific to the construction work to be performed issued by an occupational health and safety practitioner.  
Appoint a construction manager and where appropriate assistant construction managers and health and safety officers.  
Appoint the necessary competent persons and engineering professionals to perform prescribed tasks and activities.  
Notify the provincial director prior to undertaking construction works which does not require the prior issuing of a work permit but includes excavation work, working at height where there is a risk of falling, demolition of a structure or works requiring the use of explosives. |
| Provincial director | Employee of the Department of Labour | Issue a work permit for contraction work to proceed within 30 days of receiving an application where the intended construction work exceeds 180 days, will involve more than 1 800 person days of construction work, or the works contract equals or exceeds R 13,0m or that for CIDB contractor grading designation 6. *  
- Receive notification of intended construction works which does not require the prior issuing of a work permit but includes excavation work, working at height where there is a risk of falling, demolition of a structure or works requiring the use of explosives.  
- Receive notifications and reports on incidents. |

* Not applicable to a single storey home for a client who intends to reside in such home when it is completed.