A2 NATIONAL BUILDING CODE OF FINLAND

Building designers and plans A2
Regulations and guidelines 2002

Ministry of the Environment Decree
on building designers and plans

Issued in Helsinki on May 8, 2002

Pursuant to the decision of the Ministry of the Environment, the following regulations and guidelines on building designers and plans are issued under section 13 of the Land Use and Building Act (132/1999) issued on February 5, 1999, to be applied in building.

This Decree will enter into force on July 1, 2002, and will repeal the Ministry of the Environment decision issued on November 1, 1990, on the presentation of building plans (A2), items 1.2.1 and 1.2.2 of the Ministry of the Environment decree issued on September 29, 2000, on concrete structures (B4), the structural examples presented in table 1.1 of item 1.2.1 of the Ministry of the Environment decision on steel sheet structures (B6) issued on October 30, 1988, and the structural examples presented in table 1.1 of item 1.2.1 and item 1.2.2 of the Ministry of the Environment guidelines on steel structures (B7) issued on June 10, 1996. Earlier regulations and guidelines may, however, be applied to permit applications submitted before this Decree enters into force.

Helsinki, May 8, 2002

Minister of the Environment Satu Hassi

Director General Jouni J. Särkijärvi

A2 NATIONAL BUILDING CODE OF FINLAND

Ministry of the Environment
Housing and Building Department

BUILDING DESIGNERS AND PLANS

REGULATIONS AND GUIDELINES 2002

Contents

LEGEND

Regulations are printed in the left-hand column in this large font and they are binding.

Guidelines are printed in the right-hand column in a small font and contain acceptable solutions.

Comments are printed in the right-hand column in italics and contain further information and refer to provisions, regulations and guidelines.

1
OBJECTIVES AND SCOPE OF APPLICATION

Land Use and Building Act, section 12

The objective of building guidance is to promote:

1) the creation of a good living environment that is socially functional and aesthetically harmonious, safe and pleasant and serves the needs of its users;

2) building based on approaches which have sustainable and economical life-cycle properties and are socially and economically viable, and create and maintain cultural values;

3) the planned and continuous care and maintenance of the built environment and building stock.

1.1 Regulation

The objective of these regulations and guidelines is to supplement the requirements of the Land Use and Building Act and the provisions issued under it concerning the planning and design of building projects and supervision carried out by the authorities.

The regulations and guidelines concern building for which a permit is required or which requires other supervision by the authorities.

Explanation

Authorities here mean municipal building supervision authorities (board) and building inspectors or other municipal office-holders engaged in building supervision.

Building supervision authorities supervise building activities to protect the public interest. They also process plans and designs with mainly the public interest in mind.

1.2 Regulation

The regulations and guidelines concern duty of care by the party engaging in a building project, designer's tasks and assessment of a designer's qualifications.

Explanation

The following lists essential requirements laid down in the Land Use and Building Act and Decree:

- *building projects must comply with local detailed plans and other land-use plans (LUBA §135, §136);*
- *building sites must suit the intended type of building (LUBA §116, LUBD §57);*
- *buildings must fit into the built environment and landscape (LUBA §1, §117);*
- *buildings must fulfil the requirements of beauty and proportion (LUBA §117);*
- *a building project must not mar buildings or townscape that have historic or architectural value (LUBA 118);*
- *buildings must conform with their purpose (LUBA §117, LUBD §51, §52, §54, §56);*
- *buildings must meet the essential requirements for structural strength and stability, fire safety, hygiene, health and environment, safety in use, noise abatement, and energy economy and insulation, as set by their intended use (essential technical requirements) (LUBA §117, LUBD §50);*
- *buildings must, so far as their use requires, also be suitable for people whose capacity to move or function is limited (LUBA §117, LUBD §53);*
- *the principles of ecologically, economically, socially and culturally sustainable development must be taken into account (LUBA §1, LUBD §50-55);*

- *intended building must also otherwise comply with stipulations and provisions concerning building and fulfil the requirements of good building practice as required by the quality, difficulty, extent and other properties of the building project (LUBA §117);*
- *buildings must not be located or constructed in a way that causes unwarranted harm to neighbours or hinders appropriate building on a neighbouring property (LUBA §135, LUBD §57).*

The following applies to repair and alteration work:

- *the attributes and special features of buildings and their suitability for the intended use must be taken into account (LUBA §117);*
- *care shall be taken to ensure that buildings or townscape of historic or architectural value are not marred (LUBA §118).*

The following general building permit requirements also apply:

- *a serviceable access road to the building site exists or can be arranged (LUBA §135);*
- *water supply and waste water management can be organized satisfactorily and without causing environmental harm (LUBA §135).*

The principal stipulations on designing and building other than those laid down in or issued under the Land Use and Building Act concern fire and rescue services, electrical safety, health protection, building of emergency shelters and environmental protection.

2
DUTY OF CARE BY THE PARTY ENGAGING IN A BUILDING PROJECT

Land Use and Building Act, section 119
A party engaging in a building project shall ensure that the building is designed and constructed in accordance with building provisions and regulations and the permit granted. The party shall have the necessary competence to implement the project, as required by its difficulty, and access to qualified personnel.

2.1 Regulation

Parties engaging in building projects must engage designers whose qualifications are commensurate with the difficulty of the design task, in good time.

Guidelines

The party engaging in the building project need not possess the qualifications required by the Land Use and Building Act. The duty of care can be fulfilled by acquiring the use of sufficient expertise through work or consultation contracts or through other private legal agreements.

It is recommended that the starting point for the plan for the building project and the appointment of designers be discussed with the building supervision authorities at the time design work is started.

2.2 Regulation

The names of appointed designers are to be included in the building permit application. The notification required by the building permit or otherwise by the building supervision authorities concerning those who will draw up any special designs and details may be submitted at the start-up meeting or otherwise before the plans or reports are submitted to the authorities.

The appointed designers, whose names have been submitted to the authorities, must be natural persons who have agreed to take on the task. The notification must be submitted in writing and it must include all necessary information to verify the designer's proficiency.

The building supervision authorities must be notified in writing when an appointed designer is replaced while the project is underway.

Explanation

Designers who must be appointed are the principal designer and the building designer. Of special designers, the names of the structural designer, HVAC designer, ventilation designer and water supply, sewage and drainage designer are usually submitted. A building designer or a special designer may also function as the principal designer.

Depending on the nature and difficulty of the building project, other special designers may also be included, such as a fire safety designer, geotechnical designer and a rock engineering designer.

2.3 Regulation

When necessary, the notification concerning the principal designer must include all other duties the designer is engaged in which may have a bearing on his ability to perform the duties of the principal designer. If a special reason exists, the principal designer may be asked to account for the duties he has been assigned to in the project and the time available to carry them out.

Guidelines

In a project where prefabricated type houses are built, it is the principal designer's duty to act as an expert when the type of building is selected and when the suitability of the building site and the building's location on it are assessed.

2.4 Regulation

When starting the design process, a party engaging in a building project must, with the assistance of the principal designer:

- assess the building project's design and building requirements and the available resources;
- determine the need for building and special design; and
- organize the collaboration of designers to draw up use and maintenance instructions for the building.

Guidelines

In practice, design work requires that the time allocated to designing and building is realistic and that designers have their rights to notify of their remarks or claims concerning their responsibilities and within these.

Explanation

The regulations concerning use and maintenance instructions for buildings can be found under part A4 of the National Building Code (RakMK).

2.5 Regulation

Parties engaging in a building project must also take care that the required responsible site manager is engaged and approved by the authorities and that provision is made for any duties the site manager must undertake during building under the building permit or a decision made at the start-up meeting to ensure the quality of building.

Explanation

See part A1 of the National Building Code for provisions on the start-up meeting held before building is begun and on the supervision of building.

3
DESIGNERS' DUTIES

Land Use and Building Act, section 120, paragraphs 1 and 2:

A design shall be prepared for construction that meets the requirements of this Act and provisions and regulations issued under it, and the requirements of good building practice.

A qualified person shall be in charge of the design in its entirety and of its quality, ensuring that the building design and any special designs form a complete entity which meets the requirements set for it (*principal designer*).

Land Use and Building Act, section 131, paragraph 1:

Building permits shall be applied for in writing. Applications shall include proof.... the master drawings signed by the designer....

Land Use and Building Act, section 120, paragraph 3:

The person in charge of each special design shall ensure that the design meets the requirements set for it. When a special design is prepared by more than one designer, one of them must be appointed as the designer responsible for the special field concerned in its entirety.

3.1 The duties of the principal designer and the principal designer's overall responsibility

3.1.1 Regulation

It is the principal designer's duty to ensure the sufficient quality and comprehensiveness of the designs for the building project so that they can be used to establish that the requirements set for building are being met.

The principal designer is answerable to the building supervision authorities for carrying out his duties in an appropriate manner during the building project's design stage and the construction work.

3.1.2 Regulation

Together with the party engaging in a building project, the principal designer shall, as required by the quality and difficulty of the project:

- ensure that required basic information is available and that it is consistent and up-to-date, and make it available to the designers;
- ensure that all designers involved in the project know which part of the required designs is their responsibility;
- organize the collaboration of the designers from different fields;
- ensure that sufficient time has been allotted to design work in the timetable; and
- ensure that all required designs are drawn up and that they have been confirmed to be mutually compatible and consistent.

Guidelines

The basic information for design work in a building project includes the following:

- requirements of land-use plans and the building ordinance, protection regulations and the evaluation of the building project's environmental impact;
- conditions at the building site, including townscape and landscape, neighbouring buildings, differences in ground levels, conditions for foundation construction, vegetation, orientation, microclimate, municipal engineering and street or road access; and
- the project's schedule of accommodation and its timetable and mode of implementation.

In addition, the following are basic points of departure for design in repair and alteration work and additional construction: the interior and exterior architecture of the building, its historical and architectural properties, materials used, building method, the assessed condition of the building — usually by an inspection, health conditions in the building and building physics.

Design collaboration is required by for example:

- building protection and preservation aspects;
- interior climate, energy economics and life-span targets for the building and building physics, including heating, sound-proofing and damp-proofing technology of the building's construction; and
- attaining the targeted level of safety.

3.1.3 Regulation

The principal designer must also:

- participate in the start-up meeting if such is called and ensure that the design duties laid down at the meeting are fulfilled;
- monitor the impact on design work of matters revealed when the structures are opened or demolished in repair or alteration work;
- take care of coordinating of the alteration design and, when necessary, of applying for authorized approval or building permit the alterations may require; and
- supervise construction work if he has been assigned to do so in the building permit or at the start-up meeting.

3.1.4 Regulation

The principal designer must ensure that building permit documents, special designs and details are drawn up and sent to the building supervision authorities as instructed by the local authority.

The principal designer shall ensure that the party engaging in a building project is informed of any issues concerning design work that have a bearing on the party's duty of care.

3.2 Designers' duties

3.2.1 Regulation

Designers must draw up the building designs they are responsible for so that they can be used to establish that the requirements set for design work and building are met.

With regard to the designs they are responsible for, designers must:

- ensure that they have access to the basic information required for the design work;
- draw up the designs that fall within in their field and the related drawings and other documents needed for the building permit application or during building;
- make any changes to designs needed during building;
- draw up use and maintenance instructions for their field of design; and
- carry out any supervision duties assigned to them in the building permit or at the start-up meeting.

Guidelines

Drawing up the master drawings required for the building permit application is the duty and responsibility of the architectural building designer.

Drawing up any special designs that are required in the building permit or ordered at the start-up meeting or during construction work is the duty and responsibility of the special designer of the relevant field.

Drawing up any details related to the designs is the duty and responsibility of the designer of the relevant field.

3.2.2 Regulation

In addition to their own design duties, designers in charge of a special design field (*responsible special designer*) must also ensure that separately drawn up designs for structures, building components or systems form a consistent whole.

Explanation
The duties of responsible special designers generally include the coordination of the following design duties:

Responsible structural designer:
Overall stability of the building, safety of load-bearing structures, structural fire safety, other structures that must be firm and safe, the interaction of substructure and load-bearing structures, the drainage of the building site, the physical functioning of structures and specified service life.

Responsible HVAC designer:
The targets of the building's interior climate, ventilation system and its energy efficiency, and the sound-proofing, fire safety and automation of ventilation equipment. Smoke extraction systems and central vacuum cleaning systems are generally included here.

Water supply, sewage and drainage systems, sound-proofing and fire safety of water supply and drainage equipment and systems and their energy efficiency, fire protection and extinguishing systems and in special cases the technical properties of unheated and uninsulated spaces and compressed air, gas and steam networks.

Depending on the type and properties of the building project, the responsible HEVAC designer's duties may be divided between a responsible ventilation designer and a responsible water supply and drainage designer.

4
DESIGNERS' QUALIFICATIONS

Land Use and Building Act, Section 123

The person drawing up a building or special design...must have the training and expertise required by the type of building project concerned and the demands of the duties involved.

The qualifications required in designing are judged according to the intended use of the building and the spaces within it, the structural loads and fire loads, the design, calculation and dimensioning methods, environmental requirements and in addition to the above any unconventional aspects of the design approach...

Design and management duties can be classified in requirement classes in order to specify the minimum qualifications. The minimum qualifications shall be prescribed by decree, and more detailed regulations and guidelines will be issued in the National Building Code of Finland.

Land Use and Building Decree, Section 48

Persons drawing up a building design or special design shall have a construction-related university degree appropriate for the planning functions in question, or an earlier construction-related higher-level vocational or other degree, and sufficient experience of working on the type of planning in question.

Buildings that are small or have ordinary technical properties may also be designed by persons with a college-level qualification in construction or in the relevant line of special study, or a corresponding earlier qualification if they are sufficiently experienced.

In addition, a person who does not possess one of the aforementioned qualifications but is deemed to have the skill required in view of the type and extent of the construction work or design task, may also carry out minor design works.

The person in charge of the design in its entirety and of its quality (*principal designer*) and the person in charge of special design shall also possess solid professional ability to manage the design in its entirety.

When the qualifications of designers are assessed, the provisions of section 123, paragraphs 1 and 2, of the Land Use and Building Act are taken into account. More detailed provisions are issued in the National Building Code of Finland.

4.1 Assessment of designers' qualifications

4.1.1 Regulation

A designer's education and experience together make up the designer's proficiency. The qualification required is the designer's adequate proficiency in relation to the demands of respective design task.

4.1.2 Regulation

The building supervision authority will ascertain the degree of difficulty of the design task in relation to the characteristics of the building project and the demands set for the building by the environment, separately for each building permit application. On this basis, the building supervision authority will assess the demands of the task in relation to the proficiency of the designer, which includes examinations passed by the designer and other studies undertaken by him plus experience and evidence of it in the relevant design field.

Guidelines

In ascertaining the degree of difficulty of the design task for each project, the grounds set out in the advisory tables given in 4.2 below, which can be used as reference. Correspondingly, the guidelines given in the tables of grounds for proficiency can be used in assessing the designer's qualifications.

In assessing the designer's qualifications, a certificate issued by the certification body for the relevant design field may be taken into account.

4.1.3 Regulation

In assessing the designer's qualifications in design tasks involving the repair and alteration works of buildings, the conditions set by the existing building and the demands that may derive from the intended new use must be taken into account.

4.1.4 Regulation

In normal building projects, the qualifications of the principal designer must generally be of at least the same level as the qualifications required for the most demanding design task in the project. The principal designer must have the experience and skill to integrate the designs of different sectors. The qualifications of a special designer responsible for a special design field in its entirety must be of at least the same level as the qualifications required for the most demanding design task in the special design field.

4.1.5 Regulation

If requested, the building supervision authority will make a separate decision as to a person's qualifications to act as designer in the project in question.

Explanation

The right of an interested party to apply for a rectification or an amendment to a decision concerning qualification is provided for in the Land Use and Building Act, sections 187 and 190.

4.2 Degree of difficulty of the design task and proficiency of the designer

(When mentioned in the tables the credit=ov refers to the definition of one academic year=40 weeks=40 credits=40 ov worth of studies)

4.2.1 Guidelines: ARK Categories of difficulty of architectural design tasks

AA (LUBD 48, 1) SPECIAL DEMANDS	**A** (LUBD 48, 1) BASIC DEMANDS	**B** (LUBD 48, 2) SMALLISH building or technical system, or one with CONVENTIONAL technical properties	**C** (LUBD 48, 3) MINOR
Design task for an extremely demanding environment or site, such as a: • cultural landscape • city centre • protected building or milieu • site or building that is of major importance in terms of history, architecture or landscape.	Design task for an environment or site with a normal level of demand.	Design task with minor environmental demands.	
Extremely demanding target level in terms of function and architecture.	Normal target level in terms of function and architecture	Simple, undemanding target level in terms of function and architecture.	
		Building project that is e.g.: • Maximum two storeys • Smallish or with ordinary technical properties	Building project that is e.g.: • Small, maximum single storey building or structure that is not intended for permanent habitation.
Repair work involving e.g.: • Demanding restoration • Change of intended use in a considerably more demanding direction	Repair work involving e.g.: • Renewal of existing surfaces, structures or technical systems or altering them • Change of intended use	Repair work involving e.g.: • Maintenance repairs without change of intended use. • Minor alteration works	Repair work involving e.g.: • Simple minor maintenance repairs

4.2.2 Guidelines: ARK Proficiency of architects/building designers for architectural/building design tasks according to the categories of difficulty in subparagraph 4.2.1

AA (LUBD 48, 1)	**A** (LUBD 48, 1)	**B** (LUBD 48, 2)	**C** (LUBD 48, 3)
Has successfully completed a degree of architect at a university or university of technology and acted as architectural building designer in category A design tasks for a minimum of five years and taken part in the design of category AA projects. Architectural building designer with category A proficiency and the experience referred to above who is deemed to have the qualifications demanded by the task.	Has successfully completed a degree of architect at a university or university of technology, or completed a polytechnic degree as a building designer (rakennusarkkitehti AMK*, rakennusarkkitehti*) at a polytechnic or technical college, or has completed some other qualification in the construction sector that incorporates an equivalent amount of study (30 credits) in building design, and has taken part in the design of category A projects for a minimum of three years.	Has successfully completed at least the qualification of building technician (rakennusmestari*) at a technical college or a higher degree which includes sufficient studies dealing with building design and has sufficient experience in building design.	Can demonstrate experience deemed to be sufficient for the design task.

*defaulting earlier degrees

Comment

There are separate provisions on the equivalence of architects' qualifications in the countries within the European Economic Area. The Ministry of Education will give an opinion on the equivalence of qualifications obtained in other countries.

The purpose of the reference to other qualifications in the construction sector in category A is to cover those who have obtained an engineer's qualification prior to commencing training as building designers (construction architects) and to enable those already working in the sector to supplement their engineers' qualifications to the minimum level, not to open up new training routes alongside architects' qualifications.

4.2.3 Guidelines: RAK Categories of difficulty of structural design tasks

4.2.3.1	**AA** (LUBD 48, 1) SPECIAL DEMANDS	**A** (LUBD 48, 1) BASIC DEMANDS	**B** (LUBD 48, 2) SMALLISH building or technical system, or one with CONVENTIONAL technical properties	**C** (LUBD 48, 3) MINOR
GENERAL BASES FOR CLASSIFICATION OF DIFFICULTY Structure classes See. RakMk B4, B6, B7	Building or space • Which is heavily loaded, has large point loads or large dynamic loads; • Which is 30 m or more in height measured from the top of the foundations to the highest beam; • Which is especially demanding in terms of stability; or • Which is used by large numbers of people at the same time. Load-bearing structural element which • Has to be made on site and has spans of over 15 m; • Has an abnormal joint construction; • Is a demanding special structure; or • Is designed in class 1. Alterations or repairs in which the static function of a structure otherwise in class 2 is substantially changed.	Building or space which is of normal size and construction. Load-bearing structural element which is designed in class 2. Project may include separately designed class 1 structures (difficulty category AA).	Building or space, • Containing conventional house-type structures; or • Which is a maximum of two storeys and is generally frequented by people on a temporary basis, such as a smallish store or agricultural building with a maximum floor area of 300 m^2 and maximum spans of 6 m. Load-bearing structural element which is designed in class 3. Project may include separately designed class 1 and 2 structures (difficulty category AA and A).	Small, single-storey building or space not intended for permanent habitation or work and with structures that can be adequately shown in the building design.

4.2.3.2 STRUCTURAL FRAMES	**AA** (1)	**A** (2)	**B** (3)
Concrete *) Finnish classification for the compression strength of concrete, expressed as a strength of a cube with 150 mm edge.	• The building is over 8 storeys • The load-bearing capacity of the structure is dimensioned for a concrete strength of over K40* . • The structure is prefabricated and has spans of over 25 m; or • The structure is tensioned.	• The load-bearing capacity of the structure is dimensioned for a concrete strength of maximum K40*. • The basement of the building has retaining walls of block construction.	The load-bearing capacity of the structure is to be dimensioned for a concrete strength of maximum K20 *.
Timber	• The building is a 3-4 storey block of flats; or • The structure is prefabricated and has spans of over 25 m;	• The building is designed using gang-nail trusses.	The building is a conventional, maximum two-storey house and the strength of timber used in strength calculations does not exceed T24 (C24).
Steel	• The building is over 8 storeys; or • The structure is prefabricated and has spans of over 36 m; or • The load-bearing capacity of the structure is dimensioned for steel with a yield stress in excess of 355 N/mm^2.	• The building is a maximum of two storeys and is intended for living or working on a permanent basis and the structural steel members of the frame and the joints between them are not standard; or • The building is 3-8 storeys regardless of intended use.	• The building is a maximum of two storeys and is intended for some other use than living or working on a permanent basis; or • The building is a maximum of two storeys and is intended for living or working on a permanent basis and the structural steel members of the frame and the joints between them are standard.

Design tasks in difficulty category AA are to be carried out according to the requirements concerning class 1 structures set out in RakMk parts B4, B6 and B7. Correspondingly, in difficulty category A the requirements concerning class 2 structures apply and in difficulty category B the requirements of class 3 apply.

4.2.3.3 BUILDING PHYSICS	**AA**	**A**	**B**
	Buildings or sites where • there are particularly severe weather conditions; or • the internal climate is particularly demanding or puts a strain on the construction in terms of building physics, such as humidified, chilled or pressurized spaces; or • substances that are dangerous to people or the environment are handled; or • the construction is subject to water pressure; or • there is an external noise problem; or the building generates noise in use; or • special requirements are set for the life-span of the construction; or • the function of the structure in terms of building physics is changed substantially in conjunction with demanding repair work; or • there is difficult repair work to moisture damage.	Buildings or sites where • the strain in terms of building physics both internally and externally can be deemed to be slightly more demanding than normal; or • normal repair work is to be carried out such as repairs to wet spaces or elevations in blocks of flats.	Buildings or sites where • the strain in terms of building physics both internally and externally can be deemed to be conventional; or • conventional or easy repair work is to be carried out in which the structure is to be repaired or serviced by conventional methods.

The difficulty of the structural design task is determined according to the highest level of difficulty in the bases for classification in tables 4.2.3.1 – 4.2.3.3. The category of difficulty may apply to the whole building or space, or to individual structural elements, in which case all structural elements do not need to be classed in the same category of difficulty.

4.2.3.4 FOUNDATIONS	**AA** (1)	**A** (2)	**B** (3)
	Building or structure of large size or complex construction on a site located in an area of organic or fine-grained soil. In addition to the size and complexity of the structure, factors which increase the special demands of the foundation construction include abnormal loading and unconventional foundation construction methods, difficult and differing ground conditions, and the impact of neighbouring buildings on the design. Extremely demanding foundation construction could include the following: • a building founded on organic soil; • a building with spaces that extend below the groundwater level or the foundations of the neighbouring building; • structures that are subject to dynamic or otherwise exceptional loading or special requirements are set for them; • new design methods or materials are used for the structures or unconventional foundation construction methods are used; • the structures are founded on fill which has not been designed for the purpose or on fill which has not been compacted in layers; • the foundations of the building are to be strengthened or repaired; or • the building is to be designed for a site where the ground contains polluted material or where there is danger of subsidence.	Building or structure of large size or demanding construction on a site located in an area of rock or glacial moraine or coarse-grained soil. Building or structure of conventional size or construction on a site located in an area of fine-grained soil.	Building or structure of smallish size or conventional construction on a site located in an area of rock or glacial moraine or coarse-grained soil.

4.2.4 Guidelines: RAK Proficiency of structural designers for structural design tasks according to the categories of difficulty in subparagraph 4.2.3

4.2.4.1. GENERAL REQUIREMENTS	**1 (AA)** (LUBD 48,1)	**2 (A)** (LUBD 48,1)	**3 (B)** (LUBD 48,2)
	Has successfully completed a degree in building construction engineering or machine construction engineering at a university or university of technology, or the building construction or machine construction engineer's qualification at a polytechnic or technical college or equivalent earlier qualification, and, has also completed the number of credits shown below in class 1(AA) in the relevant field of design and has acquired the planning experience as a building designer shown below.	Has completed at least the building construction or machine construction engineer's qualification at a polytechnic or technical college or equivalent earlier qualification, and, has also completed the number of credits shown below in class 2(A) in the relevant field of design and has acquired the planning experience as a building designer shown below.	Has been to a technical college and successfully completed at least the qualification of building technician, or a technician's qualification in building construction or machine construction which includes sufficient credits dealing with the design and function of the type of construction in question.

4.2.4.2 FRAME STRUCTURES load-bearing elements:	Has completed at least an amount of study equivalent to	Has completed at least an amount of study equivalent to
Concrete construction* The relevant parts of other courses of study that include mechanics and concrete construction may be taken into account with discretion.	• 14 credits in structural mechanics • 7 credits in concrete construction and concrete technology and 7 credits in the design of concrete structures. Design experience generally of at least 4 years and evidence of having taken part in the design of 1(AA) category concrete structures.	• 10 credits in structural mechanics • 5 credits in concrete construction and concrete technology and 5 credits in the design of concrete structures. Design experience generally of at least 2 years and evidence of the design of concrete structures.
Timber construction* The relevant parts of other courses of study that include mechanics and timber construction may be taken into account with discretion.	• 14 credits in structural mechanics • 7 credits in the design of timber structures Design experience generally of at least 4 years and evidence of having taken part in the design of 1(AA) category timber structures.	• 10 credits in structural mechanics • 7 credits in the design of timber structures of which a maximum of 2 credits may be replaced by studies in the design of concrete and steel structures.
Steel construction* The relevant parts of other courses of study that include mechanics and steel construction may be taken into account with discretion.	• 14 credits in structural mechanics • 7 credits in the design of steel structures Design experience generally of at least 4 years and evidence of having taken part in the design of 1(AA) category steel structures.	• 10 credits in structural mechanics • 5 credits in the design of steel structures Design experience generally of at least 2 years and evidence of the design of steel structures.

*In the design of composite structures the designer is required to have appropriate proficiency in the relevant category of difficulty for at least one of the materials.

4.2.4.3 BUILDING PHYSICS	**AA**	**A**
	• building physics at least 6 credits Design experience generally of at least 4 years participation in building physics design.	building physics at least 3 credits Design experience generally of at least 2 years participation in building physics design.

4.2.4.4 FOUNDATIONS/ Geotechnology	**AA**	**A**
The requirements set out in 4.2.4.1 and 4.2.4.2 concern the designer of load-bearing structural elements.	Completed at least an amount of study which includes: • evidence of study in soil mechanics and foundation construction at major subject level including studies in ground construction and environmental technology, and studies in structural mechanics and structural design as a minor subject. Design experience generally of at least 4 years and evidence of having taken part in the geotechnical design of 1(AA) category foundation structures.	Completed at least an amount of study which includes: • sufficient evidence of study in soil mechanics and foundation construction (together at least 10 credits) and in structural mechanics and structural design (together at least 10 credits). Design experience generally of at least 2 years and evidence of geotechnical design of foundation structures.

4.2.5 Guidelines: LVI/ Categories of difficulty of ventilation design tasks

AA **A** SPECIAL AND BASIC REQUIREMENTS (LUBD 48,1)	**B** Technical systems with CONVENTIONAL technical characteristics (LUBD 48,2)	**C** MINOR (LUBD 48,3)
The difficulty of the design task is in category A if the design, dimensioning and location of the system requires command of the theoretical background (e.g. temperature, humidity, sound, air purity, combating of noxious gases and substances, environmental impact and energy economy) or • if the building or a part of the building has a demanding target level for indoor climate, or • a demanding solution in terms of fire technology. Repair or alteration work on a building which is • of historical or architectural importance, or • originally designed for this category. If the design solutions associated with the conditions or targets given above are particularly demanding the design task will be in category AA.	Design task for a building where the design, dimensioning and location of the ventilation system can be carried out according to general dimensioning principles and design solutions, on the basis of conventional requirements set for indoor climate. Repair or alteration work on a building with normal design parameters, e.g. • where a ventilation system is to be renewed with conventional technology and • which is originally designed for this category.	The design task is in category C if the building or space is small, single-storey and not intended for permanent habitation or work and the ventilation can be adequately shown in the building design or is otherwise simple to explain.

4.2.6 Guidelines: LVI Proficiency of ventilation designers for design tasks according to the categories of difficulty in subparagraph 4.2.5

AA and **A** (LUBD 48, 1)	**B** (LUBD 48, 2)
Has successfully completed a degree in mechanical services at a university or university of technology or completed a polytechnic degree with degree in mechanical engineering at a polytechnic or completed an equivalent (earlier) qualification at a technical college or equivalent earlier higher vocational qualification with degree in mechanical engineering. For tasks in category AA has also acted for at least 6 years in ventilation design tasks which are mainly in category A but which also include a sufficient number of tasks in category AA. For tasks in category A has also acted for at least 4 years in ventilation design tasks which are mainly in category A.	Has completed at least a mechanical services technician's qualification and in addition acted for at least 3 years in mechanical services design tasks which are mainly in category B.

4.2.7 Guidelines: LVI/Categories of difficulty of water supply and sewage design tasks

AA **A** SPECIAL AND BASIC REQUIREMENTS (LUBD 48,1)	**B** Technical systems with CONVENTIONAL technical characteristics (LUBD 48,2)	**C** MINOR (LUBD 48,3)
• The difficulty of the design task is in category A if the of the water supply and sewage system is demanding because of the use of the building or production process or room programme or because of the extent scope of the system, or the preconditions set by the municipal infrastructure or because of the environmental risks involved, or • when the choice of system and design solution require a command of the theoretical basis for dimensioning, equipment and material selection or sound and fire technology or wastewater treatment. Design task associated with repair or alteration work on a building which is • of historical or architectural importance, or • originally designed for this category. If the design solutions associated with the conditions or targets given above are particularly demanding the design task will be in category AA.	Design task for a building where the selection of the water supply and drainage system and equipment and material selection can be carried out using conventional design solutions and dimensioning principles set for equipment functions and characteristics. Conventional design task associated with repair or alteration work on a building • where the system is being renewed on the existing technical basis following conventional methods and • which is originally designed for this category.	Design task for a building which • is not intended for permanent occupation or work and which is not connected to water distribution or sewerage system, or • where there is no water closet and minimum water supply and sewerage and surface water drainage are simple and can be shown in the building design or they are otherwise easily explained.

4.2.8 Guidelines: LVI/Proficiency of water supply and sewage designers for design tasks according to the categories of difficulty in subparagraph 4.2.7

AA and **A** (LUBD 48, 1)	**B** (LUBD 48, 2)
Has successfully completed a degree in mechanical engineering at a university or university of technology or completed a polytechnic degree in mechanical engineering at a polytechnic or completed an equivalent (earlier) qualification at a technical college or equivalent (earlier) higher vocational qualification with degree in mechanical engineering. For tasks in category AA has also acted for at least 6 years in water supply and drainage tasks which are mainly in category A but which also include a sufficient number of tasks in category AA. For tasks in category A has also acted for at least 4 years in water supply and drainage design tasks which are mainly in category A.	Has completed at least a mechanical services technician's qualification and in addition acted for at least 3 years in water supply and drainage design tasks which are mainly in category B.

5
PERMIT DOCUMENTS, OTHER PLANS AND REPORTS/DETAILS

5.1 General

5.1.1 Regulation
The method of presentation of plans for construction must be clear and follow generally acceptable good drawing practice. The scale of the drawings must be chosen so as to be appropriate for presenting the building to be described and the drawings must observe the indicated scale. The drawing may also include explanatory text.

The drawings must have a title block, which includes information on the building, the designer and the designer's qualifications, the content of the drawing and its identification. The designer's signature, name in block capitals and contact details must appear in connection with the designer's details. A document intended for archiving must be suitable for archive and microfilming purposes.

Explanation
Instructions are given in the RT cards dealing with building drawings for drawing conventions in general use such as line types and weights, marks, symbols, dimensioning, title block, layout of the sheet, dimensions and folding of the sheet and assembling the drawings into a series of drawings.

Under the Archives Act (831/1994), the National Archives Service will issue a list of materials and methods that suit the production of documents that are to be retained permanently.

The building supervision authorities will issue separate instructions regarding electronic documentation and related backup procedures.

5.1.2 Regulation
A drawing that is to be supplied to the building supervision authorities is to be drawn up so as to include both drawing and text in a single uniform document of specific sheet size. Drawings are to be prepared by normal line drawing methods or computer generated methods with the building materials indicated by symbols. Explanations are to be given of the symbols used.

5.2 Master drawings

Land Use and Building Act, Section 131, 1

Building permits must be applied for in writing. Applications shall include...the master drawings signed by the designer...

Land Use and Building Act, Section 134, 1

The master drawings to be followed in construction are approved in connection with the grant of a building permit.
...

Land Use and Building Decree, Section 79

The building inspector may grant approval for deviation from the approved design during the course of construction unless the nature of the deviation and the provisions and regulations on permit consideration require substantial amendment of the plan and the deviation affects the interests of neighbours.

Any amendments approved during the course of construction and the approving official shall be indicated on the drawings. Inspected drawings shall be submitted to the local building supervision authority before the final review.

Land Use and Building Decree, Section 49, 1

The master drawings enclosed with a building permit application comprise a site plan and floor plan, section and elevation drawings.
...

5.2.1 Regulation
The master drawings are to be drawn up to such an extent and in such a manner that the permit procedure for the building project is possible under them and any other possible details associated with them. The effect of construction on the neighbours' interests must also be sufficiently discernible from the master drawings. The approved master drawings are the basis for other planning connected with the building and for the working drawings prepared for the construction work. The archived master drawings must accurately correspond to the construction work as it is carried out.

5.2.2 Regulation
The site plan must show that the planned construction follows the town plan or some other land use plan and building code, is suitable for the site or building plot and the environment and fulfils the requirements set for it regarding the use of the site or building plot. The situation before and after the planned construction must be clear from the site plan as, too, must the effect of the construction on the neighbours' interests to a sufficient degree.

In repair and alteration work (on a building) the site plan must be drawn up to the extent that the repair and alteration work affects the conditions and use of the site or building plot.

5.2.3 Regulation
The site plan must show at least the following information on the quality, extent and special features of the project in the required way and with the accuracy required by the permit process:

- boundaries and dimensions of the site or building plot;
- identification numbers of the property and the areas bordering it;
- plan notations concerning the city block/site in the planned area;
- city blocks in the planned area and boundaries of streets and other areas and names of streets and roads;
- boundaries and levels of properties in the immediate vicinity outside the site or building plot to a sufficient extent;
- buildings in the immediate vicinity to a sufficient extent;
- buildings and structures to be constructed on the site or building plot together with existing buildings and/or buildings that are to be demolished;
- distance of the building from the boundaries, overall dimensions of the external walls measured from the external surfaces, plus the number of storeys;
- distance of the building from the shoreline when the site or building plot is bounded by a shore;
- levels and contours of the corners of the site or building plot, boundaries and corners of the building, plus the planned levels of the courtyard/garden at various points;
- official and/or measured levels as far as they are available;
- the level of the lowest floor served by a sewer, plus the general anti-flood valve level and location of the water meter;
- water supply and sewers with chambers, sewer from the site boundary to the public sewer;
- in areas not served by mains water and sewerage, the location of the well and the wastewater treatment plant, and the outflow of the treated wastewater;
- rainwater and groundwater gullies, and surface water treatment;
- cableways and power lines that affect the location of the building
- access to the garden/yard, pedestrian and vehicular traffic arrangements on the property, plus car parking arrangements, rescue routes, ramps, stairs, retaining walls and fences;
- emergency shelter exits, underground oil tanks etc, geothermal pipework;
- facilities and structures associated with use of the property and management of waste etc., plus their location in the garden/yard;

- planting and trees that are to be retained, trees that are to be felled and areas of new planting, playgrounds, sitting areas and car spaces; plus
- treatment of the shoreline and jetties in shore areas.

Guidelines
The site plan is to be drawn up at a scale of 1:500 or 1:200. A scale of 1:500 may require matters to be presented on several drawings, at a scale of 1:200 one drawing is usually sufficient. A scale of 1:1000 may be used to show particularly large schemes. North is to be indicated on the site plan with an arrow. The drawing is to be located on the sheet so that north is at the top.

The immediate surroundings and buildings outside the boundaries of the site or building plot are to be shown to the necessary extent, but for a distance of ten metres at least.

If the planned construction changes the existing levels in the garden/yard or the levels in relation to the corners of the site, the situation in the yard both before and after construction is to be shown by levels and contours. If necessary two drawings may be used on the same sheet. An extract from the base map and/or survey drawing may be used to show the situation before construction.

The entrances are to be marked on the drawings. Identification numbers of access stairways are to be indicated if known.

Water supply pipes and sewers with chambers, and rainwater and groundwater chambers may be shown on a separate water supply and sewage site drawing.

The fire classification of the building is to be shown on the drawings or explained in the text.

Access from a public or private road is to be explained if necessary in the text.

The date of approval of the local detailed plan is to be shown and the planning notes and regulations that affect the city block/site are to be explained in the text.

Gross floor area calculations and parking space calculations are to be shown in the text, if they are not covered in a separate report. The calculated gross floor area permitted within the building rights is to be shown as a total and divided between buildings, if necessary for each floor, for the basement and for the attic space and also separately according to the different purposes of use that may be defined in the local detailed plan. The part exceeding an external wall 250 mm thick is to be reported separately.

Explanation
There is an RT card dealing with the preparation, content, drawing and method of presentation of site plans.

5.2.4 Regulation

The floor plans and sections must show with the accuracy required to deal with the matter that the planned construction fulfils the requirements of the regulations and of good building practice in terms of spatial planning, dimensioning, and basic solutions and properties of the structures.

Guidelines
Floor plans and sections are generally drawn up at the same scale. The scale normally used is 1:100. For small schemes a scale of 1:50 may be more appropriate and 1:200 to describe larger schemes. Drawings may also be supplemented with part drawings of important details at an appropriate scale.

The basic solutions of the structures are to be shown in the form of sections known as structure types which describe external walls, partitions, ground floor, intermediate floor and top floor, plus roof construction, ducts, chases and chimneys if used. The materials of the structures and their thermal insulation, waterproofing,

damp-proofing, sound insulation and fire technical characteristics are to be described at least insofar as there is a requirement set in the building code. The location of the structure types is to be indicated on the floor plans and sections. The structure types are usually suitable for showing on the sections.

5.2.5 Regulation

Plans must be drawn of all floors of the building, basement, roof space and roof. The roof drawing is required if the roof and the structures, equipment and access ways on the roof are not sufficiently apparent from the elevations.

Vertical construction and building elements are to be shown in the form of sections and horizontal construction and building elements in the form of projections. The position and direction of view of each section is to be shown on the plans.

Guidelines

The floor plans normally show:

- the construction and openings, ducts and chases in it, and suspended ceilings if necessary; and structures and equipment outside the building envelope and below the lowest floor level (such as pumping chambers);
- direction of opening of doors and thresholds if required;
- principal fixed furniture and fittings;
- taps and floor gullies;
- intended use of rooms and spaces;
- fire compartments/ fire classification of compartment walls/floors;
- overall dimensions of the building and parts of the building;
- when building close to an adjoining building, the distance from the external wall and if necessary other structures from the adjoining building;
- the levels of floors and landings;
- the width of exit ways;
- the dimensions of stairways, flights and landings;
- the slope and dimensions of ramps;
- the dimensions of lifts for the disabled and the free space in front of the lift; and
- the dimensions of WCs and washing facilities intended for the disabled.

Arranging ventilation such as a method or system whereby supply air and extract air is organized is to be explained in the text. Domestic water supply, wastewater treatment and the heating system should also be explained.

The fire classification of the building or part of the building is to be explained in the text if necessary. Fire extinguishers and dry risings are to be marked on the drawings. Routes into underground spaces for firemen are to be marked if necessary.

Sound insulation requirements posed on the building envelope by the regulations are to be shown for the external walls and windows as necessary.

If necessary, the area of a room to be used for living purposes and the area of the window are to be shown on the drawing or in the text to indicate the size called for by the minimum requirements for natural light. The window size is to be shown on the drawing or in the text as required by energy economy. The opening of the window is to be explained in the text.

The organization of changes in level on routes that are important for the disabled and from the point of view of safety in use both in the yard and indoors by means of ramps and lifts with their dimensions, plus the dimensions of landings and the rise and tread of stairs may be shown in the text or in a separate report on access for the disabled.

5.2.6 Regulation
Section drawings must be prepared of all necessary points to show the construction and characteristics of the building. The sections must be chosen to adequately show the floors and other levels of the building and the yard, and its relative levels at appropriate points.

Vertical and horizontal construction and building elements are to be shown in section. Section drawings are to be prepared of the building at essential points from the point of view of long and cross sections.

Guidelines
Section drawings usually show:

- the construction and the building elements and openings and overhangs in them, stairs, ramps, lifts and other shafts, plus balconies and suspended ceilings if required; and also structures and building elements outside the building envelope such as eaves and solar collectors, plus structures below the lowest floor;
- main dimensions of the building and its parts and parts projecting from the structure in a vertical and horizontal direction;
- floor to floor heights and all necessary levels of floors and landings;
- headroom under overhangs and headroom of openings for traffic and circulation;
- headroom of rooms, spaces and access ways;
- overall dimensions of top, intermediate and lowest floor structures;
- heights of window sills and balustrades as height dimensions on the drawings or explained in the text;
- section lines at ground level/elevations and at elevations/roof level, height of plinth, eaves, roof ridge or highest point of roof expressed as a level or if necessary as a height dimension from ground level, plus the slope of the roof;
- existing and planned ground levels, plus the location of structures such as overhangs, shafts and retaining walls and the location of subsoil drains in the immediate vicinity of the building as required; and
- the surface and levels of the garden/yard and as much as necessary of the adjoining site to indicate the surface water drainage on the site, and to show any possible cut and fill.

5.2.7 Regulation
The elevation drawings must show that the architecture of the planned construction fulfils the requirements of beauty and harmony taking into account the building itself and its relationship with the surrounding buildings and the landscape. Elevation drawings must be prepared of all sides of the building together with visible parts of the roof. The connection with adjoining buildings in the built environment is to be shown to a sufficient degree.

The elevation drawings must show section lines, eaves, roof ridge or highest point of the roof expressed as a level or if necessary as a height dimension from ground level, roof surfaces, slope of the roof, visible building elements and surfaces of the external wall with all fixed equipment, finishes, materials, surface treatment and colour of surfaces, building elements and equipment, and visible design solutions outside the building that affect the function and appearance and style of the building.

Guidelines
The elevation drawings are to be drawn up generally at the same scale as the plans and sections.

Elevation drawings usually show:

- windows and window division, recesses and overhangs; doors and gates, plus elevation finishes and decoration of building elements (by separate drawing if required); hatches, openings and grilles (openings and grilles that form part of the ventilation system are to be marked supply and extract; windows and hatches intended for smoke extraction are to be marked);
- columns and beams that remain visible
- advertisements and any other items of fixed equipment, fittings and lighting that extend beyond the external walls or the roof surface; fixed sun shades; ventilation plant rooms and lift motor rooms; access steps, roof access steps, catwalks and snow barriers; dish aerials, solar collectors; fire extinguishers, pipework, chillers and other visible equipment;

- chimneys and flues (height of the flue or the level of the top of the chimney is to be marked);
- eaves line;
- plinth line;
- external landings, canopies and balconies; external stairs and ramps with balustrades and handrails;
- existing and planned ground levels if there is a difference; and
- fences, retaining walls plus other parts of the building or structure.

5.2.8 Regulation

Elevation drawings are to be drawn up as orthographic projections. The compass point in which the elevation faces is to be marked on the drawing. Translucent shading to clarify the different planes is suitable for illustrating the drawings. The materials and colours of the elevation finishes are to be indicated in writing and they may be illustrated with examples if required.

5.3 Details to be appended to building permit applications

Land Use and Building Decree, Section 49,2
...
The ground investigation report on the building site and, if needed, an account of the site's health effects and ground levels, and the type of foundation and any other measures required as a result shall be enclosed with the building permit application.
...
Land Use and Building Decree, Section 55,2
...
Permit applications and notifications concerning the construction or demolition of a building or part of a building shall include an account of the amount and type of construction waste and how it will be sorted, unless the amount of waste is minor. Applications and notifications shall report separately any construction and demolition waste that is harmful to health or the environment, and how it will be disposed of.

5.3.1 Regulation

The general technical suitability of the site for construction, the appropriateness of the method of foundation, the healthiness of the subsoil on the site and other characteristics of the site connected with construction must be sufficiently established by the ground investigation report referred to in the Decree.

Guidelines

The ground investigation report is dependent on site conditions and the characteristics of the project. The basic data on ground conditions covers the quality of the subsoil, variation in the groundwater level, flood water level, and rainwater and sewerage anti-flood valve level. Clarification is generally given in the form of ground investigation/soil tests. In smallish building projects or where ground conditions are easy this clarification may consist of details on subsoil data shown on the plans and sections of the master drawings.

In order to demonstrate the healthiness of the site/building plot, investigation of the presence of radon, pollution of the subsoil, or groundwater pollution, for example, may be called for.

Explanation

There are regulations on ground construction and safety measures in RakMK A1, 5.4.1 and RakMK B3. There are regulations on the treatment of construction and demolition waste in RakMK A1, 13.1.

5.3.2 Regulation

The construction waste report referred to in the Decree must adequately establish that construction waste is taken into account in the design and that operational responsibilities are carried out during the construction work.

Guidelines

The construction waste report will usually show:

- measures for preventing the generation of construction waste and for utilizing useful building components;
- measures for avoiding environmental and health risks; and
- use of surpluses and final disposal of other waste.

Explanation

The Government Decision on Construction Waste (295/1997) includes regulations on reducing the amount and deleterious effects of construction waste and organizing recovery and reuse.

The Government Decision on the Safety of Construction Work (629/1994) also includes regulations on the treatment of demolition waste from the point of view of the safety of the demolition work.

Land Use and Building Act, Section 131, 1

„..

If necessary, the applicant may be required to provide additional information needed to decide on the application.

5.3.3 Regulation

If it is not sufficiently clear from the master drawings that the requirements set for construction are fulfilled, the building supervision authorities must call for any necessary additional details to resolve the application.

Guidelines

Details needed to resolve the application could be, for example:

- details of how the building is linked to the surrounding buildings, including buildings on the adjoining site(for example, as a street elevation diagram);
- elevation colour scheme;
- details of site or building plot surface water treatment;
- yard and planting plan;
- details of the strength and stability of the construction;
- details of the performance of the building's damp-proofing technology;
- details of the performance of the building's sound-proofing technology;
- details of indoor air targets and factors that affect them;
- energy economy report;
- fire safety plans (exit ways with numbers of persons, alternative means of escape, escape routes, safety and fire extinguishing systems etc.);
- accessibility report on unobstructed mobility and function (organization of circulation and change of level from the site/building plot boundary and car parking spaces into the building and between the different levels of the building, shown diagrammatically on the site plan or yard drawing and the floor plans e.g. in the form of reductions);
- report on calculation of the area of the storeys (calculations plus diagram of spaces counted as gross storey area shown diagrammatically on e.g. reductions of the floor plans);
- emergency shelter plans;
- survey of condition of the building or part of the building if the work concerns repairs or alterations;

- report on the history of the building if the work concerns repairs to a building of architectural or cultural importance; and
- report on the arrangements for waste management at the property.

5.4 Special designs and reports/details

Land Use and Building Act, Section 134, 3

Regulations on preparing special designs and submitting them to the local building supervision authority may be included in the building permit.

...

Land Use and Building Decree, Section 49, 3

Any need to provide the local building supervision authority with special designs and reports is stated in the building permit, at the start-up meeting or, if special cause exists, during the construction work. This is not necessary if the building in question is smallish with basic structural and technical attributes.

...

5.4.1 Regulation

Necessary special designs are usually structural designs, plus ventilation and water supply and sewerage designs. In considering the need for special designs, however, the conditions and the requirements that stem from the use and number of users of the building must always be taken into account.

5.4.2 Regulation

The structural drawings and calculations must show the strength and stability of the load-bearing structures and dimensions for carrying out the work. Methods of heat insulation, moisture barriers, damp-proofing, water-pressure barriers and sound insulation must be clear from the structural drawings. Designs for repairs must show the structures that remain in use and their function to a sufficient extent. Structures that are to be demolished must also be shown in the plans.

Guidelines

Structural drawings usually include pile driving, foundations, floors, roof, sections, structural elements and detailed drawings, plus manufacturing, location and fixing drawings for pre-cast concrete units.

Structural drawings generally show:

- the foundation of the building;
- the structures and their location with identification numbers, dimensions and details such as reinforcement, fixings, joints, holes and weak points;
- the construction and the characteristics of the materials in terms of their load-bearing capacity, sound and heat insulation, moisture barriers and damp-proofing, fire safety and durability; and
- the construction of balustrades, guard rails, ladders, catwalks etc., which are important because of persons' safety.

Reports that are to be appended to the structural designs include:

- ground investigation/soil test;
- basis for geo-technical dimensioning; and
- structural calculations, which in addition to the actual calculations themselves, also show the bases for dimensioning, the structural model, loading cases, stability checks and, if necessary, details of the computer software used and other bases for calculations.

5.4.3 Regulation
The structural design normally includes the substructure design. The design must also show the substructure and the effect of the completed structures on the site and its surroundings and the steps taken to prevent dangerous and hazardous influences.

The details of the substructure must correspond with the requirements of the ground conditions, structures and working methods used.

Guidelines
The substructure design usually includes:

- ground treatment, foundation structures, other permanent substructures and, if necessary, methods of protecting and strengthening neighbouring structures;
- soil structures;
- frost protection;
- dewatering;
- barrow pits,
- the connection of the building to mains pipe work and to the garden/yard;
- the construction of the mains pipe work and the yard;

The existing substructures and their condition must be investigated as the basis for repair work.

5.4.4 Regulation
The ventilation design must show target values for indoor air, and the arrangement and functioning of the ventilation system complete with all ducts, equipment and dimensioning.

Guidelines
The ventilation drawings (IV drawings) usually include plans, sections and any necessary details. The drawings should be supplemented with operating and control diagrams, and equipment schedules.

The drawings usually show items which form part of the ventilation installation and the natural ventilation including:

- solutions relating to structural fire safety, such as fire compartmentation;
- location, insulation, dimensioning and air-tightness class of ducts and equipment; and
- cleanliness of equipment and access panels.

Operating and control diagrams usually show:

- operating diagram and report on the ventilation system;
- operation of the ventilation system and equipment as the load changes with the seasons; and
- sound levels of ventilation equipment.

5.4.5 Regulation
The water supply and sewage drawings (KVV drawings) must show the water supply and sewage system and their operation, complete with all equipment, fittings and dimensioning. The drawings are supplemented with line diagrams.

Guidelines
The water supply and sewage drawings (KVV drawings) usually include a site drawing, floor plans, sections and all necessary details. The drawings should be supplemented with line diagrams.

- The water supply and sewage site plan usually shows the water mains and sewers drains on the site up to the connection with the public network and beyond the networks to a sufficient extent, other water pipes and sewers on the property, chambers, cleaning eyes, separators and pumping chambers etc, and the location of the water meter. Beyond the water supply company

network, the location of the water intake, the method of wastewater treatment and the outfall for treated wastewater must also be shown.

- Floor plans and necessary sections usually show water pipes, sewers, water and sewage connection points, all necessary equipment for water and sewage connections (pumping chambers, separators etc.) and the location of the water meter.
- Insulation, leakage control and heating cables (location, size, space required, materials and levels) are also usually shown on the drawings.
- Line diagrams usually show floor levels, flows and pressure losses in pipe fittings, pipe work and equipment, drainage points and flows, and the dimensioning of water pipes and drains.

In a one or two-storey residential building, the items listed above can be shown on the floor plans rather than on line diagrams.

5.4.6 Regulation

The heating appliance design must show the arrangement and operation of the heating, complete with equipment, fittings and dimensioning.

Guidelines

The heating appliance drawings usually include plans, sections and any necessary detailed drawings. The drawings should be supplemented with operation and control diagrams and line diagrams.

The drawings and calculations usually show the heating systems':

- location, space requirement and dimensioning;
- energy requirement and power demand; and
- sound level calculations for the heating appliance.

The operating and control diagrams usually show the operation of the heating plant and equipment in different weather conditions and under different loadings.

5.4.7 Regulation

In addition to the requirements dealt with under items 5.4.1-5.4.6, the following items affect the need for special designs and details; exceptional loading and fire load, requirements of design, calculation and dimensioning methods, increased need to take into account the conditions of an exposed building site and the environment, or any other unusual design solutions, or any other matters comparable to these that increase the demands of the project.

Guidelines

Other special designs and details that may be needed depending on the quality and special characteristics of the project may include:

- radon protection plan;
- rock construction design;
- plans for the function of heating, damp proofing and sound insulation of the building, which include any necessary explanations and drawings of, for example, the construction of the lowest floor and the wet spaces together with their damp proofing and water proofing, or of the sound insulation of the intermediate floors, walls and external envelope;
- fire safety report (basis for design, models used and results obtained);
- plans for fire alarm system and mechanical smoke extract;
- safety lighting and symbol design;
- automatic fire extinguisher plan;
- building automation design; and
- lighting design.