

Farm Structures FACTSHEET



BRITISH
COLUMBIA

Ministry of Agriculture and Food

Order No. 300.000-1
June 2000
Agdex: 710

FARM STRUCTURES PROGRAM

The Resource Management Branch of the British Columbia Ministry of Agriculture and Food has had a long history of providing structural engineering, design and inspection services for farmers throughout the province. Since 1988, emphasis in the structures program has shifted considerably from one-on-one client consultation to providing more general extension advice. Part of this shift in priorities has been as a result of privatization of government services and the attendant reduction in personnel numbers. Still included as part of the program, however, is a conceptual building plan service.

The Resource Management Branch considers it essential to continue with some form of its traditional plan service but with greater emphasis on providing technology transfer. Building plans are therefore viewed with the purpose of assisting the broader agricultural community throughout the province rather than necessarily being used as a basis for securing a building permit. Farmstead planning and functionality, layout of structures, and ventilation system troubleshooting and design are the major areas where extension in the structures program continues to play a unique role. Detailed structural design of farm buildings, however, is increasingly being turned over to private sector engineering consultants especially in areas where sealed drawings are required by local governments.

Farm Buildings: Definition

Farm buildings, as defined in the *1998 British Columbia Building Code*, are structures that do not contain a residential occupancy and that are subject to the following qualifications: (1) they must be associated with and located on land

devoted to the practice of farming, and (2) they must be used essentially for the housing of equipment or livestock, or the production, storage or processing of agricultural and horticultural produce or feeds.

Farm buildings include barns, produce storage buildings, milking centres, piggeries, poultry houses, grain bins, silos, machinery sheds, farm workshops, feed preparation centres, tobacco pack barns, manure storages, greenhouses, and garages not attached to the farm residence.

Part 2 of the *British Columbia Building Code* states that all such buildings shall conform to the requirements in the *Associate Committee on the National Building Code (ACNBC) Canadian Farm Building Code 1995*.

National Building Code 1995

Farm buildings are given separate status in the *National Building Code*, the rationale being that most are classified as low human occupancy, are often located in remote areas, and are often special in nature with respect to the occupancies involved. For the purposes of definition, low human occupancy means a density of less than one person per 40 square meters (430 square feet). This rating allows engineers using Part 4 of the *National Building Code* to work with lower than usual specified loads in their design. An example of this is that allowable stresses in working stress design calculations are permitted to be increased by 25% or, in the case of limit states design, the importance factor applied to factored *live loads* (for example, snow, rain, wind or hay) is permitted to be 0.80 rather than 1.0.

Farm buildings classified as other than low human occupancy include retail centres for feeds, horticultural and livestock produce, auction barns and show barns where bleachers and other public facilities are required. It is possible to have areas of high and low human occupancy in the same building provided that the structural safety and fire separation requirements for high occupancy are met in the part thus designed.

Farm Building Code 1995

Implications of the separate status granted to agricultural buildings are published in the *1995 Canadian Farm Building Code*, a compendium document to the *1995 National Building Code of Canada*, also issued by the Associate Committee on the National Building Code (ACNBC) at the National Research Council of Canada in Ottawa. The *Farm Building Code* comprises a model set of minimum requirements for farm buildings in matters affecting only human health, fire safety and structural sufficiency. As such, it is presented in a format similar to the more comprehensive *National Building Code* that permits its legal adoption by an authority having jurisdiction (for example, a municipality or regional district), either directly or by reference.

The 1977 edition of the *Canadian Farm Building Code* contained a considerable amount of useful farm information covering such topics as housing requirements for various sizes and species of livestock, recommended ventilation rates and practices, manure management guidelines, construction practices, loads imposed by various agricultural products, cladding details, water supply, electrical services and many more. All such information, because it did not relate specifically to human safety, was withdrawn from the 1983 edition and published in 1988 in a more readable document, *The Canadian Farm Buildings Handbook*, information from which is available at the Resource Management Branch. A further useful document formatted after *Farm Building Code* but in expanded form is the *1995 Construction Guide for Farm Buildings*.

British Columbia Building Code 1998

The *1995 National Building Code of Canada* and the *1998 British Columbia Plumbing Code* form the basis for the *1998 British Columbia Building Code*.

The requirement in the *B.C. Building Code* that all farm buildings conform to the requirements in the *1995 Canadian Farm Building Code* is waived in areas outside the boundaries of a city, district, town or village, unless it is within an area subject to bylaws adopted by a regional board under the provisions of section 818 of the *Municipal Act*. This includes many parts of the province, notably the interior, the north, and parts of Vancouver Island. These same areas often lack agricultural building design services as well. In such areas, detailed structural building plans conforming to the most recent building codes and individual client advice provided by ministry extension personnel are essential in encouraging the construction of safe and functional buildings.

British Columbia Building Code Requirements

For areas where the *Building Code* does apply, various regulations are laid out to ensure that due process is followed. In this regard, a major distinction is placed between buildings conforming to Part 9 of the *Code* and those conforming to Part 4.

Part 9 provides detailed requirements for the construction of small buildings up to 600 m² (6455 ft²) in area and three stories in height, and applies to all occupancies except assembly, institutional and high-hazard industrial. This section generally refers to residential housing and to smaller farm buildings, and contains detailed information on such components as studs, floor beams, lintels, wall sheathing and trusses not subjected to unusual loading conditions. Except for unusual cases, most construction reviews and inspections of Part 9 buildings are done by municipal or regional building authorities.

For the most part, all wood-frame post, beam and plank construction with load-bearing framing members spaced more than 600 mm (24 in) apart and spans exceeding 12.2 m (40 ft) must be designed in conformance with Part 4 of the *BC Building Code*. Except for smaller stud-frame machine shops, garages and poultry buildings (i.e., those less than 600 m² in area), this includes the majority of farm structures since post and beam construction is prominent in the agricultural industry.

All buildings designed under Part 4 of the *Building Code* must be accompanied by structural drawings and related documents bearing the authorized seal and signature of the designer, and this designer must be a professional engineer or architect as appropriate under provincial or territorial legislation. Furthermore, Part 2 of the *B.C. Building Code* requires that *review* of the construction of any building or part thereof must be carried out by the designer, or other suitably qualified person, to determine whether or not the construction conforms to the design. The issuance of a building permit is subject to the retained registered professional signing Schedules B1 and B2, copies of which are available from the *Code*. In some cases, building departments require the signature of Schedule C, ensuring appropriate field reviews have been performed, and before occupancy is allowed.

The Resource Management Branch still provides generic structural plans for farm buildings designed under Part 4 of the *Code*. However, each set of plans is stamped with a disclaimer stated as follows:

THIS IS A CONCEPTUAL PLAN ONLY AND MAY NOT BE ADEQUATE TO OBTAIN A BUILDING PERMIT.

These plans are provided only as guidelines showing dimensions and materials to assist in planning and management. Structural details may not meet current design codes.

Local snow, rain and wind loads as well as soil conditions should be checked with the appropriate municipal or regional building department to satisfy permit requirements. Professional engineering design and inspections may be necessary.

The BC Ministry of Agriculture, Fisheries and Food accepts no responsibility or liability for the use of these plans.

Canada Plan Service

Many of the leaflets and plans issued by the Resource Management Branch have been created by the Canada Plan Service (CPS), a federal-provincial organization formerly headquartered in Ottawa prior to 1994 but now under the caretakership of the Ontario Ministry of Agriculture, Food and Rural Affairs. It acts as a coordinating unit, creating and providing information related to agricultural facilities. Input and priorities on technology and information transfer are established annually by a management committee consisting of one representative from each provincial Ministry of Agriculture.

The Canada Plan Service is subdivided into ten commodity or specialty subcommittees, each of which reviews and generates updated or new information on a triennial basis. The ten CPS Plan Series are Beef (1000 Series), Dairy (2000), Swine (3000), Sheep (4000), Poultry (5000), Fruit and Vegetable (6000), Grain Storage (7000), Special Structures (8000), Building Engineering (9000), and Environment (10,000). Information on CPS plans is available on the Internet at www.cps.gov.on.ca.

Consultation with and input to CPS forms an essential part of the Resource Management Branch's structures program, ensuring contact with and technology transfer from other parts of the country. Sharing of information and resources within the CPS network increases the productivity of extension material and exchange among the agricultural community at large.

The Resource Management Branch has created a number of structures handbooks for various commodities containing management information in the form of leaflets, notes, and conceptual plans. Included, for example, are details on housing alternatives, feeding systems, feed storage, heating and ventilation options, manure management, construction practices, building components, fencing, and general structures. Handbooks have been compiled for dairy, swine, beef, poultry and horticulture. A special structures handbook contains pertinent information for horse, sheep, goat, deer and rabbit facilities.

Resource Management Branch Services

There is no question that the change in direction of the structures program, as mentioned above, is viewed as a reduction in appreciated services by several groups such as local building authorities, contractors, and, most importantly, farmers themselves. Discussions and correspondence with building standards officials and municipal and regional building personnel have generated concerns that expertise in farm building design is generally limited throughout the province and would be virtually nonexistent without the services of the Resource Management Branch. The structures program of the Branch is instrumental in expediting farm building construction projects, in encouraging farmers to build with proper plans, and in providing the latest information on building technology. These advantages especially benefit the remoter areas of the province.

Because farm buildings are quite standard in design and functional in nature, architectural input forms a negligible part of the building and planning process, and as a result, lend themselves well to generic plans. The Resource Management Branch will, therefore, maintain an up-to-date building plan file for routinely requested buildings. Structural details conforming to the latest wood, concrete and steel codes will be included. As much information as possible on component detailing and sizing to cover a variety of soil, snow, rain and wind loading conditions will allow standard designs to be used throughout the province. This is especially important where building engineering and inspection services are either not required or not readily available. In regions where design and inspection services are deemed necessary by municipal building authorities, farmers will be required to absorb consultants' fees for such services, typically in the range of 1%-3% of construction costs.

Summary

Summarizing, the structures program of the Resource Management Branch will:

- Maintain and create building plans providing structural details for routine and popular plans to service remote areas of the province where such information is unavailable.
- Create new plans containing new technologies if they are viewed to be helpful to the broad agricultural community.
- Encourage long-term development and research into animal welfare housing and environment.
- Provide farmstead site and floor plans for clients if time and resources permit and in situations where such services are deemed essential for the adoption of environmental and sustainable farming practices.
- Allow and encourage private engineering consultants to use full sets of Ministry of Agriculture and Food drawings or components thereof in providing site-specific plans for a client; this will significantly reduce unnecessary duplication of drafting which forms a major cost of an engineered plan.

- Normally provide one set of plans, free of charge, to a client.
- Stamp all drawings with a disclaimer alerting owners that designs used should be checked by contractors and/or building departments to ensure that local soil, wind, rain and snow loading conditions conform to those stated on the plan.
- Work to develop agricultural engineering expertise in the private sector.
- Assist consultants in providing information necessary to create a functional set of plans where deemed appropriate.
- Continue to provide advice in the area of ventilation troubleshooting and/or design.
- Provide and create written information on agricultural building systems.
- Work with the farm building and ventilation supply industries in introducing new technology.
- Develop and keep current agricultural building cost information.

The Resource Management Branch considers individual contact with farmers to be a vital part of keeping in touch with current issues, problems and trends with respect to building technology. It wishes to remain a leader in the industry, encouraging new approaches through demonstration and extension where deemed appropriate. The availability of conceptual building plans and the Branch's willingness to continue with functional aspects of design will assist in maintaining a reasonable level of contact with consultants, trades, building authorities and farmers alike.

As a service to the community, the Branch maintains a list of interested engineering consultants and building contractors for reference.

FOR FURTHER INFORMATION CONTACT

John Luymes, Farm Structures Engineer
Phone: (604) 556-3114
Email: John.Luymes@gems7.gov.bc.ca

RESOURCE MANAGEMENT BRANCH

Ministry of Agriculture and Food
1767 Angus Campbell Road
Abbotsford, BC CANADA V3G 2M3