

# Environmental FACTSHEET

## FLOOD CONSTRUCTION LEVELS AND SETBACKS FOR FARM BUILDING SITUATIONS

### Introduction

This factsheet summarizes land use management and setback requirements for flood hazard areas in the absence of site-specific information. The guidelines complement the Ministry of Agriculture standards for building setbacks from watercourses in farmed areas and are independent of watercourse classification systems.

The goals of floodplain-based land use guidelines are to reduce or prevent injury, loss of life, and to minimize property damage during flooding events. The guidelines form the basis for recommended provincial minimum requirements and are intended to assist local governments, land-use managers and approving officers develop and implement plans for approval decisions on farmstead and building locations within flood hazard areas. Experience has shown that regulating land development to keep people out of harm's way is the most practical and cost effective way of achieving such goals.



While mitigation of damage is paramount in assessing the potential for flood damage, site-specific practical and operational considerations should always be kept in mind when evaluating building developments on existing farmsteads.

### Reduction of Flood Threats and Flood Damage

Flooding is a common hazard on British Columbia farmland as a result of heavy rainfall, snowmelt, and/or ice jams. When a watercourse overflows its banks, floodplains store the water until it is able to move downstream or until it can be absorbed into the ground. Flooding is a natural event that replenishes the groundwater and revitalizes the soil through deposition of sediments.

The reduction of flood damage and disruption is a key concern for provincial authorities and local communities. Avenues by which such threats can be reduced include programs such as the Ministry of Environment's *Dam Safety*, *Dike Safety*, and *Flood Hazard Management* programs, and through reference to available floodplain mapping.

The most effective method of reducing the risk of flood damage is to regulate development on the floodplain, part of which includes regulation with respect to building setbacks. This requires the co-operation of all levels of government, builders, realtors, farmers and the public. Land-use decisions by local government must take into account flood risks to ensure that agricultural development occurs on the least hazardous lands. Flood hazard management programs ensure the public's safety and the protection of property through increased public awareness of flood hazards, the establishment of floodproofing standards for new farm-based development, and local government land-use planning.

## Legislation and Site-Specific Information

The Ministry of Environment's *Flood Hazard Area Land Use Management Guidelines* must be considered by local governments in making bylaws under section 910 of the *Local Government Act*. Local governments can address flood hazard management objectives through the development of official community plans, the adoption of appropriate building standards and the issuance of building permits. Bylaws specifically addressing flood hazard concerns take precedence over provincial guidelines. Where ambiguity may exist as it pertains to floodplain construction, local governments should be contacted to ensure appropriate recommendations for floodproofing are followed.

For certain areas of the province, specific details for a farming area under consideration may be available for decision-makers' inputs. Sources of such supplementary information may include:

- local government documents such as bylaws and official community plans
- historical records and descriptions of previous flooding events
- engineering and other assessment studies
- flood hazard management studies
- floodplain mapping
- site or vicinity covenants

## Floodplain Mapping

Local governments must consider relevant floodplain mapping information when making bylaws under section 910 of the *Local Government Act* and in making related decisions regarding flood hazards, part of which may include the establishment of Flood Construction Levels. A floodplain map delineates the area that can be expected to flood, on average, once every 200 years. A flood covering such a statistically-determined area is called the 200-year flood. It must be noted, however, that a 200-year flood can occur at any time in any given year, the indicated flood level on a map may be exceeded, and that *portions* of the floodplain can flood more frequently.

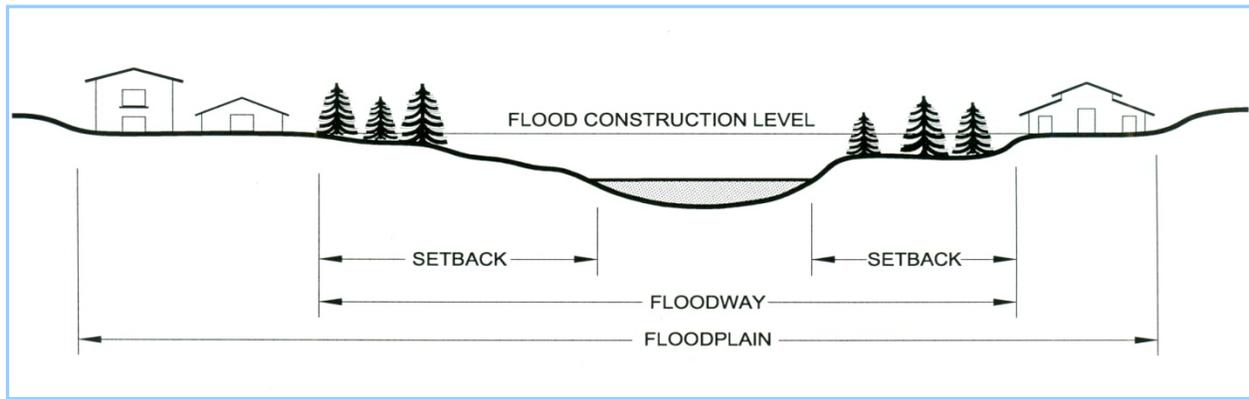
Floodplain maps show the location of the normal channel of a watercourse, surrounding features or development, ground elevation contours, flood levels

and floodplain limits. Floodplain limits, also known as isograms, are defined by the elevation and horizontal extent of the high water marks of a 200-year flood or a flood of any desired recurrence interval, such as, for example, the 20-year flood level used in applying *Health Act* requirements for septic tank siting. The magnitude and water levels associated with the designated flood are determined for rivers and watercourses by using survey and hydrological data. The magnitude of the designated flood is determined by frequency analysis of past floods supplemented by regional runoff data when required. The water surface profile is then calculated for the designated flood. The floodplain is then delineated by the translation of the flood profile plus freeboard allowance to base mapping to produce the finished floodplain maps.

## Flood Construction Levels and Floodplain Setbacks

Flood Construction Levels (FCLs) are used to keep living spaces and areas used for the storage of goods damageable by floodwaters above flood levels. In some locations, FCLs have been established. Otherwise, they are typically referenced as an elevation above the natural boundary. Floodplain setbacks are established to keep development away from areas of potential erosion and to avoid restricting the flow capacity of a floodway. Keeping floodways clear of development can reduce the risk of damage to

neighboring properties and will reduce disruptions to natural river processes, leading to a more balanced and economical approach to managing flood-prone areas. Setbacks are measured from the natural boundary unless otherwise specified. Figure 1 illustrates the flood construction level and setback definitions. A designated flood level is the observed or calculated water surface elevation for the designated flood and along with freeboard is used to determine the Flood Construction Level. (It is suggested that a qualified professional engineer and/or geoscientist help determine site-specific FCLs.)



**Figure 1**

## Application by Hazard

For situations where site-specific hazard-related information such as covenants, bylaws, flood maps and engineering reports do not exist, the following minimum requirements should be considered to guide development away from higher flood hazard areas and to allow development to proceed in a safe manner in low risk areas. The following Table 1 summarizes minimum provincial guidelines for setbacks and flood controls levels for various natural or man-made features. A

watercourse is defined as any natural or man-made depression with well-defined banks and a bed 0.6 metres or more below the surrounding land serving to give direction to a current of water at least six months of the year and having a drainage area of two square kilometers or more upstream of the point of consideration. For the purposes of defining setbacks, the natural boundary of a watercourse assumes the best estimate of the edge of dormant or old side channels.

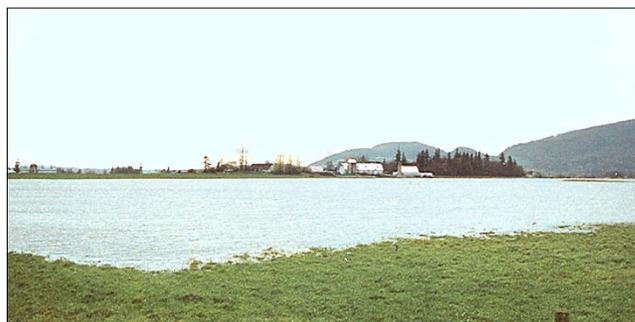
**TABLE 1  
FLOOD CONSTRUCTION LEVELS AND SETBACKS FROM WATER BOUNDARIES**

<b>NATURAL OR MAN-MADE FEATURE</b>	<b>FLOOD CONSTRUCTION LEVEL</b>	<b>SETBACK FROM NATURAL BOUNDARY</b>
Lakes (Length: >15 km)	Designated Flood Level: Underside of floor system no lower than lake flood level plus freeboard.	15 metres
Lakes (Length: >15 km)	Undesignated Flood Level: 3.0 metres above natural boundary of lake, pond, slough, swamp or marsh area affected by the lake.	15 metres
Small Lakes (Length: <15km) Ponds, Swamps, Marsh Areas	For areas without history of severe flooding or concerns about shoreline erosion: 1.5 metres above natural boundary of lake, pond, slough, swamp, or marsh.	7.5 metres
Bluffs	Situation: Building site at top of steep bluff and toe of bluff is subject to erosion and/or is closer than 15 metres from the natural boundary.	Horizontal distance equal to 3 times height of bluff (measured from the toe of the bluff)

Large Reservoirs	Reservoir-specific (based on 'safe line' definitions in operating plans).	Specific to given reservoir and based on site analysis
Small Reservoirs	No operating plan in place: 1.5 metres above spillway crest or 0.6 metres above dam crest, whichever is greater.	Setback principles similar to those for lakes, ponds, and marsh areas (see above)
Watercourses (Standard Requirement)	Designated Flood Level: Underside of floor system no lower than Flood Construction Level.	30 metres
Watercourses (Standard Requirement)	Undesignated Flood Level: Flood Construction Level to be no lower than 3.0 metres above natural boundary.	30 metres
Watercourses (Increased Requirement)	Undesignated Flood Level and former demonstration of extensive flooding and/or significant bank erosion and/or depth of flooding: Underside of floor to be no lower than 3.0 metres above natural boundary.	>30 metres (based on site-specific evaluation)
Smaller Streams	<p>Reduced requirements if:</p> <ul style="list-style-type: none"> <li>• discharge records substantiate designated flood flows to be less than 80 cubic metres/second</li> <li>• watercourse shows no history of flooding or bank erosion</li> <li>• watercourse is not located on alluvial or colluvial fan and/or requirements are deemed appropriate by approving officer.</li> </ul> <p>Undesignated Flood Level: Floor underside to be no lower than 1.5 m above natural boundary.</p>	15 metres
Very Small Streams	Situation: For streams not meeting definition of watercourse and where there is no history of flooding or bank erosion and where the watercourse is not located on an alluvial or colluvial fan, FCL is at discretion of approving officer.	At discretion of approving officer.
Culverts and Bridges	Situation: For possible obstruction of culverts and bridges immediately downstream of subject property in times of flood, FCL is to be 0.3 metres above crown of road.	Setbacks similar to those for size of watercourse noted above.
Areas Protected by Standard Dikes	Buildings to meet FCL requirements prescribed for primary stream, lake or sea adjacent to the dike and for internal drainage associated with ponding elevations.	As above but with additional requirement of 7.5 metre setback for buildings and floodproofing fill from any structure used for flood protection or seepage control or from dike right-of-way used for protection.

## Application by Land Use

In addition to flood construction levels and setbacks associated with natural features, further guidelines are suggested for land use categories, including those for agriculture. Table 2 outlines such requirements for farm buildings. Setbacks, based on hazard type as described above, apply to all agricultural situations, whether or not the area is diked. In addition to meeting flood construction level guidelines, farm building owners are strongly encouraged to incorporate construction floodproofing measures where practical



<b>TABLE 2</b> <b>FLOOD CONSTRUCTION LEVELS AND SETBACKS FOR FARM BUILDING SITUATIONS</b>		
<b>BUILDING TYPE</b>	<b>FLOOD CONSTRUCTION LEVEL</b>	<b>SETBACK FROM NATURAL BOUNDARY</b>
Farm Dwelling	Situation: Parcel size greater than 8.0 hectares in area and within Agricultural Land Reserve. Underside of wood floor system or the top of pad of habitable area no lower than 1.0 metre above the natural ground elevation at any point on the perimeter of the building.	As per Table 1. In areas where the Riparian Area Regulation (RAR) applies, the RAR process must be followed to determine the setback. Where the RAR setback is less than the distance suggested in Table 1, the greater setback is recommended.
Farm Dwelling	Situation: Protection is provided by standard dikes, and floodproofing is impractical, i.e., requiring an elevation in excess of 2.5 metres. Owners of existing parcels may choose the option of full floodproofing or adopting a minimum ponding elevation to provide protection against drainage problems associated with storm conditions. In return, owners must agree to a waiver of financial assistance in the case of flood damage to be registered as a covenant against the land title.	As per Table 1. In areas where the Riparian Area Regulation (RAR) applies, the RAR process must be followed to determine the setback. Where the RAR setback is less than the distance suggested in Table 1, the greater setback is recommended.
Open-Sided Livestock Structures	No flood proofing by elevation required.	As per Table 1
Closed-Sided Livestock Structures Behind Standard Dikes	No flood proofing by elevation required.	As per Table 1
Closed-Sided Livestock Structures Not Behind Standard Dikes	Underside of wood floor system or top of pad no lower than 1.0 metre above natural ground elevation taken at any point on the perimeter of the building.	As per Table 1
Other Farm Buildings	Flood proofing left to discretion of owner.	As per Table 1 except in cases where the RAR applies to commercial and industrial buildings on farmland that are not used for agricultural purposes. In those cases, the RAR process must be followed as for Farm Dwellings (above).

## References

*Agricultural Building Setbacks from Watercourses in Farming Areas*, Factsheet, Ministry of Agriculture and Lands, December 2005. (DRAFT)

*A Users Guide to Floodplain Maps in British Columbia*, Canada-British Columbia Floodplain Mapping Program, Environment Canada and British Columbia Environment.

*Flood Hazard Area Land Use Management Guidelines*, Ministry of Water, Land and Air Protection, Province of British Columbia, May 2004.

*Flood Hazard Information: Lower Fraser River Floodplain*, Ministry of Water, Land and Air Protection, Province of British Columbia.

*Water Management: Flood Hazard Management in British Columbia*, Ministry of Environment, Lands and Parks, Province of British Columbia.

## Websites

Ministry of Environment, Water Stewardship Division

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### FOR FURTHER INFORMATION CONTACT

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