BUILDING CODE BULLETIN

STANDATA

September 20, 2013

DISASTER RECOVERY PROGRAM
FLOOD MITIGATION MEASURES FOR HOMES BEING REBUILT

PURPOSE

To outline the flood mitigation measures required for Disaster Recovery Program (DRP) funding for residences and small business irreparably damaged and located in the flood fringe.

DISCUSSION

There are several strategies that may be employed for flood loss prevention. The best solution to avoid flooding is to build in areas that are outside of the predicted flood hazard area. Where this strategy is not possible or practical, a strategy for “flood protection” may be employed involving the construction of levees, dikes or floodwalls. These “flood protection” measures reduce the potential for flooding but do not eliminate it, as the measures may fail due to flooding beyond predicted levels or other unanticipated causes.

Another strategy known as “high and dry” may also be considered. “High and dry” involves elevating the site to ensure the building and outdoor equipment is above the predicted flood level, which in Alberta is the 1-in-100 year flood level. One of the drawbacks of the “high and dry” strategy is that it can be expensive and not always practical to apply. Site elevation is often a better solution at the community planning stage to avoid creating issues such as surface drainage to adjacent properties at a lower level.

“Wet-flood mitigation” is a commonly used strategy based on the assumption that water will enter the building. The objective is to minimize moisture damage and allow for rapid restoration of building material and equipment. Municipal Affairs published "Disaster Recovery Program Flood Mitigation Measures," on August 15, 2013 (STANDATA Information Bulletin 06-BCB-009R1) which set out the minimum “wet-flood mitigation” measures for owners of homes and small business to be eligible for DRP funding. These measures involved minimizing moisture damage in the basement, safe means to cut and restore power, sealing penetrations and backflow prevention for plumbing.

ENHANCED FLOOD MITIGATION MEASURES FOR REBUILDS

In cases where the building is irreparably damaged in the flood fringe, this STANDATA sets out conditions for owners to be eligible for DRP funding. Owners will be required to reconstruct to these measures only to the extent reasonably possible in cases where reconstruction is in progress. These measures are consistent with the recognized disaster recovery mitigation measures under the Government of Canada’s Disaster Financial Assistance Arrangements (DFFA) Guidelines and the U.S. Federal Emergency Management Agency (FEMA).

All flood mitigation measures are to be included under one flood mitigation permit form (see attached form) issued by the DRP and verified by a safety codes officer employed by the municipality or an accredited agency. The municipality or accredited agency will include all measures under the flood mitigation permit form and issue permits and perform inspections by the appropriate safety codes officers. The flood mitigation permit form verifies compliance with flood mitigation measures when signed and dated by a safety codes officer.

Municipalities may have requirements for flood mitigation and reconstruction under local bylaws. Owners are required to be in compliance with local bylaw requirements as this STANDATA sets out conditions for DRP funding eligibility only. Questions regarding DRP funding for flood mitigation required by your municipality should be addressed to the DRP office at Alberta Emergency Management Agency at 1-866-825-4455. DRP has established policy for dealing with municipal bylaws that are above the standards (Minimum Individual Mitigation Measures and Required Mitigation Measures for Rebuilding).

PROFESSIONAL INVOLVEMENT

Where deemed eligible for DRP funding by the Alberta Emergency Management Agency, building reconstruction that falls within the scope of this STANDATA — foundation and/or superstructure reconstruction — may require related design work to be carried out by a

1) Professional engineer/technologist licensed to engage in the practice of engineering under the Engineering and Geoscience Professions Act, or an
2) Architect licensed to engage in the practice of architecture under the Architects Act,

where the designer is suitably qualified for the area of work the reconstruction project entails. Professional involvement is required for assessment of foundations and structural safety and may be required for grading and complex design issues involving structural, mechanical, electrical construction. Consult with the building safety codes officer for your municipality to determine if professional involvement is required.

DESIGN MEASURES

The following table sets out the objectives for rebuilds that homeowners and small business owners must comply with to qualify for DRP funding. Designers may consider specific variations within these design measures, as is normally the case for standard design and construction to codes and standards under the Safety Codes Act. Design and construction is subject to the review and approval of the safety codes officer in that jurisdiction.

Recommended Design Measures for Building Reconstruction		
Design Measure	**Objective(s)**	**Design Considerations**
1. Furnaces above flood level	• To minimize flood-related damage by locating all primary and secondary heating systems above the design flood level.	• Furnaces need to be located above the predicted flood level and supported appropriately, whether located outside the residence, inside the building, on main floors or attic spaces (ensure manufacturer's installation instructions are addressed and environmental conditions that may relate to temperature and humidity). • Boilers shall be located above the design flood level in a serviceable location that meets the requirements of the manufacturer's installation instructions and the appropriate code.
2. Hot water heaters above flood level	• To minimize flood-related damage by locating all domestic hot water heating systems above the design flood level.	• Hot water tanks and instantaneous hot water heaters shall be located above the predicted flood level in a serviceable location that meets the requirements of the manufacturer's installation instructions and the appropriate code. • Elevated domestic hot water tanks may require additional protection for stability and protection from back siphonage.
3. Electrical service box/panelboards above flood level	• To minimize flood related damage and prevent electrical shock hazard.	• Service box located on the main floor or in garage if above the predicted flood level.
4. Isolating basement circuits	• To allow for power to be restored to remainder of building if basement has been flooded.	• Basement circuits limited to basement only.
5. Service disconnect above grade	• To allow for easy disconnect of power in an emergency. • To allow ability to safely re-energize without having to enter a flooded basement.	• New rule in the 2012 Canadian Electrical Code allows for an outdoor service disconnect. • Installing a service panel in the garage if one exists, and feeding the house as a sub-panel. Receptacles within the garage could supply power for restoration, while the house remains de-energized.
6. Installing weeping tiles on either the interior or exterior of the structure	• To minimize flood-related damage due to the infiltration of groundwater.	• Ensure that backflow protection is addressed as required by the National Plumbing Code for combination systems. • Contact local authorities to ensure termination of the sump of discharge meets local requirements.
7. Installing sump pumps on either the interior or exterior of the structure	• To minimize flood-related damage due to the build-up of groundwater.	• Ensure sump pumps are secured in place, protected from frost if necessary, supported with backflow protection and create no additional flood risk, plus ensure discharge to the surface terminates such that drainage away from the foundation is supported.
8. Securing propane tanks	• To prevent tank flotation by having all propane tanks properly secured, or installed above predicted flood level.	• Propane tanks need to be considered over the entire range of capacity from full to near empty conditions so that bracing/restraints can ensure security of the tank in any condition.

9. Using easily disposable or water-resistant building materials in basement	• To minimize flood-related damage to basement materials. • To allow for easier restoration of basement.	• Refer to STANDATA Building Code Bulletin 06-BCB-009R1, “Disaster Recovery Program Flood Mitigation Measures,” for guidance on materials.
10. Changing to exterior basement insulation	• To avoid need to restore or replace interior insulation in event of flooding.	• Compliance with the manufacturer’s installation instructions to ensure proper protection and water management capability of the exterior insulation. • In lieu of exterior insulation, insulate on the interior side but to 600 mm (2 ft.) below grade only.
11. Disconnecting downspouts and foundation drains from sewers	• To minimize the load on existing sanitary systems during extreme events such as flooding.	• Ensure no interconnection between weeping tile, sump drains, downspouts and foundation drains to sewer. • Combined sewers, require special attention to ensure overloading is minimized.
12. Installing protective plumbing such as backflow prevention valves.	• To minimize risk of exposure to sanitary sewage and storm water through backflow events during flooding.	• Backflow protection shall be provided for drainage piping that serves all fixtures below the level of the adjoining street. • Drainage systems shall be designed such that backflow prevention devices are sufficient for expected surge. This may require manual valves, plus normally opened, and normally closed backwater valves to ensure proper protection in the event of a flood. • Storm drainage system may require additional reinforcement to ensure stability under extreme backflow conditions. • Existing combined sewers need to be considered as sewers so that the storm system can be separated and discharged independently.
13. Limiting foundation openings	• To minimize seepage or flow of floodwater into basement through openings.	• Foundations must be able to withstand increased hydrostatic forces as a result of less flood water ingress into basement/deeper exterior floodwater. • Seal piping, wiring, conduit penetrations at basement walls. • More extensive sealing of penetrations such as windows and other exterior measures may have unintended consequences (i.e. the prevention of bedroom emergency window egress) • Elevation of foundation openings above design flood level, provided bedroom window egress is not undermined. • Basement window well design enhancement, i.e. improve drainage to footings, extension of window well walls above grade, or above predicted flood level where possible.

14. Elevating ventilation system	• To reduce likelihood of floodwater ingress into ventilation system.	• Locate ducts above the design flood level, or designed and constructed to prevent water from entering or accumulating within the ducts during floods up to the predicted flood level. • If the ducts are located below the predicted flood level, the ducts shall be capable of resisting hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the predicted flood level. • If duct work must be installed below the design flood level, it should be minimized as much as possible (while remaining in compliance with the ventilation requirements of the ABC for living spaces). • Protected controls from flood inundation. • Protected exterior units from floodwater inundation, scour, and impact. • Protected exterior piping and wall penetrations below the design flood level from impact and water infiltration, i.e. outside air intake, dryer vent, combustion air/exhaust venting, etc.

General/Additional Design Considerations:

- In addition to the requirements set out in this STANDATA, all related requirements of codes and standards under the Safety Codes Act must be met.
- Appliances and equipment placed in unheated spaces or outside of the building rather than in main or upper levels of the building shall be protected for safe operation and efficiency.
- Frost protection shall be addressed on any portion of the system that is subject to freezing temperatures.
- Sump pit covers should be designed to remain closed and in place in the event of a flood (i.e. attached and hinged) and withstand bodyweight loads to limit the possibility of injury.
- Avoid storage within the furnace/service room to minimize obstructions in accessing building service controls following a flood.

[Original Signed]
Harry Li
Acting Chief Building Administrator

[Original Signed]
Sidney Manning
Chief Plumbing and Gas Administrator

[Original Signed]
Clarence Cormier
Chief Electrical Administrator

Flood Mitigation Permit Form

Disaster Recovery Program

1-866-825-4455

PLEASE PRINT

Project Location	
Project Address	Municipality

Applicant/Owner Information		
Owner Name	Contact Person	Phone
Address (if different than Project Address)		Fax
DRP Reference Number		

Permit Information		
Building	Contractor Name	Building Permit Number
		Issuer signature (or attach permit copy)
	Furnaces above flood level	☐ Yes ☐ No ☐ NA (if NA explain)
	Basement materials acceptable	☐ Yes ☐ No ☐ NA (if NA explain)
	Elevating ventilation system	☐ Yes ☐ No ☐ NA (if NA explain)
	Limiting foundation openings & penetration sealing	☐ Yes ☐ No ☐ NA (if NA explain)
	Basement insulation installation	☐ Yes ☐ No ☐ NA (if NA explain)
Building Verified Compliant	SCO Signature	Date
Electrical	Contractor Name	Electrical Permit Number
		Issuer signature (or attach permit copy)
	Electrical service box above flood level	☐ Yes ☐ No ☐ NA (if NA explain)
	Basement circuits isolated	☐ Yes ☐ No ☐ NA (if NA explain)
	Service disconnect above flood level	☐ Yes ☐ No ☐ NA (if NA explain)
	Panels above flood level	☐ Yes ☐ No ☐ NA (if NA explain)

.../2

Electrical Verified Compliant	SCO Signature	Date

Plumbing	Contractor Name	Plumbing Permit Number
		Issuer signature (or attach permit copy)
	Hot water heaters above flood level	☐ Yes ☐ No ☐ NA (if NA explain)
	Back Water protection in place	☐ Yes ☐ No ☐ NA (if NA explain)
	Securing propane tanks	☐ Yes ☐ No ☐ NA (if NA explain)
	Disconnecting downspouts & foundation drains from sewers	☐ Yes ☐ No ☐ NA (if NA explain)
	Weeping Tile	☐ Yes ☐ No ☐ NA (if NA explain)
	Sump Pump	☐ Yes ☐ No ☐ NA (if NA explain)

Plumbing Verified Compliant	SCO Signature	Date

Project Information

Applicant's Declaration, I certify that information provided above and/or submitted with this application is true and correct.

Please Print Name	Signature	
Address	Phone Number	Date