

DEMOLITION OF FOUNDATIONS & SITE PROTECTION

Discussion

During the week of May 2 to May 9 2016 approximately 2000 structures were lost to wildfire in the Wood Buffalo region. In most cases, when a structure was completely lost, it burned down to the foundation. Article 1.1.1.1. of the Alberta Building Code states that the code applies to “the reconstruction of any building that has been damaged by fire, earthquake or other cause.”

Due to the amount of properties damaged and the extended time expected between demolition and re-construction, clarity around the Municipality’s expectations for site preparation is required. The information provided here focuses on the requirements of the Alberta Building Code when new foundations are not expected to be rebuilt immediately after the removal of the foundation.

Critical Issues

There will be several critical steps in the safe, timely and complete removal of fire damaged structures, services, building materials and foundations. In particular, there will be the requirement to ensure fencing or secure barricades are in place during demolition and after the demolition and removal of a foundation the excavation is filled or fencing remains in place. It is also critical that a procedure is in place to ensure the integrity of the subgrade soils supporting new structures will not be compromised.

Site Safety

From a safety perspective, open excavations and construction sites can be hazardous to both workers and the public. Excavation sites pose a fall hazard and accumulated water can be a drowning hazard. **For this reason, the Alberta Building Code requires that all open excavations and any basements that are not immediately removed be kept securely fenced and reasonably clear of water until the demolition and construction process is complete.**

Excavation

8.2.2.1. Water Removal

1) Excavations shall be kept reasonably clear of water.

8.2.1.3. Fencing, Boarding or Barricades

1) When a construction or demolition activity may constitute a hazard to the public and is located 2 m or more from a public way, a strongly constructed fence, boarding or barricade not less than 1.8 m high shall be erected between the site and the public way or open sides of a construction site.

8.2.1.5. Work Shutdown

1) When work on a construction site is suspended or ceases so that it will not be occupied during normal working hours, the hazardous part of the construction site shall be protected by
a) covering all windows, doors and other openings located within 3 m of the ground which may give access to the building with a securely fastened barricade, or
b) a fence or barricade constructed according to the requirements of Article 8.2.1.3.

Structural/Geotechnical Effects of Water in Excavations

In addition to being hazardous to persons, accumulated water in open excavations can have a negative effect on the soils expected to carry foundations of a new building. Depending on the soil type, allowing an excavation site to become even somewhat saturated can cause degradation in bearing capacity, while in others soils expansion may occur. Varying amounts of moisture in variable soils are sure to cause differential movement and in the right conditions can reduce a foundations ability to evenly distribute loads. This can lead to structural damage or even failure over time. Articles 4.2.4.4. and 4.2.5.5. of the Alberta Building Code assume constant monitoring and control of water in excavations and insitu testing when soils have been affected by moisture. This means when excavations are left open due to delays in construction the moisture content of subgrade soils will need to be continually

checked and accumulated water removed immediately to prevent possible degradation of the soil at the foundation. Records of monitoring should be kept for future review by the geo-technical consultant.

Structural/Geotechnical Effects of Frost in Excavations and Foundations

Most soils are susceptible to movement in frost, and predictably, the greater the moisture in the soil the greater the movement can be expected. Article 9.12.1.3. requires excavations to be protected from freezing throughout the construction process. Freezing of the ground under a building can negatively affect the bearing capacity of soils and cause differential movement leading to structural damage when the frozen ground either expands the soil under a building or subsides when the frost comes out of the ground when the building is subsequently heated. In any case, it is never permissible to construct on frozen ground or allow the soils beneath a foundation to become frozen. If it is not possible to remove a foundation before winter sets, it is still recommended that the bottom of the foundation be protected from the detrimental effects of freezing. Local experience with frost levels in Fort McMurray has shown that without protection or heat, and depending on the winter and the type of soils in a particular location, freezing can occur up to a depth 3 meters. The effect this can have on the subgrade soils when they eventually thaw out is to soften and reduce the bearing capacity of what was once, prior to construction, considered undisturbed soil. Should this occur, additional geo-technical testing may be required to confirm all of the frost has come out of the soils beneath the foundation and to confirm bearing capacity. Prior to re-building, any soils with reduced bearing capacity will have to be removed under the supervision of a geo-technical engineer.

4.2.2.4. Altered Subsurface Condition

- 1) If, during construction, the soil, rock or groundwater is found not to be of the type or in the condition used in design and as indicated on the drawings, the design shall be reassessed by the designer.**
- 2) If, during construction, climatic or any other conditions change the properties of the soil, rock or groundwater, the design shall be reassessed by the designer.**

4.2.5.7. Protection and Maintenance at Excavations

- 1) All sides of an excavation, supported and unsupported, shall be continuously maintained and protected from possible deterioration by construction activity or by the action of frost, rain and wind.**

4.2.5.5. Control of Water around Excavations

- 1) Surface water, all groundwater, perched groundwater and in particular artesian groundwater shall be kept under control at all phases of excavation and construction.**

9.12.1.3. Protection from Freezing

- 1) The bottom of excavations shall be kept from freezing throughout the entire construction period.**

Conclusion

Preserving the integrity of the soil beneath a foundation is a prime concern for owners and contractors. To do this a well thought out and coordinated strategy for demolition and reconstruction that accounts for safety, weather, trade availability and construction timelines will be required. Unless open excavations are backfilled or a new foundation and building is to be constructed immediately after excavation, as is the case in conventional construction, fire damaged basements or open excavations resulting from demolition will need to remain securely fenced and be closely monitored to prevent the accumulation of water and the freezing of the subgrade. **In all cases, building permits will be required for reconstruction. Prior to placing new foundations owners will be required to obtain a soil test from a geo-technical engineer that confirms minimum Alberta Building Code requirements. Owners and contractors will be required to provide this confirmation at the foundation inspection before any authorization to proceed further is permitted. If a foundation is installed and construction is delayed or continues through the fall and winter, the building, or at least the foundation will need to be heated to prevent any freezing of the subgrade. Sites shall remain fenced until the floor is on the foundation and any service trenches are back filled. For**



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further information on fencing requirements see the “Fencing During Construction and Demolition Guide”.

Additional information is also provided in the “Demolition Permit Information Package, Checklists & Application Form” available at Planning and Development and on the Regional Municipality of Wood Buffalo website.

Questions regarding any of the information above may be directed to Planning and Development at 780-743-7813 or email inspections@rmwb.ca.