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## Proposed Change 1809

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<b>Code Reference(s):</b>	<b>NBC20 Div.B 9.18.6.2. (first printing)</b>
Subject:	Radon and Soil Gas Mitigation
Title:	Ballast for Ground Cover in Heated Crawl Spaces
Description:	This proposed change clarifies the requirements for proper ballast to weight down the ground cover in heated crawl spaces.

This change could potentially affect the following topic areas:

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| <input type="checkbox"/> Division A                                | <input checked="" type="checkbox"/> Division B             |
| <input type="checkbox"/> Division C                                | <input type="checkbox"/> Design and Construction           |
| <input type="checkbox"/> Building operations                       | <input checked="" type="checkbox"/> Housing                |
| <input checked="" type="checkbox"/> Small Buildings                | <input type="checkbox"/> Large Buildings                   |
| <input type="checkbox"/> Fire Protection                           | <input type="checkbox"/> Occupant safety in use            |
| <input type="checkbox"/> Accessibility                             | <input type="checkbox"/> Structural Requirements           |
| <input checked="" type="checkbox"/> Building Envelope              | <input type="checkbox"/> Energy Efficiency                 |
| <input type="checkbox"/> Heating, Ventilating and Air Conditioning | <input type="checkbox"/> Plumbing                          |
|  | <input type="checkbox"/> Construction and Demolition Sites |

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### Problem

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The provisions found in Clause 9.18.6.2.(2)(a) of Division B of the National Building Code of Canada (NBC) 2020 do not clearly state what is meant by ground cover being evenly weighted down in a heated crawl space.

Ground cover has been shown to balloon as the result of having ballast of incorrect or inconsistent thickness covering it; for example, this ballooning can occur during common operations like running a clothes dryer in a dwelling. This ballooning can cause the soil gas barrier to fail, which leads to soil gases, such as radon, leaking into the livable space of the building. These gases affect the indoor air quality, and the presence of radon can cause an increase in the probability of the building occupants developing lung cancer.

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## Justification

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This proposed change clarifies the type of ballast material that can be applied over the ground cover in a heated crawl space and the thickness of the ballast material, which can be measured by the authority having jurisdiction during construction. This clarification would reduce the probability of a premature soil gas barrier failure, which would reduce the probability of soil gases, such as radon, leaking into the livable space of the building.

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## PROPOSED CHANGE

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### **[9.18.6.2.] 9.18.6.2. Ground Cover in Heated Crawl Spaces**

- [1] 1)** Where a crawl space is heated, a ground cover consisting of not less than 0.15 mm polyethylene sheet conforming to CAN/CGSB-51.34-M, "Vapour Barrier, Polyethylene Sheet for Use in Building Construction", shall be installed as part of an *air barrier system* in accordance with Subsection 9.25.3.
- [2] 2)** The ground cover required in Sentence (1) shall have its joints lapped not less than 300 mm, and
  - [a] a) be sealed and evenly weighted down with not less than 50 mm of coarse clean granular material containing not more than 10% of material that will pass a 4 mm sieve, or
  - [b] b) be covered with concrete not less than 50 mm thick.
- [3] 3)** The perimeter of the ground cover required in Sentence (1) shall be sealed to the *foundation* wall. (See Notes A-9.13.4., A-9.25.3.4. and 9.25.3.6., and A-9.25.3.6.(2) and (3).)
- [4] 4)** All penetrations of the ground cover required in Sentence (1) shall be sealed against air leakage. (See Subsection 9.25.3.)

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## Impact analysis

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Currently, it is common practice in construction to use granular material as ballast over ground cover in heated crawl spaces. However, the granular material is not always applied at a thickness of 50 mm. If increasing the thickness of the granular material were required to comply with this proposed change, costs would increase by between \$0.70/m<sup>2</sup> and \$1.03/m<sup>2</sup> for every 25 mm of thickness.

Where sand has been used as ballast instead of granular material, the cost difference ranges from \$0.66/m<sup>2</sup> to \$0.88/m<sup>2</sup> less for a 50 mm thickness of sand compared to using the same thickness of granular material. However, because sand does not drain as well as granular material and can cause mould growth in a heated crawl space, it is not a suitable substitute for granular material.

The benefit of applying the ballast is a reduction in the probability of the ground cover ballooning, which can cause the ground cover seams to fail. It costs between \$300 and \$400 to repair damaged ground cover due to ballooning.

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## Enforcement implications

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The proposed change would reduce confusion during inspection about acceptable ballast materials and thicknesses for weighting down ground cover.

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## Who is affected

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This proposed change would affect building occupants by reducing the risk of soil gases and moisture leaking into the building and causing adverse health effects.

For contractors, this proposed change would clarify the requirements for ballast over ground cover and reduce the amount of remedial work that would have been required previously.

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## OBJECTIVE-BASED ANALYSIS OF NEW OR CHANGED PROVISIONS

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[\[9.18.6.2.\]](#) 9.18.6.2. ([1] 1) [F40,F61-OH1.1] [F61-OH1.2]

[\[9.18.6.2.\]](#) 9.18.6.2. ([1] 1) [F61-OS2.3]

[\[9.18.6.2.\]](#) 9.18.6.2. ([1] 1) no attributions

[\[9.18.6.2.\]](#) 9.18.6.2. ([2] 2) [F40,F61-OH1.1] [F61-OH1.2]

[\[9.18.6.2.\]](#) 9.18.6.2. ([2] 2) [F61-OS2.3]

[\[9.18.6.2.\]](#) 9.18.6.2. ([3] 3) [F40-OH1.1]

[\[9.18.6.2.\]](#) 9.18.6.2. ([4] 4) [F40,F61-OH1.1,OH1.2]

[\[9.18.6.2.\]](#) 9.18.6.2. ([4] 4) [F61-OS2.3]