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To: "Direct to Mayor and Council - DL"

Date: 9/13/2024 11:21:30 AM

Subject: Building Code changes to enable single egress stairways

Attachments: VFRS Position Paper on Single Exit Buildings - 2024-05-31.pdf  
Single Egress Stair (SES) FCABC Speaking Points July 2024.pdf

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Good afternoon Mayor and Council,

On behalf of Chief Fry, I am writing to share the following materials pertaining to recent changes to the BC Building Code to permit single egress stairways in small multi-unit residential buildings. As indicated in the documents, VFRS does not support this change.

We will be providing Council with recommended updates to the Vancouver Building Bylaw later this fall. That report will include for consideration amendments to align with the BC Building Code provisions which enable single egress stairways. Of course, the Chief Building Official, Fire Chief and other staff will be available to address any questions Council may have in respect of this matter.

Best,  
Paul

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The City of Vancouver acknowledges that it is situated on the unceded traditional territories of the xw'kməyám (Musqueam), Səwxwú7mesh (Squamish), and səlilwəta' (Tsleil-Waututh) Nations.



May 31, 2024

## **Single Exit Stair Buildings Position Paper on Code Change Proposal**

### Background

- Current Vancouver Building By-law, BC Building Code and National Building Code (the Codes) require all buildings have at least two exits from each floor
- Currently a single exit stair is permitted only if the building
  - Is not more than 2 storeys in height,
  - Not more than 60 persons served by the exit stair
  - Floor area is small, varying between 150 m<sup>2</sup> and 300 m<sup>2</sup> depending on type of occupancy
  - Travel distance to the exit stair is not more than 10 to 25 m depending on the type of occupancy.
- The Province of Ontario is considering changing the Ontario Building Code to permit a single exit for residential buildings up to 6 storeys high
  - Limit of 60 persons per floor
  - Maximum 4 dwelling units per floor, each unit maximum 150 m<sup>2</sup>
- The Ontario proposal cites the benefits of removing the 2<sup>nd</sup> exit stair
  - Encourages more “missing middle” residential building types to be constructed
  - More flexibility for multi-bedroom apartments
  - higher density
  - Higher potential to improve energy efficiency in buildings with ability to cross ventilate each dwelling units, as each unit will be a corner unit
- The Province of BC is considering similar changes, but for buildings up to 8 storeys, and is seeking a consultant to study the proposal

### Discussion

- Firefighters and Fire Chief Associations from Ontario have issued position papers opposing the removal of the second stair
  - The 2<sup>nd</sup> stair is used primarily for staging firefighting operations while the 1<sup>st</sup> stair is used for residents’ evacuation. If only one stair available for both functions, will cause delay in evacuation and delay firefighting and rescue operations
  - If the 1<sup>st</sup> stair becomes unavailable for any reason such as maintenance, obstructed by debris, or contaminated by smoke from the fire floor, residents will have no emergency exits at all.

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**VANCOUVER FIRE RESCUE SERVICES**  
**Community Safety Division**  
 Fire Prevention and Public Education

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- Proponents cite the Codes have not caught up with modern building and fire protection technology; they cite advancement of sprinkler protection as one reason to be able to eliminate the 2<sup>nd</sup> stair
    - VFRS agrees sprinkler protection goes a long way and has been very successful in mitigating fire risk. However VFRS cautions on relying totally on sprinkler protection
      - As was evident from the Winters Hotel fire, the sprinkler system was successful in extinguishing the first fire. But after every successful activation of the sprinklers, the sprinklers must be shut down to minimize water damage while waiting to be restored to operating condition by a technician.
    - Water supply for sprinkler protection may be temporarily unavailable or insufficient due to high usage or maintenance of the municipal water mains in the zone.
  - The proposal seeks to limit 60 persons per storey, with maximum 4 dwellings per storey
    - Unlike other types of occupancy, residential dwelling units cannot be inspected to enforce occupant load without reasonable cause. A warrant to enter a dwelling unit for the purpose of inspections will be required when the BC Fire Safety Act comes into force imminently. Occupant load per storey can easily exceed 60 persons (or 15 persons per dwelling) since residents of one unit cannot verify the number of people in the other units.
      - In the National/BC Building Code and VBBL, any room or space with more than 60 persons require a minimum of 2 separate exits for an acceptable level of life safety
    - Population in BC is generally aging with more people with disabilities or limited mobility. In the event evacuation of the residents is necessary, the exit stair will be congested and evacuation slowed.
  - The proposal assumes all fire protection and life safety systems are in perfect order and does not recognize the importance of redundancy of fire and life safety systems to reduce risk.
    - Systems may be down at any time, and for significant periods of time for maintenance or replacement.
    - Elevators for evacuation capacity should not be relied upon. There have been recent cases of apartment buildings whose inoperable elevators forced residents, many with limited mobility, to climb and descend stairs for several weeks.
    - The stair may be blocked off for maintenance such as clean up after a fire, or maintenance of the fire hose standpipe located in the exit stair

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- Residents or visitors may leave their mobility devices, electric scooters or bicycles, on the stair landings which serve also as elevator lobbies on each floor, rendering the stair unusable

VFRS Position

- VFRS opposes the proposed code change to remove the 2<sup>nd</sup> exit stairway for any building over 2 storeys.
- If the proposal to remove 2<sup>nd</sup> stair advances, mitigating measures for the significant reduction of the level of life safety should be provided
  - VFRS recommends to be included in any code change proposal measures such as:
    - Backup water supply (on-site storage tank) for the sprinkler system independent of the municipal water mains
    - At least two elevators installed
    - Stairway pressurization fans
    - Emergency power supply for elevators, stairway pressurization fans and, where necessary, fire pump
    - Prohibit use of lightweight wood trusses or wood I-joists in floor assemblies
    - Building to be of mass timber construction

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## Single Egress Stairway (SES) –FCABC Speaking Points

### **Main Messages:**

1. The single egress stairway concept is complex and should be properly evaluated through the national code change process.
2. BC's planned adoption of single egress stairways is moving too quickly, does not have supporting data and not all stakeholder concerns have been addressed or taken into consideration.
3. The BC Building Code (BCBC) does not take into consideration or control other aspects of realities once a building is completed.
4. Fires do occur in egress pathways even with protection systems in place.
5. BC Fire Code inspections of apartment buildings show low compliance rates.
6. Emerging Issues such as lithium-ion battery fires make this proposal even riskier
7. Human movement research on evacuations showed a negative impact with a single exit.

### **1. ACTION – Complex Changes**

*“Changes in building practice and codes in Canada have traditionally followed an in-depth consensus-based process that considers all perspectives, extensive research and evidence. Due to the important and wide-ranging implications, it is not a process to be rushed, considered incremental or driven by single-issue agendas.”*

*“It is imperative that any changes to the building code be made in close collaboration with the fire service.”*

### **2. Background - Concerns with Moving Too Quickly**

#### FEDERAL & INTERNATIONAL

- There has been a strong push towards the single egress stairway option based on a recent master's thesis paper. However, the thesis paper did not fully evaluate all impacts of this change such as fire rates, fire code compliance or the impact on firefighting activities.
- There has been a code change request made to the Canadian Commission on Building and Fire Codes to allow for single egress stairway buildings up to 6 stories.
- The Federal Government has requested that the NRC complete a review of single egress stairways; however, that review will not be completed before the province's planned implementation.
- In the spring of 2024, the International Codes Commission (ICC) rejected the request to allow a single egress stairways in buildings up to 6 storeys

#### PROVINCE OF BC

- The Province of BC is looking to make quick changes to the BCBC to adopt language which would allow single egress stairway buildings.

- Concerns and risks identified by the fire service have not been addressed or considered.
  - There was very limited consultation with the fire service community in BC where many concerns were raised and not addressed prior to the release of the report and moving forward. This was not a transparent consultation process.
- The province's proposal has limited data or research to show:
  - How this change will reduce the impact of the housing crisis.
  - Which communities will be impacted by this change.
  - That this has been successful in other locations.
- No cost analysis has been provided to indicate there is a cost benefit while lowering the life safety level within a building

### **3. BC Building Code does not dictate fire service capabilities**

- Other jurisdictions that allow single egress stairways require a variety of other stipulations that are not covered by the BCBC such as, the level of fire response that needs to be in place.
- The BCBC does not have any authority over what level of fire protection a municipality has in place or must have in perpetuity.

### **4. Fires Do Occur in Egress Pathways**

- *“Research of Canadian apartment building fires showed 9% originated in the means of egress—such as hallways and stairwells—and that smoke affected primary access routes in more than 42% of the fires. “*

### **5. BC Fire Code Inspections Show Low Compliance**

The province's proposal relies on building safety systems to perform without failure 100% of the time.

- Fire inspection data from some urban municipalities (representing over 25% of BC's population) revealed a five-year annual average of 40% of apartment buildings that have compliance issues with their life safety systems and exit / egress areas.
- This shows that these systems don't always work, so they should not be relied upon to safely replace the existing redundant second staircase.
- *“Redundancy is the foundation of fire protection because individual systems may and do fail. Research of Canadian apartment fires showed problems with smoke alarms in almost 9% of fires, while in 7.3%, automatic extinguishing equipment did not work because the fire was too small or other reasons. “*
- *“The 2022 Winters Hotel fire in Vancouver, B.C., where two people perished in a building equipped with a sprinkler and fire alarm system, demonstrates the vulnerabilities of fire protection systems. “*

## 6. **Emerging Issues & Human Movement During Evacuations**

The province's proposal assumes that a building operates perfectly and has not fully evaluated:

1. Lithium-ion battery fires in hallways or stairwells
2. What happens when that exit stair is clogged or blocked
3. How occupants' behaviors during a fire can lead to deadly outcomes with only one egress path.

UK research on evacuations showed that:

- It takes twice as long to evacuate with one stairway vs two stairways.
- Single egress stairways caused the backing people up into lines in potentially smoke-filled hallways and evacuees with impairments slowed evacuation further.
- Many other countries are reevaluating their use of single egress stairways. UK, France etc in new builds.
- While the building may be built to a new standard with specific occupancy and behaviours, we know that the future of these buildings may see changes to the residents. For example: many old hotels have turned into Single Residential Occupancies (SRO's) with higher risk populations.

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**Note:** Text in quotes are referenced from Len Garis' paper titled: *Evaluating Stakeholder Concerns About Proposed Single Egress Stairs (July 2024)*

<https://blogs.ufv.ca/cpscjr/2024/07/10/evaluating-stakeholder-concerns-about-proposed-single-egress-stairs-residential-buildings-in-canada-and-what-the-data-tells-us/>