



Safety Codes, Permits, and Inspections



Life Safety and Property Protection: Alternative Solution for Secondary Suites in Rowhouses

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APPROVALS

This report has been produced as a demonstration of an alternative solution to the National Building Code - 2023 Alberta Edition, to inform the creation of a municipal policy. Use of this report for any other purpose is prohibited.

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EXECUTIVE SUMMARY

This report has been prepared as an alternative solution to the National Building Code - 2023 Alberta Edition, Sentence 9.10.11.2.(2), demonstrating that rowhouses with secondary suites and 1h fire separations at party walls perform at least as well as buildings conforming to the current acceptable solutions, without additional compensatory measures.

Research and full-scale testing have demonstrated unequivocally that the additional compartmentation provided by secondary suite regulations within the NBC(AE) significantly improve both tenability thresholds and structural/property protection, both for the house of fire origin as well as adjoining buildings. This is achieved specifically by preventing smoke movement between compartments through smoke-separations between dwelling units, as well as providing structural fire protection of building elements which affect both the occupants of a house, as well as first responders.

Although similar regulations have recently been adopted in British Columbia with limited technical rationale, this report provides both a defensible approach to this alternative solution, as well as a path for code change request based on empirical evidence, supporting efficient code development.

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1.HISTORY/BACKGROUND

Secondary suites have been presented as an important part of improving access to affordable housing options and increasing density within urban environments. While a political and technical topic for many years in Canada, regulations towards them have typically been developed as a patchwork of municipal and provincial rules. This was addressed by the Canadian Commission on Building and Fire Codes (CCBFC) and the National Research Council through publication of model regulations for secondary suites in the 2010 National Building Code of Canada (NBCC). Since then those regulations have been adopted/harmonized across Canada, including within the current National Building Code - 2023 Alberta Edition (NBC(AE)). Along with recent trends in urban zoning reform, some of the regulations around secondary suites, specifically in rowhouses, have raised concerns of appropriateness and affordability. A commonly-identified issue is the requirement for firewall separation in rowhouses with secondary suites, as required by NBC(AE) Division B, Sentence 9.10.11.2.(2). The City of Edmonton previously issued Policy B19-03¹ interpreting the use of Area Separation Walls to meet the requirements of this Sentence. This report considers the body of research and testing which has been conducted relative to this built-form, and proposes an update to the City's policy based on an alternative solution.

2.PROPOSED ALTERNATIVE SOLUTION

This alternative solution proposes continuing utilization of the 1h fire separation for party walls between rowhouses, with or without secondary suites, eliminating the 2h firewall required within NBC(AE) Division B, 9.10.11.2.(2). such that the Article could be rewritten as below. The analysis shows that this alternative will achieve at least the minimum level of performance of the Division B acceptable solutions, as per Division A, Article 1.2.1.1. A summary of the functional, objective, and intent statements associated with this Article are presented in Appendix A.

¹ Policy B19-03, [Area Separation Walls \(ASW\) for a Row House with Secondary Suites](#), City of Edmonton, Development Services, 2021

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9.10.11.2. Firewalls Not Required

1) ~~Except as stated in Sentence (2), a~~ A party wall on a property line of a building of residential occupancy need not be constructed as a firewall, provided it is constructed as a fire separation having not less than a 1 h fire-resistance rating, where the party wall separates

- a) two dwelling units where there is no dwelling unit above another dwelling unit,
- b) a dwelling unit and a house with a secondary suite including their common spaces, or
- c) two houses with a secondary suite including their common spaces.

~~2) Where a building of residential occupancy contains more than 2 houses, a party wall that separates any 2 adjacent houses with a secondary suite from the rest of the building shall be constructed as a firewall to create separate buildings each containing no more than 2 adjacent houses with a secondary suite.~~

3) The wall described in Sentence (1) shall provide continuous protection from the top of the footings to the underside of the roof deck.

4) Any space between the top of the wall described in Sentence (1) and the roof deck shall be tightly filled with mineral wool or noncombustible material.

There are two key objectives to this alternative solution. The first is to demonstrate equal or better performance with respect to the protection and safety of occupants of suites both within and adjacent to houses with secondary suites. The second objective is to demonstrate equal or better performance with respect to property protection of adjoining houses. Although the intent, functional, and objective statements associated with Sentence 9.10.11.2.(2) pertain only to protection of adjacent buildings and their occupants, it is useful and conservative to extrapolate those intents/objectives to the occupants of the building of fire origin to demonstrate equivalent outcomes there as well as any adjacent buildings and their occupants. The following sections deal with occupant safety and property protection separately.

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2.1. Safety of Occupants Within Rowhouses with Secondary Suites

As provided in Appendix A, the intent, functional, and objective statements for Sentence 9.10.11.2.(2) imply objectives to protect from fires or explosions impacting areas beyond a point of origin, rather than occupant safety or property protection within a building of fire origin. Despite that, this report includes consideration of the building of fire origin for conservative completeness. It also helps to demonstrate through research conducted subsequent to adoption of the 2010 NBCC regulations on secondary suites that occupant safety and building tenability during a compartment fire is improved within houses with secondary suites through measures which compartmentalize the building. This is unsurprising, as containment is a basic tenet of fire protection, and has been a fundamental approach to building fire safety in Canada since the very first national model building code published in 1941.

2.1.1. Alternative Solution Description

In order to compare the performance of an acceptable solution to the proposed alternative, two scenarios are presented (summarized below). For simplicity, both scenarios assume adjoining houses, despite the fact that application of 9.10.11.2.(2) implies at least three adjoining houses. It can be assumed that there are additional units adjoining the examples considered, but consequences in terms of occupant safety and property protection diminish with distance and separation from the house of fire origin. In other words, if the life safety and performance of directly adjoining houses is acceptable, the outcomes for more distant buildings follow the same trend. For the purpose of demonstrating equivalent performance, this analysis compares two baseline fully-conforming acceptable solutions:

- **Scenario 1** - Two Part 9 houses separated by a party wall along a property line, with each house assumed to also contain a secondary suite within the basement. This acceptable solution will assume a 2h firewall separation meeting the requirements of Sentence 9.10.11.2.(2). and will demonstrate the baseline/acceptable performance of rowhouses with secondary suites.
- **Scenario 2** - Two Part 9 houses separated by a party wall on a property line, with neither house incorporating secondary suites. This acceptable solution will assume a 1h fire separation meeting the requirements of Sentence 9.10.11.2.(1). This scenario highlights the inconsistent performance expectations of rowhouses which do not contain secondary suites.

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As stated above, the proposed alternative solution includes secondary suites within both houses, with a party wall separation consisting of a 1h fire separation, but otherwise meeting all other prescriptive requirements of the NBC(AE).

2.1.2. Required Safe Egress Time - RSET

Occupant safety within Part 9 buildings is largely based on the ability of occupants to exit a building during an emergency, generally expressed as Required Safe Egress Time (RSET). Egress time from single family homes has been studied in Canada most notably by Dr Guylene Proulx². Dr. Proulx noted that the characteristics of specific occupants play an important role in egress time, and that individuals present a great deal of variability in evacuation time from one situation to another. This variability is expressed as uncertainty in factors such as recognition time, pre-movement time, response time, and travel time, all which make up the overall evacuation time. When added to the time required to detect and trigger a fire/smoke alarm, this represents the total Required Safe Egress Time (RSET) for a single family home.

Proulx investigated evacuation time by considering worst-case estimates for actions constituting occupant movement. Pre-movement actions included awakening to a fire alarm, investigating the situation, fighting the fire, gathering family members, dressing for winter conditions, and gathering belongings, resulting in a worst-case total pre-movement time of 600s. Accounting for fire detection, alarm, premovement, and travel time, the following estimates of RSET were established:

Table 1: Estimated Required Safe Escape Times from a Single Family House

	Best-Case	Worst-Case
Detection Time	60s	300s
Alarm Time	0s	10s
Pre Movement Time	30s	600s
Travel Time	30s	60s
Total RSET	120s	970s

² Proulx, Cavan, Tnikian, [Egress Times from Single Family Homes](#), Research Report IRC-RR-209, National Research Council Institute for Research in Construction Fire Research Program, 2006.

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Care should be taken in assuming precision of these RSET values, based on the significant variability discussed above. Worst-case estimates are useful however in considering the time-frames for which occupant tenability within a house is required to be maintained. For the purpose of this analysis, the Required Safe Egress Time for houses will be assumed to be roughly 16 minutes (rounding the worst-case 970s from Proulx for simplicity, and to remove any notion of precision).

2.1.3. Available Safe Egress Time - ASET

Occupant tenability in houses is generally measured by three common factors when considering fires and explosions, including visibility (smoke obscuration), exposure to heat/flame, and exposure to toxic substances. The Available Safe Egress Time (ASET) is a measure of the time prior to development of untenable conditions, based on these factors.

While specific limits for each of these criteria are useful to assess thresholds of tenability within a building, for the purpose of this analysis it is only necessary to demonstrate that each of the tenability criteria is no greater than for the acceptable solution during a fire event. This is particularly useful when considering exposure to toxic gases, typically expressed as fractional effective dose (FED), as the products of combustion of a specific fire can have a significant impact on the extent of toxic substances occupants are exposed to. For this analysis, one specific design fire scenario will be used, and any expected change in tenability relative to the difference in construction of the proposed alternative and acceptable solutions will be evaluated.

Studies on the tenability of single family home fires include the Fire Performance of Houses testing conducted by Dr Joseph Su^{3,4}. In these studies, FED was used to quantify the limits of tenability throughout a house based on a relatively severe, fast-growing basement fire scenario. A variety of compartmentation conditions within the basement, as well as throughout the house (i.e. open/closed doors) were included. Aggregating the results of these tenability tests, the ASET ranged from as little as 165 seconds (based on smoke obscuration within an open basement door) up to times where tenability limits were never reached in some portions of the house. It is important to note that the tests

³ Su, et al, [Fire scenario tests in fire performance of houses test facility: data analysis](#), Research Report IRC-RR-210, National Research Council Institute for Research in Construction Fire Research Program, 2007

⁴ Su, et al, [Performance of Protected Ceiling/Floor Assemblies and Impact on Tenability with a Basement Fire Scenario](#), Research Report IRC-RR-307, National Research Council Institute for Research in Construction Fire Research Program, 2011

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intentionally limited fire involvement within a single basement compartment, and with a duration designed to be no greater than 30 minutes. Under these conditions these tests demonstrate a practical ASET within the range of 3 - 12 minutes.

The fire scenarios used in the Fire Performance of Houses studies do not represent all possible residential structure fires, nor do they represent worst-case scenarios; however they provide a reasonable baseline for comparison of the acceptable solutions and the proposed alternative. The fire scenarios do demonstrate a loss of tenability prior to the worst-case Required Safe Egress Time from the previous section, implying that more strenuous fire scenarios would not provide valuable insight into occupant safety, as tenability under those scenarios would be lost well prior to occupant egress, even for buildings constructed to acceptable solutions.

It is important to note that in both studies by Su - the Fire Scenarios tests, as well as the Ceiling/Floor performance tests - the introduction of non-rated closures and separations (a hollow-core door separating the basement from the main level of the house, and basements ceiling protection using regular 12.7mm gypsum board attached directly to floor I-joists) dramatically extended the time to reach tenability limits compared to the baseline condition (no door, no basement ceiling protection). In the Fire Scenario tests, closing the basement door prevented untenable conditions from developing throughout the rest of the house for at least 18 minutes. The Ceiling/Floor test (PF-04) using 12.7mm regular gypsum board applied to wood I-joists yielded an incapacitation time of approximately 3 minutes (based on smoke obscuration from the open basement door) but a delay in structural collapse of the basement ceiling of approximately 12 additional minutes, compared to the unprotected wood I-joint assembly. Although these discrete timing values are not directly applicable to all houses/fires, they provide clear evidence of increased fire and life safety performance both in terms of tenability and structural stability of a house through use of doors separating spaces within the house, and regular 12.7mm gypsum board to protect floor assemblies - both characteristic of secondary suites within houses, but not required for a house without a secondary suite. This clearly demonstrates the improved fire and life safety performance of houses with secondary suites, compared to those without.

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Similar studies have corroborated these findings, such as that by Traina et al⁵ which studied occupant tenability in single family homes prior to fire department intervention. This study also relied upon FED for a number of fire scenarios but with varying conditions/thresholds, and found tenability to vary throughout homes between approximately 4 minutes to 10 minutes without firefighter intervention. An important conclusion of this work coincided with the findings of Su et al, specifically that tenability timelines increased substantially through compartmentation and specifically closed doors, despite a lack of fire-resistance rating or smoke separation.

Therefore, based on the research above, it is reasonable to estimate that the Available Safe Egress Time in houses of fire origin is on the order of 3 - 12 minutes, and impacted significantly by compartmentation, including closed doors.

The previous sections have shown that both the time required to safely egress a house of fire origin is in the order of 2 - 16 minutes, and the time available for safe egress is in the order of 3 - 12 minutes. Care should be taken to assume precision in these values given the various possible fire scenarios (eg fuel loading, ventilation, and compartmentation) and occupant characteristics within any specific house, however both ASET and RSET in this case indicate that the necessary timeframe for occupant protection in a house is in the order to 2 - 16 minutes. As this represents a timeframe by which there can be no expected performance contribution from greater separation requirements at adjoining houses, it can be concluded that the alternative solution performs at least as well as the acceptable solution in terms of occupant safety within the building of fire origin.

2.1.4. Additional Occupant Risks From Secondary Suites

As demonstrated previously in this analysis, the inclusion of secondary suites in houses improves the fire performance of those buildings through the introduction of smoke separations, and structural protection. However, there are arguably additional subjective risks associated with the inclusion of secondary suites, commonly generalized as an increase in occupant load, as well as an increase in probability of fires occurring due to increased activities, specifically cooking, smoking, and other causes of fire associated with residential uses⁶.

⁵ Traina et al, [Occupant Tenability in Single Family Homes: Part 1 - Impact of Structure Type, Fire Location and Interior Doors Prior to Fire Department Arrival](#), Fire Technology 53, 2017

⁶ M Wijayasinghe, [Fire Losses in Canada](#), Office of the Fire Commissioner, Alberta Municipal Affairs, 2011

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Although increased occupant load is often associated with secondary suites, and in fact may be inherent in the social demand for such housing, there is no basis in the code to differentiate this occupant load. Specifically, houses are not limited in occupancy through the acceptable solutions of the code, nor are the specific activities associated with secondary suites (cooking, smoking, etc). Large families, multi-generational housing, and cohabitation of a single dwelling unit, which are all permissible without applying additional rules for secondary suites, impose the same activities and increase activity-based fire-occurrence probability.

The addition of secondary suites regulates compartmentation which as shown increases the fire performance of houses. Therefore, it is illogical to conclude that the addition of secondary suites, thereby increasing occupant load and activity (which is permissible without secondary suites) has a negative safety impact on building occupants.

Fuel loading within secondary suites was also addressed by Bwalya et al⁷, which found that secondary suites had similar fuel loading characteristics of other typical rooms, but with reduced dimensions. Reasonably, there is no basis for concluding that fuel loading within a secondary suite exceeds that of a house/room without a secondary suite.

Further to these points, it is important to note that the functional and objective statements for Sentence 9.10.11.2.(2) do not include objectives to manage fuel loading, or fire occurrence/probability, which is consistent with the expected performance/contribution of a party wall separation, which is to say there is no performance difference with respect to occupant load, or fire probability associated to the presence, or absence, of a firewall.

2.1.5. Occupant Safety Conclusion

The previous sections demonstrated that within the timeframe of occupant egress from a house (approximately 16 minutes) and loss of tenability based on a reasonable fire scenario (approximately 12 minutes) there is no reasonable expectation that a 2h firewall separation would perform better than a 1h fire separation in terms of occupant safety within either a dwelling unit or a house with a secondary suite.

⁷ Bwalya et al, [Characterization of fires in multi-suite residential dwellings: summary report](#), Research Report 2014-10-24, National Research Council of Canada, 2014

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Further to that conclusion, the testing completed through the Fire Performance of Houses study subjectively demonstrates the dramatic improvements in both occupant safety/tenability and structural protection through measures associated with secondary suites, specifically separations between suites (basement and main floor) and regular gypsum board protection of ceiling-floor framing. This demonstrates that the existing secondary suite regulations can actually significantly improve the safety of occupants and protection of property without increasing the degree of party wall separation between houses.

2.2. Occupant Safety within Adjacent Houses

While the previous section addressed the safety of occupants within a house with a secondary suite, irrespective of the presence of adjoining houses, this section will focus on the safety of occupants of adjoining houses, specifically those attached by a party wall (rowhouse). This section will assume fire initiation in a house attached to the occupancy being evaluated, comparing the proposed 1h fire separation to a 2h firewall.

As was shown in the previous section, the importance of evacuation of occupants of the building in which the fire occurs is paramount, and if evacuation has not occurred within 3 - 12 minutes, the survival of occupants within the house is questionable. This also coincides with the expected response/intervention time of a career fire department⁸. It is reasonable to conclude that evacuation efforts for nearby buildings will coincide with evacuation of the building of fire origin. Therefore, considering the expected fire performance of a 1h fire separation during this time frame (approximately 12 minutes), there is no expected functional difference between a 2h firewall and a 1h fire separation for the tenability of the occupants of the adjacent houses.

It should be noted that most municipalities maintain a distinction of the 10-minute response capability of the local fire department in order to apply the code requirements for spatial separation. Such a consideration/acknowledgement of fire department capability should be applied to this alternative solution, providing a measure of assurance that intervention by first responders is expected within the timeframe of occupant egress, and equivalent performance of a 1h fire separation and 2h firewall (3 - 12 minutes).

⁸ Deployment Objectives and Single-Family Dwelling Initial Full Alarm Assignment Capability, NFPA 1710 - Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, 2020.

2.3. Protection of Adjacent Houses

The protection of adjacent houses (OP3 associated to Sentence 9.10.11.2.(2)) utilizing a 1h fire separation in place of a 2h firewall is challenging to evaluate outside full-scale testing or research to characterize the performance of each wall assembly, and this analysis will not address objective performance in that manner. Instead, this section will demonstrate the inconsistent performance expectation introduced by Sentence 9.10.11.2.(2) relative to other Part 9 buildings, specifically row houses without secondary suites, and the unnecessary limitation on building area by introduction of a firewall given modern firefighting capabilities.

It has been demonstrated in previous sections that the timeliness of meaningful protection to occupants is within 12 minutes from fire initiation, which also coincides with typical response times of career fire departments. Within this timeframe, there is no reasonably-expected difference in life safety provided by a 2h firewall compared to a 1h party wall. However, firewalls offer additional property protection by acting as passive fire protection where the response of a fire department is expected to be delayed or overwhelmed by the fire event. Simply put, the firewall acts to protect adjacent buildings (even from firefighting activities themselves) in cases where the building/fire is so large that the fire department cannot reasonably contain/control the fire in the building of origin⁹. This is expressed generally as the maximum building area by which fire department intervention can be reasonably expected to control fire spread to adjoining/adjacent buildings.

The firewall introduced by Sentence 9.10.11.2.(2) when a number of secondary suites are present created a significant inconsistency in the maximum building area for rowhouses. At the extreme, a rowhouse without secondary suites may be up to 600m² in building area, whereas when secondary suites are present, the maximum building area is reduced to as few as two houses (or approximately 140m² in building area for typical townhomes in Edmonton). This is not congruent with fire risk, or challenge faced by responders in addressing row house fires, as it has already been demonstrated that compartmentation from the addition of secondary suites decreases the fire risk associated with property protection, both for the house of fire origin, as well as adjacent houses.

⁹ K Calder, P Senez, [The Historical Development of the Building Size Limits in the National Building Code of Canada](#), Sereca Consulting Inc, prepared for the Canadian Wood Council, 2015

3.CODE CHANGE HISTORY

Starting in 2007, the Canadian Commission on Building and Fire Codes (CCBFC) created a Task Group on Secondary Suites under the Standing Committee on Housing and Small Buildings. The task group created a number of code change requests as part of the 2010 NBCC cycle, including changes to 9.10.11.2. The code change request (presented in Appendix B) included a clarification of the exceptions for firewalls between houses along property lines, which was intended to permit secondary suites without firewall separations. Following public review comments, at their April 15th 2009 meeting, the Standing Committee accepted the proposal with technical changes, stating:

"In response to a negative [public comment]. . .the Standing Committee agreed that in row houses, the level of hazard with respect to more than two houses with secondary suite located side by side could be higher because of higher occupant load that could result if all houses in a set of row houses are built or retrofitted to contain secondary suites. A requirement for a party wall between more than two houses with a secondary suite is revised such that that party wall should be constructed as a firewall every two houses with secondary suites."

Although it is unclear what information may have been provided in the public comments, the additional testing and research conducted following this decision in 2009, and cited within this report, clearly demonstrates that the assumptions regarding level of hazard, although subjectively conservative, were incorrect.

This report has already demonstrated these incorrect assumptions, and research and full scale testing by Su⁴ and Bwalya⁶ has shown that fuel loads within secondary suites are consistent with other residential uses, and increased occupant load from suites is associated with separations and closures which dramatically improve both the occupant tenability and structural integrity of the building of fire origin. Equally, adjacent houses benefit in terms of fire exposure in the same way, exemplifying that rowhouses without secondary suites (particularly unfinished basements) are of no greater risk to occupant safety and property protection than rowhouses with secondary suites, even with only 1h fire separations delineating each house.

4.CONDITIONS

This analysis has identified through reference to research and full-scale testing, that rowhouses with secondary suites perform objectively better than rowhouses without secondary suites, such that the additional requirement of firewalls between every two dwelling units is not required to provide equal or better performance (see Proposed Alternative Solution section). The conditions by which this alternative solution is bound includes adherence to all other Division B requirements for secondary suites within houses, specifically, but not limited to:

- 9.10.9.16.(4) - walls and floor-ceiling framing must be protected by a continuous smoke-tight barrier of not less than 12.7mm gypsum board
- 9.10.9.3. - doors within smoke-tight barriers must be solid-core, and self-closing
- 9.10.19. - all smoke alarm requirements, including placement, interconnection, and permanent power supply
- Firefighting assumptions included in the Notes to Part 3 including an expectation of local fire department response and intervention reasonably within 10 to 30 minutes.

5.DISCUSSION

This analysis was prepared to demonstrate an alternative solution to NBC(AE) Sentence 9.10.11.2.(2) by objectively determining the relative risk of occupant safety and property protection in relation to the associated intent, functional, and objective statements for that Sentence and Article. Consideration was given to the historical context of firewall separations in general, as well as associated regulations with respect to secondary suites, in particular those introduced in the 2010 NBCC, to ensure the rationale and purpose of those regulations were also accounted for. By relying on full scale testing and research, it has been demonstrated that rowhouses with secondary suites provide considerable life safety and property protection equal to or exceeding the level of protection achieved through the acceptable solutions in Division B for rowhouses without secondary suites - whether such rowhouse basements are developed or not - without the presence of firewall separations at party walls. This performance is primarily attributable to compartmentation of suites through smoke-tight barriers consisting of gypsum board floor-ceiling framing and wall framing protection, which are inherent to other requirements for secondary suites within rowhouses throughout the NBC(AE).

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Further, when the proposed alternative is compared to the acceptable solution which also includes secondary suites, it has been shown that the relative performance differences between a 1h fire separation and a 2h firewall are irrelevant, given the timeframes for occupant safety considerations as well as the capability and intervention of emergency responders.

This report focussed on specific fire scenarios based on full-scale testing and research conducted by the National Research Council, specifically investigating basement fire scenarios. The conclusions drawn through this analysis are not dependent solely on basement fires, however generally those represent the most onerous fire conditions for building occupants and firefighters especially when considering the potential for collapse of unprotected floor assemblies. The key factors which were shown to improve occupant tenability and property protection were associated to compartmentation and smoke separations which are inherent to rowhouses with secondary suites in any configuration, i.e. basement suites, main floor suites, and combinations thereof. Therefore, although not explicitly investigated, the occupant tenability and property protection performance of rowhouses with secondary suites can be considered at least as good as rowhouses without secondary suites, irrespective of the degree of fire separation between houses.

6.CONCLUSION & RECOMMENDATIONS

The proposed alternative solution to utilize a 1h fire separation for party walls between rowhouses, with or without secondary suites, eliminating the 2h firewall required within NBC(AE) Division B, 9.10.11.2.(2) has been demonstrated to provide equal or better performance compared to two possible acceptable solutions, i.e. rowhouses without secondary suites, and rowhouses with secondary suites adhering to 9.10.11.2.(2). The conditions for this alternative solution are general, and not project specific, and are trivial to apply on a broad basis. Therefore, it is recommended that this alternative solution be used to support a policy/municipal variance to remove Sentence 9.10.11.2.(2), including the conditions presented.

APPENDIX A

This appendix summarizes the various objective, functional, and intent statements for Article 9.10.11.2. Although the proposed alternative solution only proposes a change to Sentence (2) of this Article, the nature of the entire Article was considered for completeness. Note that intent statements are taken from the most recently published for the 2015 NBCC, however the Article remains unchanged since this publication. Applicable statements are in **bold text**.

Attribution Table:

9.10.11.2. Firewalls Not Required	
(1)	[F03-OS1.2]
	[F03-OP3.1]
(2)	[F03-OS1.2]
	[F03-OP3.1]
(3)	[F03-OS1.2]
	[F03-OP3.1]
(4)	[F03-OS1.2]
	[F03-OP3.1]

Summary of Functional Statements

F03 To retard the effects of fire on areas beyond its point of origin.

Summary of Objective Statements

OS Safety

An objective of this Code is to limit the probability that, as a result of the design, construction or demolition of the building, a person in or adjacent to the building will be exposed to an unacceptable risk of injury.

OS1 Fire Safety

An objective of this Code is to limit the probability that, as a result of the design or construction of the building, a person in or adjacent to the building will be exposed to an unacceptable risk of injury due to fire. The risks of injury due to fire addressed in this Code are those caused by—

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OS1.1 – fire or explosion occurring

OS1.2 – fire or explosion impacting areas beyond its point of origin

OS1.3 – collapse of physical elements due to a fire or explosion

OS1.4 – fire safety systems failing to function as expected

OS1.5 – persons being delayed in or impeded from moving to a safe place during a fire emergency

OP Fire and Structural Protection of Buildings

An objective of this Code is to limit the probability that, as a result of the design, construction or demolition of the building, the building or adjacent buildings will be exposed to an unacceptable risk of damage due to fire or structural insufficiency, or the building or part thereof will be exposed to an unacceptable risk of loss of use also due to structural insufficiency.

OP3 Protection of Adjacent Buildings from Fire

An objective of this Code is to limit the probability that, as a result of the design or construction of the building, adjacent buildings will be exposed to an unacceptable risk of damage due to fire. The risks of damage to adjacent buildings due to fire addressed in this Code are those caused by—

OP3.1 – fire or explosion impacting areas beyond the building of origin

Intent Statements

Note the OS&OP intent statements differ only in the final words, “. . .which could lead to:

“. . .harm to persons in the dwelling unit not originally involved in the fire.”

“. . .damage to the adjacent building.”

Therefore, for brevity, the OP3 tab/intents have been omitted from each Sentence, other than Sentence (2):

Sentence 9.10.11.2.(1)

1. [OS1](#) 2. [OP3](#)

Objective [OS1.Fire.Safety](#)

Attribution [\[F03-OS1.2\]](#)

Intent

Intent 1:

To supersede the requirements of Sentence 9.10.11.1.(1), which would otherwise require the party wall to be a firewall, if a certain measure is taken [i.e. the party wall is constructed as a fire separation having not less than a 1 h fire-resistance rating], on the basis that this is restricted to buildings that are limited in height in which evacuation can be expected to be relatively quick.

This [the measure] is to limit the probability that fire will spread from one dwelling unit or house with a secondary suite to another dwelling unit or house with a secondary suite, which could lead to harm to persons in the dwelling unit not originally involved in the fire.

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Sentence 9.10.11.2.(2)

1. [OS1](#) 2. [OP3](#)

Objective [OS1.Fire.Safety](#)

Attribution [\[F03-OS1.2\]](#)

Intent

Intent 1:

To clarify that:

- the requirements of Sentence 9.10.11.1.(1), which require that all party walls be constructed as firewalls, also applies to situations where buildings of residential occupancy contain more than 2 houses, and
- the permission to construct the party wall as a fire separation having not less than a 1 h fire-resistance rating is limited to situations where fewer than 2 houses with a secondary suite are adjacent to each other, on the basis that this is restricted to buildings that are limited in height in which evacuation can be expected to be relatively quick and that the occupant load is smaller than what would be expected in a duplex.

This [the measure] is to limit the probability that fire will spread from one part of a building of residential occupancy containing more than 2 houses to the rest of the building, which could lead to harm to persons in the dwelling unit not originally involved in the fire.

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Sentence 9.10.11.2.(2)

1. OS1 **2. OP3**

Objective OP3.Protection of Adjacent Buildings from Fire

Attribution [F03-OP3.1]

Intent

Intent 1:

To clarify that:

- the requirements of Sentence 9.10.11.1.(1), which require that all party walls be constructed as firewalls, applies to situations where buildings of residential occupancy contain more than 2 houses, and
- the permission to construct the party wall as a fire separation having not less than a 1 h fire-resistance rating is limited to situations where fewer than 2 houses with a secondary suite are adjacent to each other, on the basis that this is restricted to buildings that are limited in height in which evacuation can be expected to be relatively quick and that the occupant load is smaller than what would be expected in a duplex.

This [the measure] is to limit the probability that fire will spread from one part of a building of residential occupancy containing more than 2 houses to the rest of the building, which could lead to damage to the adjacent building.

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Sentence 9.10.11.2.(3)

1. OS1 **2. OP3**

Objective OS1.Fire Safety

Attribution [F03-OS1.2]

Intent

Intent 1:

To limit the probability that a party wall will not be continuous, which could lead to gaps or openings in the party wall during a fire, which could lead to the spread of fire from one building to another, which could lead to harm to persons in the building not originally involved in the fire.

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Sentence 9.10.11.2.(4)

1. [OS1](#) 2. [OP3](#)

Objective OS1 Fire Safety

Attribution [\[F03-OS1.2\]](#)

Intent

Intent 1:

To limit the probability that fire will spread through spaces between the top of a party wall and a roof deck, which could lead to the spread of fire into the roof deck from one building to another, which could lead to harm to persons in the building not originally involved in the fire.

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APPENDIX B - NBC 2005 Proposed Code Change

The following code change was presented in the Public Review on Proposed Changes to the 2010 National Model Construction Codes — 2008 .

Canadian Commission
on Building and Fire Codes

Commission canadienne des codes
du bâtiment et de prévention des incendies

PROPOSED CHANGE

NBC05-09.10.11.02.(01)-HSB-v5-ballot_ed.doc

MODIFICATION PROPOSÉE

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Document

NBC 2005 CNB

Document

Provision

9.10.11.2.(1)

Exigence

Comité

Housing and Small Buildings • Maisons et petits bâtiments

Comité

Minutes

TG on Secondary Suites 1.07; 2.5.3; SC HSB 2005.4.06.07.; SC-HSB 2005.5.06.02Procès-verbaux

EXISTING PROVISION

9.10.11.2. Firewalls Not Required

1) In a building of residential occupancy in which there is no dwelling unit above another dwelling unit, a party wall on a property line between dwelling units need not be constructed as a firewall provided it is constructed as a fire separation having not less than a 1 h fire-resistance rating.

PROPOSED CHANGE

Replace Sentence 9.10.11.2.(1) as follows:

Other Code Provisions Affected: None

9.10.11.2. Firewalls Not Required

1) ~~In a building of residential occupancy in which there is no dwelling unit above another dwelling unit, a party wall on a property line between dwelling units of a building of residential occupancy need not be constructed as a firewall, provided it is constructed as a fire separation having not less than a 1 h fire-resistance rating, where the party wall separates~~

- a) ~~two dwelling units where there is no dwelling unit above another dwelling unit,~~
- b) ~~a dwelling unit and a house, or~~
- c) ~~two houses.~~

RATIONALE

Problem

General Background

Currently the NBC regulates secondary suites through Part 9 using same criteria as for duplex and semi-detached dwelling units. Compared to a single family dwelling, building code provisions that are applicable to secondary suites often impose additional requirements.

A number of provincial codes and municipal jurisdictions have requirements that apply specifically to the secondary suites but there is little consistency among jurisdictions. The provinces and territories have requested that the requirements of the National Building Code be reviewed with the aim of providing uniform model requirements that would better accommodate and reduce non-conforming construction of secondary suites.

This proposed change is one of a series that was developed to address the issue.

Technical change: Single Dwelling Unit Performance Level

The level of hazard with respect to houses with secondary suites is not sufficiently different from the level of hazard with respect to single dwelling units to justify application of different requirements for party walls between houses.

The existing provisions, which would require that a party wall on a property line between two houses or between a house and a dwelling unit be constructed as a firewall, are unnecessary stringent.

Justification - Explanation

This proposed change expands the application of requirements that currently apply to party walls between dwelling units to party walls between houses.

The proposed relaxation exempts party walls from the application of Article 9.10.11.1. which would otherwise require that a party wall on property line between two houses or between a house and a dwelling unit be constructed as a firewall. It enables the secondary suite to be constructed at a reduced cost and provides sufficient level of safety to control the spread of fire from one building to another and to exit the building.

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Canadian Commission
on Building and Fire Codes

Commission canadienne des codes
du bâtiment et de prévention des incendies

PROPOSED CHANGE

NBC05-09.10.11.02.(01)-HSB-v5-ballot_ed.doc

MODIFICATION PROPOSÉE

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Exit time would be no more than in a traditional single-family house and the proposed interconnection of the smoke alarms between the secondary and the primary unit would provide early warning to the residents of both dwelling units in an event of fire.

Information also indicates that the fire load may be equal or less than historically found in single dwelling units with for example the removal of basement storage, and may reduce the level of hazard in the building.

Current Approaches

	New Construction	Existing Buildings
Ontario	• no change	• party wall with 1 fire-resistance rating acceptable
Alberta	• no change	• n/i
Quebec	• no change	• 2 h rating on altered side acceptable
Nova Scotia	• n/i	• no change
BC	• no change	• no change
PEI	• X	• X
Vancouver	• no change	• X
Montreal	• no change	• X
Surrey, Sidney	• no change	• no change

Note:

- NBC provisions are the same for Manitoba, Nova Scotia, Saskatchewan, New Brunswick, Newfoundland, North West Territories, Yukon, and Nunavut for new buildings.
- NBC provisions are the same for Manitoba, Saskatchewan, New Brunswick, Newfoundland, North West Territories, Yukon, and Nunavut for existing buildings.
- NBC provisions are the same for Saskatoon in new and existing constructions.

Cost implications

General Background

It is not possible to identify definitive cost implications of the changes proposed to recognize the secondary suites. Cost implications, whether increases or decreases, will depend on how individual authorities having jurisdiction are currently applying the Code's requirements to these dwelling units and to houses with secondary suites.

Where compliance with the existing Code provisions is currently being required, application of proposed provisions are intended, on the whole, to reduce cost. There are a few instances where the proposed provisions would increase a certain level of performance and, for these particular provisions, costs would be expected to increase. These increase are meant to be off-set by cost decreases that would result from changes to other requirements.

This Proposed Change

It is expected that this change will reduce costs of providing secondary suites. The proposed requirement will provide flexibility for the creation of secondary suites in existing buildings.

Enforcement implications

Can be enforced by the infrastructure available to enforce the Code

Who is affected

Designers, builders, owner, AHJ

OBJECTIVE-BASED ANALYSIS OF NEW OR CHANGED PROVISION

Provision: 9.10.11.2.(1)

Analysis:

Attributions

REFERENCED PUBLICATIONS

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Traina et al, [Occupant Tenability in Single Family Homes: Part 1 - Impact of Structure Type, Fire Location and Interior Doors Prior to Fire Department Arrival](#), Fire Technology 53, 2017

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