Proposed Alternative Solutions

For
<Brief Alternative Solution title>
<Project Name>
<Project Address>

Prepared for
<Project Owner>

Prepared by:
<Design Professional>
<Company>
<Professional Seal>

<Date Prepared>

Table of Contents:

1. Description

1.1. Project Description

➔ Provide brief description of the entire project.
➔ Provide reasons for deviating from acceptable solutions.

1.2. Alternative Solutions List

1.2.1. Alternative Solution #1: **Segmentation and Interconnections**

- Use of links to connect buildings and limit fire spread.
- Installation of fire-rated doors designed to close automatically in the event of a fire or alarm event.

➔ Provide further description of this alternative solution.

1.2.2. Alternative Solution #2: **Water Supply**

- Construction of ponds, complete with dry hydrant for fire department connections.
- Installation of water tanks.
- Installation of fire cisterns.

➔ Provide further description of this alternative solution.

1.2.3. Alternative Solution #3: **Automatic Sprinkler System**

- Installation of dry-pipe sprinkler system suitable for farm buildings.

➔ Provide further description of this alternative solution.

1.2.4. Alternative Solution #4: **Choice of construction materials**

- Using noncombustible construction articles from the National Building Code of Canada.
- Specifying fire-rated wood coated with fire resistant paint for framing components (ceilings, walls, and attics).
- Specifying interior finish materials with low flame spread ratings that do not support. combustion, for example, concrete or tile surfaces and to a lesser extent steel sheathing.

➔ Provide further description of this alternative solution.

1.2.5. Alternative Solution #5: **Fire Load Calculations**

- Restricted fire loads in combination with building design solutions.

➔ Provide further description of this alternative solution.

1.2.6. Alternative Solution #6: **Fire Alarm System**

- Installation of fire-detection and notification systems suitable for farm buildings.
- Install additional fire-detection and notification systems in concealed spaces.

➔ Provide further description of this alternative solution.

1.2.7. Alternative Solution #7: **Enhance Access Route**

- Design and construct fire department access route as per MBC 3.2.5.6.(1)
- Additional access routes

➔ Provide further description of this alternative solution.

1.2.8. Alternative Solution #8: **Fire Fighter Response Time**

- Letter from the local fire department that the typical fire fighter response time is no more than 10 minutes.
- Other information should include the average number of trained fire fighters upon initial arrival and the fire departments water tender and pumping capacity.

➔ Provide further description of this alternative solution.

1.2.9. Alternative Solution #9: **Other Strategies**

- Other innovative or proprietary measures not listed above.

➔ Provide further description of this alternative solution.

2. Design Professional

➔ Provide qualifications of the design professional(s) responsible for the Alternative Solutions.

3. Acceptable Solutions that are being substituted

3.10.1.2. Floor Areas

1) When a *farm building*, other than a greenhouse, of the number of *storeys* in the first column of Table 3.10.1.2. has a *floor area* on any one *storey* that exceeds the *floor area* listed opposite in the second column, the *farm building* must be separated into *fire compartments* by vertical *fire separations* having a *fire-resistance rating* of at least 2 h, so that each separated portion has a *floor area* on any one *storey* that is less than the maximum *floor area* listed in the second column of the Table.

Maximum Floor Areas for Farm Buildings of Low Human Occupancy
Forming Part of Article 3.10.1.2.

Number of *Storeys*	Maximum Floor Area per Storey
1	4800 m^2
2	2400 m^2
3	1600 m^2

➔ Provide other accepted solutions in 3.10 that are being substituted, if applicable.

4. Objective and Functional Statements

4.1. Objective Statements

OS1 Fire Safety

The 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 risk of injury due to fire addressed in this Code are those caused by:

OS1.2 – fire or explosion impacting areas beyond its point of origin
OS1.3 – collapse of physical elements due to a fire or explosion

OP Fire and Structural Protection of Buildings

The 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 risk of injury due to fire addressed in this Code are those caused by:

OP1.2 – fire or explosion impacting areas beyond its point of origin
OP1.3 – collapse of physical elements due to a fire or explosion

➔ Provide objective statements from other NBC provisions, which in the opinion of the design professional, are similar to the accepted solutions in 3.10.

4.2. **Functional Statements**

The objectives of this Code are achieved by measures, such as those described in the acceptable solutions in Division B, that are intended to allow the *building* or its elements to perform the following functions:

F02 – To limit the severity and effects of fire or explosions
F03 – To retard the effects of fire on areas beyond its point of origin
F04 – To retard failure or collapse due to the effects of fire

➔ Provide functional statements from other NBC provisions, which in the opinion of the design professional, are similar to the accepted solutions in 3.10.

4.3. **Reference NBC provisions**

- 3.1.3.1. Separation of Major Occupancies
- 3.2.2.1. Application, Building Size and Construction Relative to Occupancy
- 3.2.2.2. Special and Unusual Structures
- 3.2.2.79. Group F, Division 3, up to 6 Storeys
- 3.2.2.87. Group F, Division 3, One Storey, Any Area, Low Fire Load Occupancy

➔ Provide other NBC articles, which in the opinion of the design professional, are similar to the accepted solutions in 3.10.

5. Intent Statements

3.1.3.1., Attribution [F03-OS1.2]

To limit the probability that a fire will spread from one major occupancy to an adjacent major occupancy having a different degree of fire risk, which could lead to harm to persons.

3.1.3.1., Attribution [F03-OP1.2]

To limit the probability that a fire will spread from one major occupancy to an adjacent major occupancy having a different degree of fire risk, which could lead to damage to the building.

3.2.2.1. Application, Building Size and Construction Relative to Occupancy

To direct Code users to provisions throughout Subsection 3.2.2. that limit the probability of the spread of fire and collapse.

3.2.2.2., Attribution [F02,F03,F04-OS1.2,OS1.3]

To limit the probability that inadequate fire safety features will contribute to the spread of fire or collapse, which could lead to a failure of the integrity of a fire separation or structural element, which could lead to the spread of fire and smoke or collapse, which could lead to harm to persons.

3.2.2.2., Attribution [F02,F03,F04-OP1.2,OP1.3]

To limit the probability that inadequate fire safety features will contribute to the spread of fire or collapse, which could lead to the failure of the integrity of a fire separation or structural element, which could lead to the spread of fire and smoke or collapse, which could lead to damage to the building.

3.2.2.87., Attribution [F02-OS1.2]

To limit the probability that combustible construction materials within a storey of a building will be involved in a fire, which could lead to the growth of fire, which could lead to the spread of fire within the storey during the time required to achieve occupant safety and for emergency responders to perform their duties, which could lead to harm to persons.

3.2.2.87., Attribution [F02-OP1.2]

To limit the probability that combustible construction materials within a storey of a building will be involved in a fire, which could lead to the growth of fire, which could lead to the spread of fire within the storey during the time required to achieve occupant safety and for emergency responders to perform their duties, which could lead to damage to the building.

➔ Provide intent statements from other NBC provisions, which in the opinion of the design professional, that are similar to the accepted solutions in 3.10.

6. Evaluation of Performance Levels of the Acceptable Solutions

Required performance level of 3.1.3.1.(1):

To limit the probability of fire spread from a fire compartment to another fire compartment to under 2 h.

➔ List other measurable parameters, that in the opinion of the design professional, define the performance level of the acceptable solution quantitatively and/or qualitatively.

7. Evaluation of Performance Levels of the proposed Alternative Solutions

7.1. Alternative Solution #1: **Segmentation and Interconnections**

➔ Provide narrative how this alternative solution will limit the probability of fire spread from a fire compartment to another fire compartment to under 2h.

7.2. Alternative Solution #2: **Water Supply**

➔ Provide narrative how this alternative solution will limit the probability of fire spread from a fire compartment to another fire compartment to under 2h.

7.3. Alternative Solution #3: **Automatic Sprinkler System**

➔ Provide narrative how this alternative solution will limit the probability of fire spread from a fire compartment to another fire compartment to under 2h.

7.4. Alternative Solution #4: **Choice of construction materials**

➔ Provide narrative how this alternative solution will limit the probability of fire spread from a fire compartment to another fire compartment to under 2h.

7.5. Alternative Solution #5: **Fire Load Calculations**

➔ Provide narrative how this alternative solution will limit the probability of fire spread from a fire compartment to another fire compartment to under 2h.

7.6. Alternative Solution #6: **Fire Alarm System**

➔ Provide narrative how this alternative solution will limit the probability of fire spread from a fire compartment to another fire compartment to under 2h.

7.7. Alternative Solution #7: **Enhance Access Route**

➔ Provide narrative how this alternative solution will limit the probability of fire spread from a fire compartment to another fire compartment to under 2h.

7.8. Alternative Solution #8: **Fire Fighter Response Time**

➔ Provide narrative how this alternative solution will limit the probability of fire spread from a fire compartment to another fire compartment to under 2h.

7.9. Alternative Solution #9: **Other Strategies**

➔ Provide narrative how this alternative solution will limit the probability of fire spread from a fire compartment to another fire compartment to under 2h.

8. Special maintenance or operational requirements (if applicable)

8.1. Alternative Solution #1: **Segmentation and Interconnections**

➔ Provide narrative on any special maintenance or operational requirements that are necessary for this alternative solution to achieve compliance with the Code after the building is constructed, if applicable.

8.2. Alternative Solution #2: **Water Supply**

➔ Provide narrative on any special maintenance or operational requirements that are necessary for this alternative solution to achieve compliance with the Code after the building is constructed, if applicable.

8.3. Alternative Solution #3: **Automatic Sprinkler System**

➔ Provide narrative on any special maintenance or operational requirements that are necessary for this alternative solution to achieve compliance with the Code after the building is constructed, if applicable.

8.4. Alternative Solution #4: **Choice of construction materials**

➔ Provide narrative on any special maintenance or operational requirements that are necessary for this alternative solution to achieve compliance with the Code after the building is constructed, if applicable.

8.5. Alternative Solution #5: **Fire Load Calculations**

➔ Provide narrative on any special maintenance or operational requirements that are necessary for this alternative solution to achieve compliance with the Code after the building is constructed, if applicable.

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8.8. Alternative Solution #8: **Fire Fighter Response Time**

➔ Provide narrative on any special maintenance or operational requirements that are necessary for this alternative solution to achieve compliance with the Code after the building is constructed, if applicable.

8.9. Alternative Solution #9: **Other Strategies**

➔ Provide narrative on any special maintenance or operational requirements that are necessary for this alternative solution to achieve compliance with the Code after the building is constructed, if applicable.

9. Assumptions, limiting or restricting factors (if applicable)

9.1. Alternative Solution #1: **Segmentation and Interconnections**

➔ Provide narrative of any assumptions and limiting or restricting factors made by the design professional that will support a Code compliance assessment.

9.2. Alternative Solution #2: **Water Supply**

➔ Provide narrative of any assumptions and limiting or restricting factors made by the design professional that will support a Code compliance assessment.

9.3. Alternative Solution #3: **Automatic Sprinkler System**

➔ Provide narrative of any assumptions and limiting or restricting factors made by the design professional that will support a Code compliance assessment.

9.4. Alternative Solution #4: **Choice of construction materials**

➔ Provide narrative of any assumptions and limiting or restricting factors made by the design professional that will support a Code compliance assessment.

9.5. Alternative Solution #5: **Fire Load Calculations**

➔ Provide narrative of any assumptions and limiting or restricting factors made by the design professional that will support a Code compliance assessment.

9.6. Alternative Solution #6: **Fire Alarm System**

➔ Provide narrative of any assumptions and limiting or restricting factors made by the design professional that will support a Code compliance assessment.

9.7. Alternative Solution #7: **Enhance Access Route**

➔ Provide narrative of any assumptions and limiting or restricting factors made by the design professional that will support a Code compliance assessment.

9.8. Alternative Solution #8: **Fire Fighter Response Time**

➔ Provide narrative of any assumptions and limiting or restricting factors made by the design professional that will support a Code compliance assessment.

9.9. Alternative Solution #9: **Other Strategies**

➔ Provide narrative of any assumptions and limiting or restricting factors made by the design professional that will support a Code compliance assessment.

10. Testing procedures, engineering studies, or building performance parameters (if applicable)

10.1 Alternative Solution #1: **Segmentation and Interconnections**

➔ Submit any testing procedures and engineering studies performed by the design professional to demonstrate that this alternative solutions will perform at least as well as the accepted solutions(s) it is replacing.

10.1. Alternative Solution #2: **Water Supply**

➔ Submit any testing procedures and engineering studies performed by the design professional to demonstrate that this alternative solutions will perform at least as well as the accepted solutions(s) it is replacing.

10.2. Alternative Solution #3: **Automatic Sprinkler System**

➔ Submit any testing procedures and engineering studies performed by the design professional to demonstrate that this alternative solutions will perform at least as well as the accepted solutions(s) it is replacing.

10.3. Alternative Solution #4: **Choice of construction materials**

➔ Submit any testing procedures and engineering studies performed by the design professional to demonstrate that this alternative solutions will perform at least as well as the accepted solutions(s) it is replacing.

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➔ Submit any testing procedures and engineering studies performed by the design professional to demonstrate that this alternative solutions will perform at least as well as the accepted solutions(s) it is replacing.

10.7. Alternative Solution #8: **Fire Fighter Response Time**

➔ Submit any testing procedures and engineering studies performed by the design professional to demonstrate that this alternative solutions will perform at least as well as the accepted solutions(s) it is replacing.

10.8. Alternative Solution #9: **Other Strategies**

➔ Submit any testing procedures and engineering studies performed by the design professional to demonstrate that this alternative solutions will perform at least as well as the accepted solutions(s) it is replacing.

Acceptable testing procedures and engineering studies

- Fire and smoke modelling
- Timed exit analysis
- Fire zone analysis
- Fire performance assessment of assemblies
- Fire hazard analysis

11. Comparison of Performance Levels of Acceptable Solution and Alternative Solution

	Required Performance Levels
Acceptable Solution:	
Limit building floor areas to Table 3.10.1.2.	Limits the probability of fire spread from a fire compartment to another fire compartment to under 2 h.
Alternative Solutions:	
1) Segmentation and Interconnections	Meets or exceeds performance level of 3.10.1.2.
2) Water Supply	Meets or exceeds performance level of 3.10.1.2.
3) Automatic Sprinkler System	Meets or exceeds performance level of 3.10.1.2.

4) Choice of construction materials	Meets or exceeds performance level of 3.10.1.2.
5) Fire Load Calculations	Meets or exceeds performance level of 3.10.1.2.
6) Fire Alarm System	Meets or exceeds performance level of 3.10.1.2.
7) Enhance Access Route	Meets or exceeds performance level of 3.10.1.2.
8) Fire Fighter Response Time	Meets or exceeds performance level of 3.10.1.2.
9) Other Strategies	Meets or exceeds performance level of 3.10.1.2.

➔ Provide statements that the proposed alternative solutions will perform at least as well as the acceptable solution(s) it is replacing.

12. Other Supporting Documents (if applicable)

12.1. Alternative Solution #1: **Segmentation and Interconnections**

➔ Provide other information or items that may be helpful in the review of this proposed alternative solution, such as engineering analysis, mathematical modelling, peer review, published standards not cited in the Code, product or material test results, evaluation of scenarios, previous approvals from other authorities, risk analysis, etc.

12.2. Alternative Solution #2: **Water Supply**

➔ Provide other information or items that may be helpful in the review of this proposed alternative solution, such as engineering analysis, mathematical modelling, peer review, published standards not cited in the Code, product or material test results, evaluation of scenarios, previous approvals from other authorities, risk analysis, etc.

12.3. Alternative Solution #3: **Automatic Sprinkler System**

➔ Provide other information or items that may be helpful in the review of this proposed alternative solution, such as engineering analysis, mathematical modelling, peer review, published standards not cited in the Code, product or material test results, evaluation of scenarios, previous approvals from other authorities, risk analysis, etc.

12.4. Alternative Solution #4: **Choice of construction materials**

➔ Provide other information or items that may be helpful in the review of this proposed alternative solution, such as engineering analysis, mathematical modelling, peer review, published standards not cited in the Code, product or material test results, evaluation of scenarios, previous approvals from other authorities, risk analysis, etc.

12.5. Alternative Solution #5: **Fire Load Calculations**

➔ Provide other information or items that may be helpful in the review of this proposed alternative solution, such as engineering analysis, mathematical modelling, peer review, published standards not cited in the Code, product or material test results, evaluation of scenarios, previous approvals from other authorities, risk analysis, etc.

12.6. Alternative Solution #6: **Fire Alarm System**

➔ Provide other information or items that may be helpful in the review of this proposed alternative solution, such as engineering analysis, mathematical modelling, peer review, published standards not cited in the Code, product or material test results, evaluation of scenarios, previous approvals from other authorities, risk analysis, etc.

12.7. Alternative Solution #7: **Enhance Access Route**

➔ Provide other information or items that may be helpful in the review of this proposed alternative solution, such as engineering analysis, mathematical modelling, peer review, published standards not cited in the Code, product or material test results, evaluation of scenarios, previous approvals from other authorities, risk analysis, etc.

12.8. Alternative Solution #8: **Fire Fighter Response Time**

➔ Provide other information or items that may be helpful in the review of this proposed alternative solution, such as engineering analysis, mathematical modelling, peer review, published standards not cited in the Code, product or material test results, evaluation of scenarios, previous approvals from other authorities, risk analysis, etc.

12.9. Alternative Solution #9: **Other Strategies**

➔ Provide other information or items that may be helpful in the review of this proposed alternative solution, such as engineering analysis, mathematical modelling, peer review, published standards not cited in the Code, product or material test results, evaluation of scenarios, previous approvals from other authorities, risk analysis, etc.

Prepared by:

<Name of Design Professional>
<Title>
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