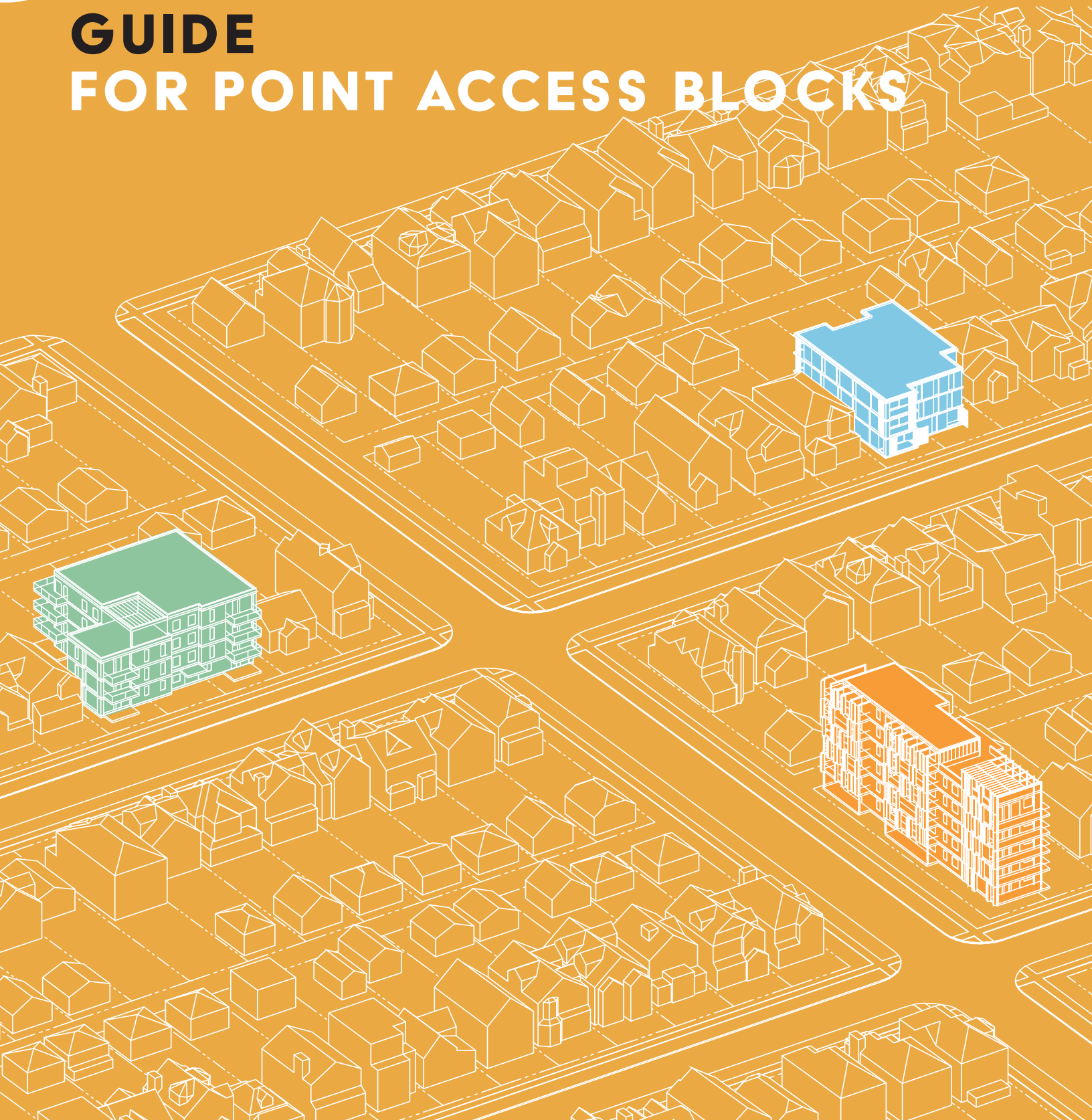


# 01

## ALTERNATIVE SOLUTION GUIDE FOR POINT ACCESS BLOCKS



## 1.01/ WHAT ARE POINT ACCESS BLOCKS?

Point Access Blocks, also known as buildings with Single Egress Stairs (SES), are compact multi-family residential buildings with a limited number of dwelling units clustered around one exit stair.

These are the typical family-sized apartments in many jurisdictions worldwide, including Germany, the UK, and France, but are not common in North America, where building code provisions have prescriptively enforced a minimum of two means of egress to achieve life safety requirements. However, Point Access Blocks can be designed in a manner that offers an equal or greater degree of safety than prescriptive apartment building designs with a number of additional benefits:

- **Allow for greater flexibility in the design and development of multi-family residential buildings**
- **Are generally smaller in scale (relative to standard types) and therefore may produce opportunities for more sensitive infill in existing neighbourhoods and aid in providing gentle density**
- **Can be built with less quantity of building materials to improve building efficiency.**
- **Potential for higher quality units with features like 3+ bedrooms, cross ventilation, improved common space, less lengthy double loaded corridors, etc**

As many Canadian jurisdictions respond to the ongoing crisis in housing, many are reviewing their building codes to better support a diversity of housing options, including supporting the development of Point Access Blocks. Recently, British Columbia modified their provincial building code through Ministerial Order to enable buildings with one stair up to 6 storeys with a number of compensatory fire and life safety provisions.

There has been a code change proposal made to the Canadian Board for Harmonized Construction Codes (CBHCC) to address single egress buildings in future editions of the National Building Code. In line with the code change request to the National Building Code that is being developed, this guide will focus on residential buildings 6-storeys or less with not more than 4 units per floor served by a Single Egress Stair.

**In Edmonton and the rest of Alberta, Point Access Blocks over two storeys as defined by the Code can only be legally constructed via a successful application for building permit to the Authority Having Jurisdiction (AHJ) that contains an accepted Alternative Solution that demonstrates an equal or greater level of safety than the current code. It is expected that professional involvement will be required in the design of a Point Access Block in Edmonton, whether they fall under Part 9 or Part 3 of the building code relative to scale and occupancy. This guide will assist with understanding how to take part in this Alternative Solution process.**

## 1.02/ ALTERNATIVE SOLUTION PATHWAY FOR PAB PROPOSALS

Building and fire code standards are adopted by the provinces, based on the model National Building and Fire Codes. The City of Edmonton, through its administrative responsibility as the Authority Having Jurisdiction (AHJ), has no ability to change or reduce the level of performance required by the provincially adopted codes. However, innovative designs like Point Access Blocks can be considered on a building-by-building basis through an Alternative Solution proposal to the AHJ.

An Alternative Solution is not a deviation from the safety standards in the code – it is a variance to the specific rules of the codes that demonstrates an alternative pathway to achieve compliance. Therefore a successful Alternative Solution must demonstrate that the proposed building is designed in such a manner that it meets an equal or greater level of performance than the prescriptive conditions required by the current code.

The Building Code Guide and more detailed Technical Report sections of the document will help proponents understand the layers of safety system implicit in typical, double egress designs and describe strategies that designers can pursue to help achieve code compliance with a single egress stair.



Capitol Hill Urban Cohousing (CHUC) in Seattle, designed by Schemata Workshop

## 1.03/ APPLICATION PROCESS FOR PAB PROPOSALS

The City of Edmonton is open to reviewing Alternative Solutions for achieving compliance with the current in-force version of the NBC(AE). Alternative Solutions derived by a designer must be considered to perform to an equivalent or enhanced level of performance to that of the assigned objectives and functional statements of the identified Acceptable Solutions of the NBC(AE). Applicants that are interested in pursuing the design and construction of a Point Access Block may submit an Alternative Solution that contemplates a code variance for the number of exits that would be required in a building, or any other aspect which may not adhere to the acceptable solutions prescribed by the Code. This guide is intended to inform potential applicants of how a Point Access Block can be approached beyond the prescriptive limitations of the applicable Acceptable Solutions.

This guide includes a Technical Report prepared in consultation with Safety Codes, Permits, and Inspections (SCPI) and Edmonton Fire Rescue Services (EFRS). This Technical Report presents a technical rationale, methodology, and analysis for Point Access Block design in the context of Alberta, and intends to facilitate an equivalent level of compliance with the NBC(AE) through Alternative Solutions. The analysis presented is an example and this guide only contemplates this specific variances.

Applications that put forward a Point Access Block are required to submit an Alternative Solution prepared by a qualified Fire Protection or Life Safety Code Consultant. It is important to ensure appropriate qualifications of professionals involved in Alternative Solutions for Point Access Blocks. Given the specific characteristics of a single exit building, it is important that professionals exhibit the skills associated with fire protection engineering, as described in the Society of Fire Protection Engineers [“Recommended Minimum Technical Core Competencies for the Practice of Fire Protection Engineering”](#). In addition, professionals should already be familiar with the engineering best practices referenced in this guideline, as well as the regulatory aspects of Alternative Solutions as per the NBC(AE).

These applications must demonstrate compliance to the NBC(AE) and are required to include Professional Involvement. While each application must fulfill these minimum criteria, this Guide demonstrates an exemplar methodology, which can assist applicants in the consideration and preparation of their own respective Alternative Solutions.

## 1.04/ EXAMPLE ALTERNATIVE SOLUTION RISK MITIGATION MEASURES

The Technical Report included in this Guide Technical Report is demonstrative, but does not prescribe a specific approach. It sets out the technical basis for a specific problem statement, risk evaluation, and mitigation measures to guide to Alternative Solution development. The Report structure can be summarized as follows:

### Regulatory Framework

This chapter explores the expectations and structure of alternative solutions, and seeks to identify and rationalize variance of the Acceptable Solutions to support a Single Exit Stair.

### Problem Definition

This chapter concerns the problem definition that will form the basis of an alternative solution, and explores in detail the implicit assumptions and expectations of exit stairs including who is at risk, NBC(AE) implicit assumptions, and performance-based design approaches.

### Risk Assessment

This chapter details the risk assessment process initiated by the problem definition, and utilises event trees, fault trees, and reliability diagrams to identify and evaluate failure modes and vulnerabilities of Point Access Block design. Risk is quantified for multiple generic scenarios that serve as a comparative benchmark for Alternative Solution acceptance.

### Alternative Solutions

This chapter identifies and describes potential Alternative Solution risk mitigation measures extrapolated from the problem definition and failure modes of the risk assessment process.

Based on assumptions and limitations of the Technical Report, respective mitigation features were demonstrated as effectively providing an Alternative Solution. The exemplar assessment identifies the main components that could lead to stair failure relate to compartmentation and smoke management, and outlines respective risk mitigation measures which are appropriate to that specific analysis, demonstrating how risk assessments are used to consider appropriate mitigations for a specific Point Access Block design.



Design studies are included in the accompanying Design Guide

## 1.05/ APPLICATION REVIEW PROCESS FOR PAB PROPOSALS

The City of Edmonton has formalized a procedure (“The Professional Review of Building Permit Alternative Solutions”) for collaborating between Safety Codes, Permits, and Inspections (SCPI) and Edmonton Fire Rescue Services (EFRS) when reviewing building permit applications that involve Alternative Solutions to the National Building Code, Alberta Edition (NBC(AE)), specifically those which may impact emergency services. This review procedure is not specific to Point Access Block applications, and more generally applies to any Alternative Solution to the NBC(AE).

Overall, the documents establish a framework for collaboration between SCPI and EFRS to ensure that Alternative Solutions are thoroughly reviewed to ensure they do not negatively impact fire safety and emergency response in the City of Edmonton. They emphasize the importance of clear communication, professional oversight and accountability, and adherence to industry best practices.

The procedure details the specific roles and responsibilities of different parties involved in the review process, including the Authority Having Jurisdiction (AHJ), the AHJ Engineer, EFRS Engineer, and the Alternative Solution applicant/professional. It emphasizes the importance of professional accountability and coordination between SCPI and EFRS.

The associated “Guideline for Alternative Solutions Affecting Emergency Services” supplements the standard operating procedure by providing guidance to design professionals on how to consider the impact of their alternative solutions on emergency services. This guideline helps professionals understand the specific procedures, capabilities, and limitations of EFRS, as well as the review process Alternative Solutions are subject to.



Design studies are included in the accompanying Design Guide

## 1.06/ PRE-APPLICATION MEETINGS FOR PAB PROPOSALS

If you are planning to propose an Alternative Solution for a Point Access Block building we recommend booking a pre-application meeting prior to submission.

The City of Edmonton offers Pre-Application Meetings for all residential infill development, including larger-scale residential (apartments with five or more units), and mixed-use (mix of residential and non-residential) developments are treated as Major Development Permit applications. For Point Access Block proposals, this review meeting will also include Building Permit reviewers. During the meeting, you will meet with a Development Planner and Safety Codes officers to review your proposal against the Zoning Bylaw and gather input from them.

The meeting may also include discussion to help you submit a well-informed development application and building permit application that includes an Alternative Solution proposal. To arrange a pre-application infill meeting for residential infill developments, use the [Pre-Application Meeting request process](#).

Design studies are included in the accompanying Design Guide



## **1.07// MANDATORY CRITERIA FOR PAB APPLICATIONS**

**Application submissions must meet certain minimum criteria:**

- **Professional involvement is required. Professional involvement means that registered professional architect and/or engineers are involved in the design and field review of a project, as well as the preparation of the Alternative Solution. Plans and specifications must be [properly authenticated and validated](#), as per the practice standards of the professional organizations.**
- **Applications that put forward a Point Access Block are required to submit an Alternative Solution prepared by a qualified Fire Protection or Life Safety Code Consultant.**
- **An Alternative Solution derived by a designer and Fire Protection or Life Safety Code Consultant must demonstrate compliance to the NBC(AE) by showing how a Single Egress Stair will perform to an equivalent or enhanced level of resiliency as a development with two egress stairs.**
- **A Pre-Application Meeting with Development Services for Point Access Block Proposals is recommended.**