JOINT PROFESSIONAL PRACTICE GUIDELINES

ALTERATION OF ELEVATING DEVICES IN EXISTING BUILDINGS

VERSION 1.0, NOVEMBER 15, 2023

AIBC
ARCHITECTURAL INSTITUTE OF BRITISH COLUMBIA

ENGINEERS & GEOSCIENTISTS BRITISH COLUMBIA

ARCHITECTURAL INSTITUTE OF BRITISH COLUMBIA

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1. Foreword

These *Joint Professional Practice Guidelines – Alteration of Elevating Devices in Existing Buildings* were developed by the Architectural Institute of BC (AIBC) and Engineers and Geoscientists British Columbia (BC) to guide professional practice of Architects and Engineering Professionals working on building projects in BC involving Elevating Devices that require either minor Alterations (i.e., minor upgrades and/or repairs) or major Alterations (i.e., complete equipment modernization).

These guidelines describe obligations and considerations in relation to the specific professional activities for the Alteration of Elevating Devices in existing buildings to be followed at the time they were prepared. However, this is a living document that is to be revised and updated as required in the future, to reflect the developing state of practice.

The related guidelines, *Joint Professional Practice Guidelines – Design and Installation of Elevating Devices in New Buildings* (AIBC and Engineers and Geoscientists BC 2023) were developed to address the project coordination issues related to the design, construction, installation, and commissioning of Elevating Devices in new buildings.

In addition to the Architect, Elevating Device Contractor Engineer, and Elevating Devices Consulting Engineer, other Registered Professionals (RPs) may collaborate on these projects, such as Mechanical Engineers, Electrical Engineers, and Structural Engineers. These guidelines outline the professional obligations and considerations to be taken into account on projects involving Alterations of Elevating Devices in existing buildings.

The AIBC and Engineers and Geoscientists BC regulate and govern these professions under the authority of the *Professional Governance Act*. The AIBC and Engineers and Geoscientists BC each have a regulatory mandate to protect the public interest, which is met by setting and maintaining appropriate academic, experience, and professional practice standards**.** One way that the AIBC and Engineers and Geoscientists BC exercise these responsibilities is by publishing professional practice guidelines. These guidelines deal with the performance of specific activities so Architects and Engineering Professionals can meet their professional obligations under the *Professional Governance Act* and the Regulations and Bylaws of their respective regulators.

2. Definitions

2.1 DEFINED TERMS

The following definitions are specific to these guidelines. These words and terms are capitalized throughout the document:

Alteration(s)

Any change to an Elevating Device, including its parts, components, and/or subsystems, other than maintenance, repair, or replacement. In the elevating devices industry, Alteration is also referred to as modernization or upgrade.

Architect

An individual who is registered as an architect by the Architectural Institute of British Columbia under the *Professional Governance Act* and entitled to practice the profession of architecture in British Columbia.

Architects Regulation

Architects Regulation, B.C. Reg. 33/2023.

Authority Having Jurisdiction

Defined by the *British Columbia Building Code* (*BCBC)* and the *National Building Code of Canada* (NBC) as the governmental body responsible for the enforcement of any part of the BCBC or NBC, respectively, or the official or agency designated by that body to exercise such a function. In the Vancouver Building Bylaw (VBBL), it is the City of Vancouver.

Building Code

The building code that applies to the project, which may be the *BCBC*, the VBBL, or the *NBC.*

Bylaws

The Bylaws of the AIBC or the Bylaws of Engineers and Geoscientists BC made under the *Professional Governance Act*.

Coordinating Registered Professional

Defined in the *BCBC* and VBBL as a Registered Professional retained under Clause 2.2.7.2.(1)(a) of Division C of the *BCBC* or VBBL to coordinate all design and field reviews of the Registered Professionals who are required for a project.

Electrical Engineer

The Engineering Professional with general responsibility for the integrity of the electrical systems in an Elevating Device. The Electrical Engineer may also be, but is not necessarily, the Registered Professional of Record for all items under the electrical discipline on Schedule B of the Letters of Assurance in Division C, Part 2, of the *BCBC* and the VBBL

Elevating Device

A hoisting and lowering mechanism, equipped with a car guided by rails, that moves between two or more landings for the carrying of passengers and freight.

Elevating Device Consulting Engineer

The Engineering Professional who provides specialized consulting services on issues related to the installation of Elevating Devices. The engagement of an Elevating Device Consulting Engineer depends on the complexity of the project.

Elevating Device Contractor Engineer

The Engineering Professional who takes responsibility for the design and field reviews of the Elevating Device equipment being installed, in accordance with the requirement of the ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*.

Engineering Professional(s)

Professional engineers, professional licensees (engineering), and any other individuals registered or licensed by Engineers and Geoscientists BC as a “professional registrant” as defined in Part 1 of the Engineers and Geoscientists BC Bylaws.

Engineers and Geoscientists BC

The Association of Professional Engineers and Geoscientists of the Province of British Columbia, also operating as Engineers and Geoscientists BC.

Engineers and Geoscientists Regulation

Engineers and Geoscientists Regulation, B.C. Reg. 14/2021.

Fire Suppression Engineer

The Engineering Professional with general responsibility for the integrity of the fire suppression systems associated with an Elevating Device. The Fire Suppression Engineer is the Registered Professional of Record for all items under the fire suppression systems discipline on Schedule B of the Letters of Assurance in Division C, Part 2, of the *BCBC* and the VBBL.

Fire Code

The fire code that applies to the project, which may be the *British Columbia Fire Code*, the Vancouver Fire By-law, or the *National Fire Code of Canada*.

Letters of Assurance

Documents set out in a schedule of Subsection 2.2.7. in Part 2 of Division C of the *BCBC* or VBBL used to confirm and assure code-compliant design and required field reviews by Architects and Engineering Professionals. Otherwise known as Schedules A, B, C-A, and C-B.

Refer to the *Guide to the Letters of Assurance in the BC Building Code 2018 and Vancouver Building By-Law 2019* (Province of BC 2022).

Mechanical Engineer

The Engineering Professional with general responsibility for the integrity of the mechanical systems in an Elevating Device. The Mechanical Engineer is the Registered Professional of Record for all items under the mechanical discipline on Schedule B of the Letters of Assurance in Division C, Part 2, of the *BCBC* and the VBBL.

Plumbing Code

The plumbing code that applies to the project, which could be the *BC Plumbing Code*, the Vancouver Building By-law Book II (Plumbing Systems), or the *National Plumbing Code of Canada*.

Professional Governance Act

Professional Governance Act [SBC 2018], Chapter 47.

Registered Professional

Defined in the *BCBC* and the VBBL as:

a) a person who is registered or licensed to practice as an architect under the *Architects Act*, or
b) a person who is registered or licensed to practice as a professional engineer under the *Engineers and Geoscientists Act*.

Registered Professional of Record

Defined in the *BCBC* and the VBBL as a Registered Professional retained to undertake design work and field reviews in accordance with Subsection 2.2.7. of Division C.

Structural Engineer

The Engineering Professional responsible for the structural design of the Elevating Device components, its connections, and its installation. For some or all components, the Structural Engineer is the Registered Professional of Record for all items under the structural discipline on Schedule B of the Letters of Assurance in Division C, Part 2, of the *BCBC* and the *VBBL.*

Supporting Registered Professional

The Registered Professional providing supplementary design and/or field review services to the Registered Professional of Record for a particular component or sub-component of a discipline. It is recommended that the Registered Professional of Record obtain and retain in the project file any Schedules S-B and S-C from the Supporting Registered Professional in the form as provided in the *Joint Professional Practice Guidelines – Professional Design and Field Review By Supporting Registered Professionals* (AIBC and Engineers and Geoscientists BC 2020).

Technical Safety BC

An independent, self-funded public body in BC, which is mandated under the *Safety Standards Act* [SBC 2003], Chapter 38, to oversee the safe installation and operation of technical systems and equipment, including Elevating Devices. In addition to issuing permits, licences, and certificates, Technical Safety BC works with industry to reduce safety risks through assessment, education and outreach, enforcement, and research.

2.2 ABBREVIATIONS

AIBC: Architectural Institute of British Columbia

AHJ: Authority Having Jurisdiction

BC: British Columbia

BCBC: *British Columbia Building Code*

CRP: Coordinating Registered Professional

FEO: firefighters' emergency operation

MCP: maintenance control program

NBC: *National Building Code of Canada*

RP: Registered Professional

RPR: Registered Professional of Record

SRP: Supporting Registered Professional

VBBL: Vancouver Building By-law

3. Overview

3.1 PURPOSE

This document provides guidance on professional practice for Architects and Engineering Professionals who work on Alterations of Elevating Devices in existing buildings.

The purpose of these guidelines is to provide a consistent approach for carrying out a range of professional activities related to this work.

Following are the specific objectives of these guidelines:

1. Establish the expectations and obligations of professional practice that Architects and Engineering Professionals are expected to have regard for in relation to the specific professional activity outlined in these guidelines by:
    a) specifying tasks and/or services that may be required of Architects and Engineering Professionals, and
    b) referring to their respective professional obligations under the *Professional Governance Act*, their regulator's Regulations and Bylaws, and other requirements, including the primary obligation to protect the safety, health, and welfare of the public and the environment.
2. Describe the roles and responsibilities of the various participants/stakeholders involved in these professional activities.
3. Define expectations for training and experience required to carry out these professional activities.
4. Provide guidance on the use of assurance documents, such as Letters of Assurance, so the appropriate considerations have been addressed (regulatory and technical) for the specific professional activities that were carried out.
5. Provide guidance to Engineering Professionals on how to meet the quality management requirements under the *Professional Governance Act* and the Engineers and Geoscientists BC Bylaws when carrying out the professional activities identified in these professional practice guidelines.

3.2 SCOPE

These guidelines are intended to apply solely to projects that deal with the Alteration of existing Elevating Devices and do not cover projects involving the design and installation of Elevating Devices in new buildings. For projects involving the design and installation of Elevating Devices in new buildings, and projects involving the design and installation of new Elevating Devices in existing buildings, refer to the *Joint Professional Practice Guidelines – Design and Installation of Elevating Devices in New Buildings* (AIBC and Engineers and Geoscientists BC 2023).

As the *Elevating Devices Safety Regulation* does not apply to Elevating Devices in private residences, these guidelines also do not apply to Elevating Devices in private residences.

Note also that these guidelines do not provide interpretation of:

- the *BC Building Code* (*BCBC*), the Vancouver Building By-law (VBBL), or the *National Building Code of Canada* (referred to and defined collectively in these guidelines as the *Building Code*);
- the *BC Fire Code*, the Vancouver Fire By-law, or the *National Fire Code of Canada* (referred to and defined collectively in these guidelines as the *Fire Code*);
- the *BC Plumbing Code*, the Vancouver Building By-law Book II (Plumbing Systems), or the *National Plumbing Code of Canada* (referred to and defined collectively in these guidelines as the *Plumbing Code*);
- the *ASME A17.1-2016/CSA B44-16*, *Safety Code for Elevators and Escalators* (referred to from here on as the *CSA B44-16*); or
- the *Canadian Electrical Code*.

However, these guidelines do discuss these codes and some commonly encountered issues related to integrating Elevating Device systems into the systems of existing buildings.

3.3 APPLICABILITY

These guidelines provide guidance on the responsibilities of Architects and Engineering Professionals who provide services related to Alterations of Elevating Devices in existing buildings. These guidelines are not intended to provide technical or systematic instructions for how to carry out these activities; rather, these guidelines outline considerations to be aware of when carrying out these activities.

Architects and Engineering Professionals must exercise professional judgment when providing professional services. As such, application of these guidelines will vary depending on the circumstances, and may also be affected by changes in laws, including legislation (statutes), and regulations, including the *Building Code*, after the publication of these guidelines.

An Architect's or Engineering Professional's decision not to follow one or more aspects of these guidelines does not necessarily represent a failure to meet their professional obligations. Such judgments and decisions depend upon weighing facts and circumstances to determine whether other reasonable and prudent Architects or Engineering Professionals in similar situations could have conducted themselves similarly.

For Engineering Professionals, failure to meet the intent of these guidelines could be evidence of professional misconduct and lead to disciplinary proceedings by Engineers and Geoscientists BC.

Information for Engineering Professionals on how to appropriately depart from the practice guidance within these guidelines is available in the *Quality Management Guides – Guide to the Standard for the Use of Professional Practice Guidelines* (Engineers and Geoscientists BC 2023a), Section 3.4.

For Architects, these guidelines support and clarify the professional standards expected in the provision of architectural services in this area.

3.4 ACKNOWLEDGEMENTS

This document was reviewed by a group of technical experts, and by various advisory groups of the AIBC and Engineers and Geoscientists BC. Contribution to these guidelines does not necessarily indicate the individuals and/or their employers endorse all aspects of these guidelines.

The AIBC and Engineers and Geoscientists BC thank the many registrants and others who contributed to these guidelines for their time and effort in sharing their knowledge and experience. These guidelines form part of the ongoing commitment of the AIBC and Engineers and Geoscientists BC to maintain the quality of professional services that Architects and Engineering Professionals, respectively, provide to their clients and the public.

Technical Safety BC reviewed these guidelines and provided their endorsement.

4. Roles and Responsibilities

4.1 COMMON FORMS OF PROJECT ORGANIZATION

Project organization varies according to the needs of the project and the parties involved.

Schedule B of the Letters of Assurance from Division C, Part 2 of the *BCBC* and VBBL, Item 1.11 Elevating Devices assigns professional responsibility for Elevating Devices to the individual who provides the required assurances for the architectural discipline—namely, the Architect.

Since Elevating Devices are complex systems, they may require consideration and input from Registered Professionals (RPs) with expertise in various disciplines, the need for which should be appropriately identified and coordinated.

An Elevating Device Alteration may require one or more of the following RPs:

- Architect
- Elevating Device Contractor Engineer
- Elevating Device Consulting Engineer
- Structural Engineer
- Mechanical Engineer
- Electrical Engineer
- Fire Suppression Engineer

Regardless of how the project is organized, the various participants each have certain specific responsibilities, as described in the following sections.

4.2 RESPONSIBILITIES

The following sections outline the responsibilities of various potential project team members.

In addition, Section 7 Quality Management in Professional Practice for Engineering Professionals provides guidance on the quality management responsibilities of Engineering Professionals.

4.2.1 OWNER

For the purposes of these guidelines, the owner is the entity that has control over the property being altered. The owner may be the owner's representative such as a strata council, a property management company, or an individual, and is usually the client.

Owners must be aware of the current condition of the Elevating Devices within their control. They may need to conduct or commission condition assessments, complete due diligence, or undertake depreciation studies to understand the condition and remaining useful life of the Elevating Device.

The owner is responsible for:

- retaining an Architect, when required by the *Architect's Act*, to design and coordinate the Alteration;
- retaining an Elevating Device contractor to complete the scope of the Alteration of the Elevating Device;
- ensuring appropriate scopes of work and realistic schedules of work are developed with the Elevating Device contractor;
- where appropriate, retaining an Elevating Device Consulting Engineer to assist with the Alteration;
- where required, retaining the appropriate RPs prior to their services being required;
- where required, obtaining approvals, licenses, and permits from the applicable Authority Having Jurisdiction (AHJ);
- submitting a revised fire safety plan in accordance with the BC *Fire Code* to the fire department for review and acceptance;
- being aware of the emergency communication bylaws and regulations, and ensuring that services are not run through elevator hoistways;
- ensuring that only equipment related to the Elevating Device is located in the Elevating Device machine room, and that items such as pipes and other equipment are located elsewhere;
- ensuring that an Elevating Device machine room is not used for storage;
- specifying and controlling the reporting process that the owner and the Elevating Device contractor must adhere to; and
- ensuring a maintenance control program is in place (see Section 5.5 Maintenance Considerations).

In addition, the owner is responsible for understanding the difference between a voluntary upgrade and a mandatory upgrade due to unsafe condition, as follows:

- **Voluntary upgrade**
  - Where the owner chooses to upgrade an existing Elevating Device voluntarily—for example, when the Elevating Device has obsolete parts, replacement parts are no longer available, and therefore the Elevating Device cannot be repaired—or when the owner wants to modernize the car and/or the controls.
- **Mandatory upgrade due to unsafe condition**
  - Where an unsafe or potentially unsafe condition exists, and the owner is required to shut down the Elevating Device and prevent it from carrying passengers until a Technical Safety BC safety officer inspects and permits the Elevating Device to resume operation. Depending on the repair or replacement required, a mandatory upgrade may be triggered.

4.2.2 REGISTERED PROFESSIONALS

4.2.2.1 Registered Professionals of Record

For each discipline that is required for the Alteration, a Registered Professional of Record (RPR) is required. For the purposes of these guidelines, the RPR is responsible for the Alteration of the Elevating Devices in existing buildings.

In addition to the responsibilities listed in their respective sections below, RPs are responsible for engaging any required Supporting Registered Professionals (SRPs) by means of a Schedule S-B/S-C (see Section 4.2.2.3 Supporting Registered Professionals below).

RPRs are responsible for assessing the potential impact of proposed work on an existing Elevating Device on other components of the building and for communicating and collaborating with the CRP and other RPRs as required so the project is coordinated.

4.2.2.2 Coordinating Registered Professional

When required by the *Building Code*, a Coordinating Registered Professional (CRP) must be retained. The CRP may be the Architect, Elevating Device Contractor Engineer, Elevating Device Consulting Engineer, or Electrical Engineer, depending on the scope of the project. When an Architect is involved on a project, the Architect will typically take on the role of CRP.

The role of the CRP, as described in the Letter of Assurance, Schedule A, Confirmation of Commitment By Owner and Coordinating Registered Professional, is to coordinate the design work and field reviews of the Architect and Engineering Professionals required for the project, in order to ascertain that the design will substantially comply with the *Building Code* and other applicable enactments regarding safety. The role of the CRP is defined in the *BCBC* and VBBL and is discussed in Note A2.2.7.2.(1)(a) of Division C.

The CRP is responsible for:

- determining which RPs are required for the Alteration;
- determining, in consultation with the RPs, which SRPs will be required for the Alteration;
- notifying the owner of these requirements for RPs;
- coordinating the design and field reviews of the RPRs;
- communicating with the owner with respect to the condition of the Elevating Device and Alterations required and recommended;
- providing the maintenance requirements to the owner;
- coordinating the integration of life safety systems impacted by the Alteration; and
- assisting the owner in coordination and submission of documentation in support of a building permit application.

4.2.2.3 Supporting Registered Professionals

RPs may delegate responsibility for scopes of work to an SRP, who provides supporting services.

Where appropriate, an SRP may be requested and should be prepared to provide supporting Schedules S-B and S-C in accordance with the *Joint Professional Practice Guidelines – Professional Design and Field Review By Supporting Registered Professionals* (AIBC and Engineers and Geoscientists BC 2020).

4.2.3 ARCHITECT

The Architect is the RPR who provides the required assurances to the AHJ by way of Letters of Assurance for all items under the architectural discipline on Schedule B of the Letters of Assurance in Division C, Part 2, of the *British Columbia Building Code* (*BCBC*) and the Vancouver Building By-law (VBBL). Item 1.11 Elevating Devices of Schedule B is assigned to the architectural discipline. In fulfilling the role of RPR for the Elevating Devices item, the Architect is responsible for determining the extent and type of supporting services that may be required from SRPs for their respective scopes of work.

The Architect will typically take on the role of CRP. In addition to the CRP responsibilities, the Architect's scope of work is to review and assess the existing conditions related to the Elevating Device upgrade for code compliance and owner requirements.

Where applicable, the Architect is responsible for:

- Elevating Device general arrangement;
- Elevating Device machine room Alterations, such as
  - the addition of partitions or separations,
  - changing access to the machine room, and
  - changing the size of the machine room;
- elevator hoistway Alterations, including additional entrances;
- elevator exit provisions, including recall levels and exit signs;
- reviewing egress paths, access to exits, exits, fire separations, and fire resistance ratings of the existing building and building compartments, which may be affected by the Elevating Device Alterations;
- elevator pit design;
- Elevating Device overhead clearance;
- structural alignment of the Elevating Device;
- elevator car interior;
- elevator door;
- Elevating Device operation; and
- consulting with the Elevating Device Consulting Engineer and the Elevating Device contractor.

The above list is a summary of an Architect's typical responsibilities for the Alteration of Elevating Devices in existing buildings. For more detailed information refer to Appendix C: Architectural Responsibilities Related to Elevating Devices in New Buildings of the *Joint Professional Practice Guidelines – Design and Installation of Elevating Devices in New Buildings* (AIBC and Engineers and Geoscientists BC 2023).

4.2.4 ENGINEERING PROFESSIONALS

In addition to the technical professional responsibilities outlined in these guidelines, Engineering Professionals providing services related to Alterations of Elevating Devices in existing buildings have a professional responsibility to uphold the principles outlined in the Engineers and Geoscientists BC's *Code of Ethics*, including protection of public safety and the environment.

As such, Engineering Professionals must use a documented approach to identify, assess, and mitigate risks that may impact public safety or the environment when providing professional services. One of the risk factors that must be considered is climate change implications on the building and building services. The Engineering Professional has a responsibility to notify the client or owner of future climate-related risks, reasonable adaptations to lessen the impact of those risks, and the potential impacts should the client or owner refuse to implement the recommended adaptations. The Engineering Professional has a responsibility to be aware of and meet the intent of any climate change requirements imposed by the owner or the AHJ.

Furthermore, among other future climate-related risks, the Engineering Professional must consider resiliency related to flood hazards and the flood construction level. Considerations may include locating the Elevating Device control space/machine room above the flood construction level, providing moisture sensors and alarms in flood risk levels, and specifying alternate automatic recall levels in case moisture is detected.

4.2.5 ELEVATING DEVICE CONTRACTOR

The Elevating Device contractor is responsible for:

- engaging the Elevating Device Contractor Engineer;
- obtaining a permit and a certificate of inspection from Technical Safety BC;
- assigning mechanics with the appropriate credentials (i.e., an Elevating Devices Mechanic, certified under the *Safety Standards Act* to install, repair, and maintain Elevating Devices);
- informing the owner of existing building conditions that affect the safe operation and maintenance of the Elevating Device; and
- identifying, and informing the owner of related work that must be completed by others, including, but not limited to:
  - mechanical upgrades,
  - electrical upgrades,
  - architectural upgrades, and
  - structural upgrades.

4.2.6 ELEVATING DEVICE CONTRACTOR ENGINEER

The Elevating Device Contractor Engineer is responsible for reviewing the scope of work for the Alteration that the Elevating Device contractor has prepared. The Elevating Device Contractor Engineer may be an SRP to one of the RPs, in which case the SRP would provide a Schedule S-B and a Schedule S-C.

The scope of this review may include, but is not limited to:

- reviewing the Technical Safety BC permit application;
- reviewing the Elevating Device details, including speed, capacity, and components;
- reviewing the scope of work for the Alteration listed in the permit application; and
- where included in the scope of work for the Alteration:
  - providing a design or review of the machine mounting,
  - providing a design or review of the rope gripper,
  - confirming seismic requirements and mounting, and
  - reviewing the gross weight and loading impact of the Elevating Device Alteration (including machine beams, rail mounting, buffers, safeties, machine sheave shaft load, and car platform/sling), while considering that a change in gross weight greater than 5 percent may affect existing building systems—specifically, an increase in gross weight greater than 5 percent will likely trigger requirements for upgrades of the existing structural systems.

4.2.7 ELEVATING DEVICE CONSULTING ENGINEER

The Elevating Device Consulting Engineer is responsible for designing an Alteration to the Elevating Device that meets the requirements of the owner.

The Elevating Device Consulting Engineer is responsible for:

- defining the scope of work and providing recommendations to the owner for the Elevating Device Alteration and ancillary work;
- preparing design drawings and specifications;
- performing field reviews, including a final field review; and
- where required, administering the tender documents and contract award.

4.2.8 ENGINEERING CONSULTING TEAM

4.2.8.1 Structural Engineer

A Structural Engineer is required on an Elevating Device Alteration project when the structural loads related to the Alteration increase by 5 percent or more, or as otherwise deemed necessary. Other situations where a Structural Engineer is required may include, but are not limited to, when there is a change or increase in the capacity, speed, or sheave shaft loading of the Elevating Device, or when the machine is changed.

The Structural Engineer is responsible for the review and design of the:

- elevator hoistway, machine room, and pit loads;
- top of elevator hoistway and machine room hoist beams;
- building roof, where craning heavy equipment is supported;
- foundation fastening for basement traction arrangement; and
- fastening points for seismic requirements.

4.2.8.2 Mechanical Engineer

The Mechanical Engineer is responsible for:

- mechanical installation related to the existing machine room, overhead, and pit (these existing conditions can often be retained);
- Elevating Device machine room temperature and humidity control, considering that hydraulic elevator machine rooms require ventilation as defined in the *BC Fire Code* and the *Elevating Device Safety Regulation,* Sentence 42;
- Elevator hoistway temperature and humidity control; and
- code compliance, review, and upgrade, as required for the existing pit drains (where there is no pit drain, there is no retroactive code requirement to install a pit drain in an existing building).

4.2.8.3 Electrical Engineer

The Electrical Engineer is responsible for:

- revisions to the building fire alarm system to comply with legally adopted codes;
- electrical single line diagram showing
  - Elevating Device feeder size to the Elevating Device machine room,
  - Elevating Device feeder size from the disconnect to the Elevating Device controller, and
  - overcurrent protection device settings;
- partial fire alarm riser diagram; and
- Elevating Device sequence of operation and fire alarm programming.

4.2.8.4 Fire Suppression Engineer

The Fire Suppression Engineer is responsible for code compliance, review, and upgrade, as required for the existing sprinkler installations.

4.2.9 AUTHORITY HAVING JURISDICTION

The responsibility for accepting and approving the design, permit application, installation, and operation of Elevating Devices is shared between Technical Safety BC and local governments.

4.2.9.1 Technical Safety BC

Technical Safety BC, a form of AHJ, is responsible for governing the Elevating Device industry, including, but not limited to, issuing installation and operating permits, completing acceptance testing, and conducting incident investigations.

4.2.9.2 Local Governments

Local governments (i.e., AHJ) are responsible for ensuring regulatory compliance with the applicable building code (e.g., the *BCBC* or VBBL*)* and issuing permits for Alterations of Elevating Devices, including trade permits and building permits.

The AHJ is assured by the RPRs that the design and installation of an Elevating Device substantially complies, in all material respects, with the applicable requirements of the *BCBC* or VBBL*,* which reference the *CSA B44-16*, *Safety Code for Elevators and Escalators*, and other applicable enactments regarding safety, and with the plans and other documents supporting an application for a building permit. Professional assurances are to be provided in accordance with Division C, Part 2, Subsection 2.2.7. of the *BCBC* or VBBL.

5. Guidelines for Professional Practice

5.1 OVERVIEW

The following subsections outline considerations for Architects and Engineering Professionals providing services related to the Alteration of Elevating Devices in existing buildings.

5.2 REGULATORY REQUIREMENTS

Architects and Engineering Professionals are required to design in accordance with all applicable codes and regulations, to perform field review during construction, and to provide assurance that the design, installation, or Alteration of an Elevating Device is substantially compliant with those codes and regulations.

This section includes information on applicable regulations, codes, and standards; guidelines for professional practice; the requirement for Letters of Assurance; and the requirements of Technical Safety BC, which manages installation permits, operating permits, and the design registration of Elevating Devices.

5.2.1 REGULATIONS, CODES, AND STANDARDS

Following are the key regulations, codes, and standards that apply to the design, installation, and Alteration of Elevating Devices:

- *Elevating Devices Safety Regulation*, under the *Safety Standards Act*
- *BC Building Code* and Vancouver Building By-law (referred to and defined collectively in these guidelines as the *Building Code*)
- *BC Fire Code* and Vancouver Fire By-law (referred to and defined collectively in these guidelines as the *Fire Code*)
- *BC Plumbing Code* and Vancouver Building By-law Book II (Plumbing Systems) (referred to and defined collectively in these guidelines as the *Plumbing Code*)
- *Canadian Electrical Code*
- *ASME 17.1-2016/CSA B44-16*, *Safety Code for Elevators and Escalators*

5.2.1.1 Elevating Devices Safety Regulation

The *Elevating Devices Safety Regulation* is issued as a regulation under the *Safety Standards Act* and identifies the governing requirements pertaining not only to the technical requirements for the installation and maintenance of Elevating Devices but also to the minimum certification for persons who work on Elevating Devices.

Under this regulation, Architects and Engineering Professionals providing design and consulting services for Alterations of Elevating Devices are required to comply with all applicable safety orders and directives published by Technical Safety BC.

Architects and Engineering Professionals should also be aware of all related information bulletins, such as *Amendments to the Elevating Devices Safety Regulation and Adoption of ASME A17.1-16/CSA B44-16 Safety Code for Elevators and Escalators* (Technical Safety BC 2019). In addition, Architects and Engineering Professionals providing these services may also be required to submit additional documentation as required by Technical Safety BC. Note that the *Elevating Devices Safety Regulation* does not apply to Elevating Devices in private residences, and these guidelines do not address this topic.

5.2.1.2 Building Codes

The *BC Building Code* or the Vancouver Building By-law—referred to and defined collectively in these guidelines as the *Building Code*—set the regulatory standards pertaining to a building, its components, and its systems.

The provisions of the *Building Code* must be met as it pertains both to Elevating Devices and how the Elevating Device interfaces and interacts with the building as a whole.

5.2.1.3 Fire Codes

The *BC Fire Code* and the Vancouver Fire By-law—referred to and defined collectively in these guidelines as the *Fire Code*— are complementary regulations governing the construction, use (including operation), and demolition of buildings.

Architects and Engineering Professionals may be engaged to provide post-occupancy design and maintenance planning services in addition to traditional design and installation services; in this case, Architects and Engineering Professionals must incorporate the *Fire Code* requirements into their services related to the Alteration of Elevating Devices. These additional services could include specification and design of measures related to firefighting operations, or recordkeeping functions such as establishing and maintaining a building fire-safety plan and Elevating Device maintenance procedures.

The *Fire Code* regulates the inspection, testing, and maintenance of the emergency service features of elevators in high buildings, to ensure they operate in compliance with provincial, territorial, and municipal requirements, and with the *Elevating Devices Safety Regulation*.

5.2.1.4 Canadian Electrical Code

Published by the Canadian Standards Association (CSA), the CSA C22.1, *Canadian Electrical Code, Part I, Safety Standard for Electrical Installations* (referred to simply as the *Canadian Electrical Code*) pertains to the installation and maintenance of electrical equipment in Canada.

5.2.1.5 Safety Code for Elevators and Escalators

The *CSA B44-16*, *Safety Code for Elevators and Escalators* (commonly referred to in the industry as the *elevator code*) is a standard referenced by the *Elevating Devices Safety Regulation* and the *Building Code*, and provides regulatory requirements based on the scope of Alterations of Elevating Devices.

In addition to the *CSA B44-16*, specific enactments or additional standards may be referenced and required to address specific building elements. Most of these are identified in either the *CSA B44-16* or in the *Building Code*.

Architects and Engineering Professionals carrying out design services are required to determine the specific codes and standards that apply to their design, and to design in compliance with the requirements of each.

5.2.1.6 Additional Related Regulations and Standards

Local bylaws or regulations may impose additional requirements. Architects and Engineering Professionals are required to consider how these regulations may apply to their project.

Commonly referenced standards for specific building elements or project components include, but are not limited to, the following:

- For maintaining the integrity of fire separations:
  - CAN/ULC-S101, Standard Methods of Fire Endurance Tests of Building Construction and Materials
  - CAN/ULC-S104, Standard Method for Fire Tests of Door Assemblies
  - CAN/ULC-S115, Standard Method of Fire Tests of Firestop Systems
- Where emergency power is provided to an Elevating Device:
  - CAN/CSA-C282, Emergency Electrical Power Supply for Buildings
  - CAN/CSA-Z32, Electrical Safety and Essential Electrical Systems in Health Care Facilities
- Where an Elevating Device interfaces with fire alarms:
  - CAN/ULC-S524, Standard for Installation of Fire Alarm Systems
- For maintaining an appropriate operating environment for Elevating Device equipment:
  - ASHRAE 62, Ventilation for Acceptable Indoor Air Quality
- Where an elevator hoistway, including its machinery or control spaces, is sprinklered:
  - NFPA 13, Standard for the Installation of Sprinkler Systems
    NFPA 13 R, Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies
- Where drainage from the elevator pit or machine room discharges to a building drainage system (i.e., conveys drainage to a public sewer system):
  - Metro Vancouver Sewer Use Bylaw 299, or similar local regulations

5.2.2 LETTERS OF ASSURANCE

Architects or Engineering Professionals providing design or consulting services for buildings are usually either providing such services in a primary capacity as a Registered Professional of Record (RPR), or in a supporting capacity as a Supporting Registered Professional (SRP).

If Architects or Engineering Professionals are providing design services, they may be required by the *Building Code* to provide Letters of Assurance. Under the *Building Code*, the Letters of Assurance include the Schedule B: Assurance of Professional Design and Commitment for Field Review, to be submitted with their design, and the Schedule C-B: Assurance of Professional Field Review, to be submitted following the completion of their field review duties.

For more information, see the *Guide to the Letters of Assurance in the BC Building Code 2018 and the Vancouver Building By-law 2019* (Province of BC 2022) and *Bulletin K: BCBC – Letters of Assurance in the BC Building Code and Due Diligence* (Engineers and Geoscientists BC 2010).

Architects and Engineering Professionals providing services in a supporting role typically do not provide Letters of Assurance; however, they may be required to provide supporting documentation to the RPR, in the form of Schedule S-B: Assurance of Professional Design and Commitment for Field Review by Supporting Registered Professional and/or Schedule S-C: Assurance of Professional Field Review and Compliance by Supporting Registered Professional, in accordance with the *Joint Professional Practice Guidelines – Professional Design and Field Review By Supporting Registered Professionals* (AIBC and Engineers and Geoscientists BC 2020).

5.2.3 TECHNICAL SAFETY BC REQUIREMENTS

Technical Safety BC is an authority having jurisdiction for passenger and freight elevators and has a mandate to provide the regulatory requirements for installations or Alterations of Elevating Devices.

Note that this authority having jurisdiction responsibility is shared with local governments responsible for enforcing the *Building Code*, the *Fire Code*, and the *Plumbing Code*.

Technical Safety BC issues safety orders and directives under the *Elevating Devices Safety Regulation*.

Two key Technical Safety BC publications apply to Alterations of Elevating Devices:

- *Safety Order: Mandatory Requirements for the Alteration of Motion Control or Operation Control* (reference number: SO-ED 2020-01)
  - This safety order prescribes the terms and conditions for a permit issued for the alteration of motion and operation control for traction and hydraulic elevators in order to increase the minimum basic level of safety for existing elevators that are to be altered (Technical Safety BC 2020a).
- *Directive: Major and Minor Alterations* (reference number: D-L4 110803 5)
  - This bulletin is issued to all licensed elevating device contractors to clarify the requirements prior to an alteration of an existing elevating device in accordance with the A17.1/B44-2016 code (Technical Safety BC 2020b).

The above directive provides clarification on major versus minor Alterations and information about related permit and inspection requirements. This directive also states that documents submitted for permitting purposes must be sealed (authenticated) by an Engineering Professional. Only documents that are prepared by an Engineering Professional in their professional capacity or under their direct supervision should be authenticated.

This requirement for authentication of documents for permitting purposes therefore implies that the work must be done by an Engineering Professional, or under their direct supervision; this is consistent with the Engineers and Geoscientists BC Bylaw requirement to authenticate all professional engineering documents prepared and delivered in the Engineering Professional's capacity to others who will rely on the information contained in the documents. (See Section 7.1.2 Authenticating Documents).

Importantly, any existing non-conformances, or proposed or required variances to the applicable code, must either be addressed and made to conform or be granted an approved safety equivalence by Technical Safety BC. The Technical Safety BC variance process allows for an alternate design to be used, provided it meets the intent of the *CSA B44-16*, *Safety Code for Elevators and Escalators*, by submitting a *Request for Variance Form 1076* (Technical Safety BC 2017). This form is typically prepared by the Elevating Devices contractor or Elevating Devices Consulting Engineer, and is submitted for review and acceptance by senior safety officers at Technical Safety BC.

5.3 DETERMINING PROJECT SCOPE

5.3.1 IDENTIFY PROJECT NEEDS

The owner, in consultation with the applicable RPs, is responsible for identifying project needs and determining the project scope. Work may range from replacing individual Elevating Device components to upgrading affected building systems, such as mechanical, electrical, or structural systems, to meet code requirements or owner preferences.

As with all equipment in a facility, the owner is responsible for the operation and maintenance of the Elevating Device equipment. *Building Code* requirements are not retroactive; they do not require that an owner undertake an Alteration of an Elevating Device. However, Technical Safety BC may require a mandatory upgrade to an Elevating Device. See Section 4.2.1 Owner for information on voluntary versus mandatory upgrades.

Requirements and thresholds for reliability and performance of Elevating Devices varies depending on the use of the building (e.g., residential, commercial, industrial, institutional). The Building Owners and Managers Association of BC (BOMA BC) recommends four shutdowns of an Elevating Device yearly, or one shutdown in any 90-day period, for maintenance and servicing.

Elevating Device equipment may need to be updated for various reasons, such as:

- lack of available replacement parts;
- mandates by Technical Safety BC;
- damage to the equipment; or
- the equipment is unsafe to operate in the current condition.

When an owner is considering a voluntary Alteration of an Elevating Device, the following key factors should be considered:

- Component obsolescence
- Reliability
- Age of equipment
- Technology of equipment
- Environmental contamination
- Maintenance requirements

Based on the above criteria, whether Alterations are required or voluntary, it is the owner's responsibility to identify the issues with the Elevating Device that must be addressed in the Alteration. The owner can fulfil this responsibility by consulting with:

- the Architect;
- the Elevating Device contractor;
- the Elevating Device Consulting Engineer;
- building tenants; and/or
- users of the Elevating Device.

The owner is responsible for assessing the risk presented by the existing condition of the Elevating Device, and for defining, in consultation with RPs, whether the proposed project involves a simple repair, such as replacing like-for-like components, or an Alteration to the original design.

5.3.1.1 Minor and Major Alterations

Technical Safety BC has published a specific directive on Elevating Device Alterations that defines whether Alterations are considered minor or major; see the *Directive: Major and Minor Alterations* (Technical Safety BC 2020b).

Alterations generally fall into two categories:

- Minor Alteration
  - Adding safety equipment, such as door retainers, that improves safety but does not alter the functionality of the Elevating Device. This is commonly referred to as "minor upgrades and/or repairs."
- Major Alteration
  - Replacing the controller, the drive equipment and related replacement of the car top, the pit, and the operating fixtures. This is commonly referred to as a "modernization" or "upgrade."

Additionally, the Technical Safety BC *Safety Order: Mandatory Requirements for the Alteration of Motion Control or Operation Control* (Technical Safety BC 2020a) provides clarity on the requirements of necessary upgrades based on the Alteration.

Currently, no safety orders or directives published by Technical Safety BC apply retroactively; therefore, based on the current code requirements, upgrades that are under consideration by the owner proactively—for example, as recommended by the RPs or the Elevating Device Contractor—are considered voluntary.

5.3.2 DETERMINE REQUIREMENTS, VARIANCES, AND ACCEPTABLE LEVEL OF PERFORMANCE

Current regulations mandate that Elevating Devices function safely, be in good working order, and provide reliable service, including, but not limited to, up time and down time, levelling, ride quality, and door operation. Since no specific requirements dictate that an Elevating Device must be upgraded, an owner must make a reasonable decision about whether to upgrade, based on the condition and reliability of the Elevating Device. Importantly, user experiences with the Elevating Device should be considered, as the Elevating Device is often of critical importance for building use, and the only means of access to upper floors for persons with disabilities.

Once the degree of Alteration is defined (See Section 5.3.1.1 Minor and Major Alterations), the next step is to determine which RPs are required for the project, including who will take responsibility for the Alteration as the RPR and who will take on the role of Coordinating Registered Professional (CRP). The requirements for the planning, design, and permitting stages for an Alteration must be coordinated between the RPR, other RPs, and all other responsible parties. See Section 4.2.2 Registered Professionals for more information.

In the early stages of design and planning, the RPs must identify existing conditions that do not conform to the current code. Some common pre-existing conditions that may not be code-conforming (but may have been at the time of installation) include services run in elevator hoistways, windows in the back of elevator hoistways, non-ULC certified elevator doors, and non-beveled horizontal ledges.

The RPR should identify non-conformances and advise the owner of the implications (i.e., performance of safety features, cost-benefit analysis) of upgrading the non-conformances. The owner may choose to upgrade the non-conformances so that the Elevating Device will meet current code requirements, whether or not it falls within the scope of the Alteration. In addition, the RPR should be prepared to discuss non-conformances and related decisions with the Technical Safety BC safety officer prior to the safety officer's inspection to determine any requirements for mandatory upgrading and minimize the chance of costly remediation late in the project.

An Alteration or upgrade to an Elevating Device cannot lower the performance of any safety features present from the original installation. Maintenance programs are mandatory and must be considered part of any Alteration.

Architects and Engineering Professionals, along with the AHJ, Technical Safety BC, and the owner, must collaborate to establish the acceptable level of performance required for the Elevating Device, and must document decisions made.

The Technical Safety BC variance process allows for an alternate design to be used, provided it meets the intent of the *CSA B44-16*, *Safety Code for Elevators and Escalators*. The *Request for Variance Form 1076* (Technical Safety BC 2017) is discussed in Section 5.2.3 Technical Safety BC Requirements.

5.3.3 ASSESS THE IMPACT OF ALTERATIONS ON BUILDING SYSTEMS

When an Alteration to an Elevating Device is proposed, the impact of the Alteration on various buildings systems must be considered.

If the scope of an Alteration includes or causes any of the following, additional RPs may be required:

- Modifications to electrical upgrades
- Modifications to fire alarm system integration
  - Upgrades to existing Elevating Devices required for firefighters' emergency operation are discussed in Section 5.4.4 Requirements for Firefighters' Emergency Operation.
- Modifications to emergency power
- Modifications to non-elevator-related equipment in the machine room and elevator hoistway
- Modifications to ventilation in Elevating Device machine rooms
- Modifications to machine room access
- Increases in building loading due to increased elevator weights
- Modifications to structural supports
- Modifications to sump pumps and drains
- Installation of a new Elevating Device in an existing building
- Modifications to the fire suppression system in an elevator machine room, elevator hoistway, or elevator pit

5.3.4 CONSIDER ELEVATING DEVICE FUNCTIONALITY

There are more opportunities for Elevating Devices Alterations than upgrading Elevating Devices for code compliance or replacing like-for-like components. The owner should be informed of the available options; a few of these options are discussed in the following sections.

5.3.4.1 Energy Consumption

Elevating Devices are a considerable source of energy consumption in buildings. The owner should consider options for reducing energy consumption of the Elevating Device.

For example, where an existing Elevating Device is equipped with an AC-to-DC variable speed generator, the owner should consider installing a conventional, variable voltage, variable frequency drive, which may provide substantial energy savings.

While regenerative technology may not provide significant cost savings, it can reduce the overall impact on energy usage. A study of estimated energy savings is recommended to inform decisions on energy-related upgrading.

5.3.4.2 Performance

Elevating Device technology is continually evolving, as commonly available systems adopt automated integration technologies to understand building traffic patterns. One example is how a new solid-state, closed-loop system will outperform an older relay system for dispatching.

However, overall elevator speed is a function of dispatching, door operation, and elevator speed combined; all should be considered in the overall performance of the system. When the performance of the existing Elevating Device is being questioned, these three components should be reviewed and be considered for upgrade.

5.3.4.3 Post-Disaster Facilities

The classification of post-disaster buildings is defined in the *Building Code*. The *CSA B44-16*, *Safety Code for Elevators and Escalators* separates the additional requirements for Elevating Devices based on the damped horizontal spectral acceleration listed in Table C-3 of Division B, Appendix C of the *Building Code*.

It is important to determine whether the building is classified as a post-disaster facility early in the design, so the owner and RPs are aware of and can address any specific post-disaster implications for the Alteration of the Elevating Device.

5.3.4.4 Disabled Persons Accessibility

Elevating Devices are a crucial part of occupant movement and accessibility in buildings. The *CSA B44-16*, *Safety Code for Elevators and Escalators* includes an Appendix E, which defines the requirements for Elevating Devices for persons with physical disabilities.

The design of the Alteration should encapsulate these requirements when reasonably possible. Examples of accessibility requirements include modifying operating fixtures and installing audible and visual indicators.

5.4 SPECIFIC REQUIREMENTS FOR MAJOR ALTERATIONS OF ELEVATING DEVICES

Most Alterations of Elevating Devices requiring Architects and Engineering Professionals are major Alterations classified as “modernizations” that require replacing one or more of the following main components:

- Controller
- Drive
- Machine
- Door equipment
- Operating fixtures

The impact of Alterations on various buildings systems must be considered. For example, replacing the controller will affect many other components and systems in the building, either due to code requirements or technology compatibility. The operating fixtures would need to be replaced where firefighters' emergency operation (FEO) is being provided, and the drive would need to be replaced due to the technology interface with the controller.

Engineering Professionals should consider replacing wiring or other items in the Elevating Device that are original but dated, if doing so could increase the overall quality and performance of the Elevating Device.

Most code requirements are internal (i.e., directly related) to the installation of the Elevating Device. The tables in subsections 5.4.1 to 5.4.5 outline the scope of work, professional involvement, code requirements, and additional considerations for typical as well as less-common projects.

- Table 1 identifies the scope of work for a typical modernization of a traction Elevating Device.
- Tables 2 through 5 address other, less common modernizations and Alterations, and include descriptions of situations where the scope of work deviates from what would be considered a typical Elevating Device Alteration project.

5.4.1 MODERNIZATION OF A TRACTION ELEVATING DEVICE

Table 1 outlines the scope of work, professional involvement, code requirements, and additional considerations for a typical modernization of a traction Elevating Device.

Table 1: Typical Requirements for Modernization of a Traction Elevating Device

SCOPE OF WORK	RESPONSIBLE PARTIES [a]	*CSA B44-16* REQUIREMENTS [b]	ADDITIONAL NOTES [b]
Controller **Operating fixtures**	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor	Section 8.7.2.27 Appendix E	• When replacing the controller, several *Elevating Devices Safety Regulation* requirements must be met. Although most requirements are internal to the Elevating Device, other major components include FEO and emergency power interfaces. • See Table 3: Work Related to a Typical Modernization Project of these guidelines for the impact of these Alterations on checking and replacing certain building machine room equipment. • Refer to the *General Contractor's Passenger, Accessibility Lifts and Freight Elevator Pre-inspection checklist* (Form 1222) (Technical Safety BC 2022).
Machine	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Electrical Engineer	Section 8.7.2.25	• Based on the condition of the machine and the ability to maintain it in the future, consideration should be given to replacing the machine as part of the modernization. • Consideration should be given to the type of machine that will be installed as it relates to energy savings.

Table 1: Typical Requirements for Modernization of a Traction Elevating Device (cont.)

SCOPE OF WORK	RESPONSIBLE PARTIES [A]	*CSA B44-16* REQUIREMENTS [B]	ADDITIONAL NOTES [B]
Ascending overspeed protection **Unintended motion control**	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer	Section 8.7.2.20	• Where a rope gripper is selected for ascending overspeed protection and/or unintended motion control, a sealed (authenticated) drawing is required as part of the Technical Safety BC permit submission. • See Authenticating Documents of these guidelines for quality management requirements.
Seismic requirements	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Structural Engineer	Section 8.4	• The seismic acceleration for the area must be considered. • Where required by Section 8.4 of the *CSA B44-16*, the Technical Safety BC minimum seismic requirements must be provided. • Where applicable, these Elevating Device-only provisions can be provided by the Elevating Device contractor.
Door equipment **Door operator** **Door detector**	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect	Sections 8.7.2.11, 8.6.12.5.3.2, and 8.7.2.13	• Although it is not directly related to the replacement of the controller, the door system for the Elevating Device (including the car and hall) must be upgraded to meet requirements of the *CSA B44-16*.
Firefighters' emergency operation	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect • Electrical Engineer	Section 8.7.2.28	• See Table 4: Requirements for Firefighters' Emergency Operation of these guidelines.
Emergency power	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Electrical Engineer	Section 8.7.2.28	• The provision of emergency power resides with the applicable Building Code; the Elevating Device provisions must meet the current requirements.
Car interiors	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect • Electrical Engineer • Mechanical Engineer • Structural Engineer	Sections 8.7.2.14 and 8.7.2.15 Appendix E	• It is at the discretion of the owner to upgrade or replace car interior finishes. When undertaken, the resulting weight change must be considered. • Further review of the Elevating Device and building structure will be required where the gross weight is increased by more than 5%.

NOTES:

Abbreviations: FEO = firefighters' emergency operation

[a] For definitions and roles of responsible professionals, see Section 2.1 Defined Terms and Section 4 Roles and Responsibilities.

[b] The title of the following code was abbreviated in this table:
CSA B44-16 = *ASME 17.1-2016/CSA B44-16*, *Safety Code for Elevators and Escalators*

5.4.2 MODERNIZATION OF A HYDRAULIC ELEVATING DEVICE

Table 2 outlines the scope of work, professional involvement, code requirements, and additional considerations for modernization of a hydraulic Elevating Device.

Table 2: Typical Requirements for Modernization of a Hydraulic Elevating Device

SCOPE OF WORK	RESPONSIBLE PARTIES [A]	*CSA B44-16* REQUIREMENTS [B]	ADDITIONAL NOTES [B]
Controller **Operating fixtures**	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor	Section 8.7.3.31 Appendix E	• When replacing the controller, several *Elevating Devices Safety Regulation* requirements must be met. Although most requirements are internal to the Elevating Device, other major components include FEO and emergency power interfaces. • See Table 3: Work Related to a Typical Modernization Project of these guidelines for the impact of these Alterations on checking and replacing certain building machine room equipment. • Refer to the *General Contractor's Passenger, Accessibility Lifts and Freight Elevator Pre-inspection checklist* (Form 1222) (Technical Safety BC 2022).
Tank unit, including motor, pump, and control valve	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor	Section 8.7.3.29	• Based on the condition of the machine and the ability to maintain it in the future, consideration should be given to replacing the machine as part of the modernization. • Consideration should be given to the type of machine that will be installed, as it relates to energy savings.
Seismic requirements	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Structural Engineer	Section 8.4	• The seismic acceleration for the area must be considered. • Where required by section 8.4 of the *CSA B44-16*, the Technical Safety BC minimum seismic requirements must be provided. • These Elevating Device-only provisions can be provided by the Elevating Device Contractor.
Door equipment **Door operator** **Door detector**	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect	Sections 8.7.3.11, 8.6.12.5.3.2, and 8.7.2.13	• Although it is not directly related to the replacement of the controller, the door system for the Elevating Device (including the car and hall) must be upgraded to meet requirements of the *CSA B44-16*.
Firefighters' emergency operation	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect • Electrical Engineer	Section 8.7.3.31	• See Table 4: Requirements for Firefighters' Emergency Operation of these guidelines.

Table 2: Typical Requirements for Modernization of a Hydraulic Elevating Device (cont.)

SCOPE OF WORK	RESPONSIBLE PARTIES [A]	*CSA B44-16* REQUIREMENTS [B]	ADDITIONAL NOTES [B]
Emergency power	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Electrical Engineer	Section 8.7.3.31	• The provision of emergency power resides with the applicable *Building Code*; the Elevating Device provisions must meet the current requirements.
Car interiors	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect • Electrical Engineer • Mechanical Engineer • Structural Engineer	Sections 8.7.3.13 and 8.7.3.14 Appendix E	• It is at the discretion of the owner to upgrade or replace car interior finishes. When undertaken, the resulting weight change must be considered, as well as the flame-spread rating of the finish materials. • Further review of the Elevating Device and building structure will be required where the gross weight is increased by more than 5%.

NOTES:

Abbreviations: FEO = firefighters' emergency operation

[a] For definitions and roles of responsible professionals, see Section 2.1 Defined Terms and Section 4 Roles and Responsibilities.

[b] The title of the following code was abbreviated in this table:
CSA B44-16 = *ASME 17.1-2016/CSA B44-16*, *Safety Code for Elevators and Escalators*

5.4.3 WORK RELATED TO A TYPICAL MODERNIZATION PROJECT

Table 3 outlines the requirements and resolutions for components and related work for a typical modernization project. These components should all be reviewed by the Elevating Device contractor and the Technical Safety BC safety officer prior to any field review by the RPs.

Where existing Elevating Devices have been retrofitted, upgraded, or replaced, the relevant fire department information in the project's fire safety plan must be updated to convey essential emergency operations instructions to responding firefighting personnel.

Table 3: Work Related to a Typical Modernization Project

SCOPE OF WORK	REQUIREMENTS AND RESOLUTIONS [a]
Machine room door	• The door must be made self-closing and self-locking. • A threshold must be added, where required for fire rating, moisture control, leakage control, or to minimize gaps. • The door must be replaced, where required to meet *Building Code* requirements for a separated, rated enclosure, such as when there is a large hole in the door.
Lighting	• All lighting in the machine room, overhead, and pit must be guarded and provide 100 to 200 lux at the equipment, depending on the location, according to requirements of the *CSA B44-16*. • Lightbulbs should be externally guarded to prevent contact and accidental breakage.
Outlets	• Electrical outlets for the machine room, overhead, and pit must be the ground fault, circuit interrupter type of outlets.
Temperature and humidity (of machinery spaces, machine rooms, control spaces, and control rooms)	• Temperatures of spaces where the controller and the machine are located must be kept within a range of 5°C to 30°C. • A hydraulic elevator machine room must be permanently vented, either directly or indirectly, to the building exterior, according to the requirements of the *Elevating Devices Safety Regulation*, sentence 42. • Existing HVAC provisions must be confirmed and updated, if required.
Fire extinguisher	• A fire extinguisher must be permanently mounted in the machine room.
Services not serving the Elevating Device machine room	• No services should pass through Elevating Device machine rooms, which are considered to be "end-of-line" rooms. • Where services such as wiring or drains have been routed through a machine room, they must be reviewed, with the intention to either relocate, reroute, or remove the services from the machine room.
Elevator hoistway	• Compliance of hoistways with codes in force at the time of installation must be checked. Remediation for items such as non-beveled ledges, services in the elevator hoistway, fire rating, penetrations (windows and/or services), and firestopping should be considered on a case-by-case basis. • Safety concerns and nonconformances should be brought to the attention of the owner and the Technical Safety BC safety officer.

NOTES:

[a] The title of the following code was abbreviated in this table:
CSA B44-16 = ASME 17.1-2016/CSA B44-16, Safety Code for Elevators and Escalators

5.4.4 REQUIREMENTS FOR FIREFIGHTERS' EMERGENCY OPERATION

Firefighters' emergency operation (FEO) allows firefighters to have control over the operation of the Elevating Device. The *Building Code*, along with the CSA B44, *Safety Code* for Elevators and Escalators, defines whether FEO is required for an Elevating Device installation. The *Building Code* only specifies the minimum requirements for FEO recall in high buildings, while the CSA B44 is generally stricter, with requirements for the provision of FEO on most elevators. The *Building Code* and the CSA B44 must be read in conjunction to determine the requirements for providing FEO for elevators undergoing a major Alteration.

Table 4 outlines scenarios when FEO may or may not be required. FEO is required by the *CSA B44-16* for changes to operation control in low and high buildings for traction and hydraulic Elevating Devices, or where FEO is already included. FEO is not required in low buildings for changes to motion control.

It is important to note that the *CSA B44-16* does not recognize partial installations of FEO (e.g., manual recall operation but not automatic recall operation), which, based on existing conditions, might initially appear to be a valid option.

Table 4: Requirements for Firefighters' Emergency Operation

TYPE OF ELEVATING DEVICE	TYPE OF ALTERATION	FEO REQUIRED [a]	*CSA B44-16* REQUIREMENT [a]
Traction Elevating Device with existing FEO	Controller [b], Motion Control [c], or Operation Control [d]	Yes	section 8.7.2.27.4
Traction Elevating Device with no FEO in high building	Motion Control [c]	Recommended [e]	section 8.7.2.27.5(m)(2)
Traction Elevating Device with no FEO in high building	Operation Control [d]	Yes	section 8.7.2.27.6
Traction Elevating Device with no FEO in low building	Motion Control [c]	No	section 8.7.2.27.5
Traction Elevating Device with no FEO in low building	Operation Control [d]	Yes	section 8.7.2.27.6
Hydraulic Elevating Device with existing FEO	Controller [b], Motion Control [c], or Operation Control [d]	Yes	section 8.7.3.31.5
Hydraulic Elevating Device with no FEO in high building	Motion Control [c]	Recommended [f]	section 8.7.3.31.6
Hydraulic Elevating Device with no FEO in high building	Operation Control [d]	Yes	section 8.7.3.31.7
Hydraulic Elevating Device with no FEO in low building	Motion Control [c]	No	section 8.7.3.31.6
Hydraulic Elevating Device with no FEO in low building	Operation Control [d]	Yes	section 8.7.3.31.7

NOTES:

[a] Abbreviations:
CSA B44-16 = *ASME 17.1-2016/CSA B44-16*, *Safety Code for Elevators and Escalators*
FEO = firefighters' emergency operation

[b] A controller is replaced without any change in the type of motion control.

[c] A change in motion control is defined as the method of controlling acceleration, speed, retardation, and stopping (i.e., variable-speed drive to a variable voltage, variable frequency drive).

[d] A change in operation control is defined as the change from continuous pressure, car switch, or other type of operation where the movement or stopping of the car is under the manual control of the operator, to any form of automatic operation, or vice versa (i.e., adding destination dispatching to an existing elevator system).

[e] For code-based requirements, refer to the *Building Code* in effect at the time of the Alteration to determine if the building is subject to the requirements of Subsection 3.2.6. (i.e., is a high building).

[f] It is required if it serves storeys above the first storey (per Sentence 3.2.6.4.(1) of the *Building Code*).

In some instances, such as a change in motion control for traction and hydraulic elevators in high buildings, the *CSA B44-16* defers to the *Building Code* to determine if FEO is required. In principle, this means that if the existing building would be considered a high building and require FEO (if designed and built to the current *Building Code*) full FEO service is required by the *CSA B44-16* for the Alteration of the Elevating Device. However, the edition of the *Building Code* to which the *CSA B44-16* is referring is unclear. Per the *CSA B44* Interpretation Number 08-11, the latest edition of the *National Building Code of Canada* (*NBC*) referenced in the *CSA B44* refers to the *NBC* in force at the time that the *CSA B44* was published.

Following is an example of how this interpretation would be applied to meet all applicable codes for an Alteration in the year 2023:

- The *Building Code* that applies to the project and Alteration (i.e., *BCBC 2018* or VBBL 2019) references the *CSA B44-16*, and the *CSA B44-16* references the "latest edition" of the *NBC*.
- The *NBC* in force at the time of publication of the *CSA B44-16* was the *NBC 2015*. The fact that *the CSA B44-16* was not adopted in BC until 2020, and the *NBC 2020* had since been published, is not relevant.
- If the existing building would be considered a "high building" by the *NBC 2015*, it would require FEO to be retrofitted. If by chance the existing building would be considered a high building by the *BCBC 2018* or VBBL 2019 (the *Building Code* applicable to the project) but not the *NBC 2015*, or by a more recently published version of the *NBC* (e.g., *NBC 2020* as per the example above), the RPR should consider proactively specifying the installation of FEO.

Note that this is a significant change from the CSA B44-07, where the provision of FEO was defined solely by the CSA B44-07 by the type of elevator and the applicable type of Alteration/ modernization. Note also that this interpretation and requirement for retroactive installation stands regardless of whether the Elevating Device without FEO was in conformance with the *Building Code* at the time of installation.

There is no obligation (or restriction) for an owner to exceed the *Building Code* requirements and proactively install FEO as part of the modernization. When considering proactively installing FEO as part of the modernization, the implications and requirements should be discussed with the AHJ, Technical Safety BC, and the RPs.

The owner is responsible for informing the fire department of any changes to the function of the Elevating Device after an upgrade has taken place. Changes should be identified in a revised Fire Safety Plan, which is submitted to the local fire department for review and acceptance.

5.4.5 CONSIDERATIONS FOR LESS-COMMON ELEVATOR ALTERATION PROJECTS

Table 5 describes the code requirements and professional involvement for less-common elevator Alteration projects.

Table 5: Considerations for Less-Common Elevator Alteration Projects

PROJECT EXAMPLE	RESPONSIBLE PARTIES [a]	CONSIDERATIONS [b]
Move the machine room to a new location	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect • Structural Engineer • Mechanical Engineer	• When a new machine room is provided for an existing Elevating Device, the new machine room must meet all requirements of the *Building Code* and the *CSA B44-16*, as well as related codes and standards. • FEO would not be required to be upgraded as part of the new machine room. See Table 4: Requirements for Firefighters' Emergency Operation of these guidelines.
Add entrances	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect • Structural Engineer	• The *Building Code* upgrade requirements are generally discrete and specific to the individual entrance and would not lead to controller upgrades. • The elevator hoistway enclosure must maintain the fire rating, and the structural integrity of the elevator core must also be maintained.
Change the travel speed of the elevator	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect • Structural Engineer	• Increasing the travel speed of the elevator would typically be completed during modernization of the elevator. • The integrity of the structural components and the enclosure design of the elevator hoistway must meet the current *Building Code* requirements, and must improve upon, not lessen, the performance of the existing elevator hoistway before the Alteration.
Add destination dispatching to an existing elevator system	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Electrical Engineer	• The change from conventional to destination dispatching is considered a major Alteration and could have an impact on the FEO of the elevator.

Table 5: Considerations for Less-Common Elevator Alteration Projects (cont.)

PROJECT EXAMPLE	RESPONSIBLE PARTIES [A]	CONSIDERATIONS [B]
Change or add pit construction	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Structural Engineer • Mechanical Engineer	• The fire rating of the pit construction and the structural integrity of the elevator core must be maintained. • A pit drain is typically not a requirement of the *Building Code* but may be considered in the scope of an Alteration. The *Building Code* requirement may be satisfied by installing a pit water detection system that recalls the Elevating Device if water is detected within the pit. • The requirements and specifications for pit drains are in the *CSA B44-16*, whereas the design requirements are under the *Plumbing Code*. Drainage requirements are in section 2.2.2.5 of the *CSA B44-16*, and in Division B, section 2.4 of the *Plumbing Code*. • Where a new elevator is installed in an existing building, or a modification is made to the pit structure, the Authority Having Jurisdiction should be consulted to determine the requirement for a pit drain.
Install a new elevator in an existing building or change the use of an existing building	• Elevating Device Consulting Engineer • Elevating Device Contractor Engineer • Elevating Device contractor • Architect • Electrical Engineer • Structural Engineer • Mechanical Engineer	• Architects and Engineering Professionals should collaborate to define the scope of the new elevator, including whether it should be located inside or outside the building, or how the change of use of an existing building affects the code compliance and operation of the existing elevator. • Architects and Engineering Professionals should aim to design a fully code-compliant solution. However, existing conditions may make full code compliance challenging, so Architects and Engineering Professionals should discuss challenges and expectations with the owner and the Authority Having Jurisdiction. • For a list of code requirements, refer to the *Joint Professional Practice Guidelines – Design and Installation of Elevating Devices in New Buildings* (AIBC and Engineers and Geoscientists BC 2022).

NOTES:

Abbreviations: FEO = firefighters' emergency operation

[a] For definitions and roles of responsible professionals, see Section 2.1 Defined Terms and Section 4 Roles and Responsibilities.

[b] The title of the following code was abbreviated in this table:
CSA B44-16 = ASME 17.1-2016/CSA B44-16, Safety Code for Elevators and Escalators

5.5 MAINTENANCE CONSIDERATIONS

The owner of the Elevating Device is required by provincial legislation to have the Elevating Device maintained by a qualified professional, as determined by Technical Safety BC.

These requirements are subject to change with the adoption of the *CSA B44-16*, *Safety Code for Elevators and Escalators* and in accordance with the Technical Safety BC information bulletin titled *Amendments to the Elevating Devices Safety Regulation and Adoption of ASME A17.1-16/CSA B44-16 Safety Code for Elevators and Escalators* (Technical Safety BC 2019).

Elevating Devices that have undergone an Alteration must immediately comply with the maintenance control program (MCP) requirements of the *CSA B44-16*. The MCP requirements are new; as such, Technical Safety BC requires that an MCP compliance document be submitted by the Elevating Device contractor for each Elevating Device as it is brought into compliance with the *CSA B44-16*.

The MCP itself is the responsibility of the owner but is typically completed with the assistance of the Elevating Device contractor. Architects and Engineering Professionals involved in Alterations can also assist in coordinating the MCP on the owner's behalf.

An existing MCP compliance document must be reviewed and modified to reflect any Elevating Device Alteration.

5.6 COMMISSIONING, VERIFICATION, AND INTEGRATED TESTING

The *Building Code*, *Plumbing Code*, and *Fire Code* have complementary requirements for the commissioning, verification, and, where applicable, integrated testing requirements for Elevating Devices. The following sections outline those requirements that apply to Alterations of Elevating Devices but are not intended to detract from other applicable provisions (i.e., those not related to commissioning, verification, and integrated testing) of the *Building Code*, *Plumbing Code*, and *Fire Code*.

5.6.1 BUILDING CODE REQUIREMENTS

Article 3.2.9.1. of the *Building Code* states the following:

> "Where fire protection and life safety systems and systems with fire protection and life safety functions are integrated with each other, they shall be tested as a whole in accordance with CAN/ULC-S1001, 'Integrated Systems Testing of Fire Protection and Life Safety Systems,' to verify that they have been properly integrated. (See Note A-3.2.9.1.(1).)"

As such, depending on the scope of the Elevating Device Alteration and the effect on other fire protection and life safety systems, testing in accordance with CAN/ULC-S1001, Integrated Systems Testing of Fire Protection and Life Safety Systems may be required.

It is the responsibility of the CRP to determine the actions necessary to comply with the *Building Code* requirement for testing per CAN/ULC-S1001.

5.6.2 PLUMBING CODE REQUIREMENTS

Article 2.4.3.6. of the *Plumbing Code* states the following:

> "Where a drain is provided in an elevator pit, it shall be connected directly to a sump located outside the elevator pit, and the drain pipe that connects the sump to the drainage system shall have a backwater valve."

As such, where an elevator pit is provided with a drain, it should be designed to accommodate the expected load, and may require the installation of an interceptor to prevent the discharge of waste into a drainage system. The required flow capacity of such a system is typically determined by referring to the *CSA B44-16*, *Safety Code for Elevators and Escalators*.

5.6.3 FIRE CODE REQUIREMENTS

Like the *Building Code*, the *Fire Code* requires integrated testing of life safety systems per CAN/ULC-S1001, Integrated Systems Testing of Fire Protection and Life Safety Systems. See Articles 2.1.3.7. and 6.8.1.1. of the *Fire Code*, and Section 5.6.1 Building Code Requirements of these guidelines for more information.

The owner should ensure that the fire department is made aware of any changes to the function of the Elevating Device after an upgrade has taken place. Changes should be identified in a revised fire safety plan and submitted to the local fire department for review and acceptance. The fire safety plan, as required by Article 2.8.2.1. of the *Fire Code*, should include the integrated system testing procedure that was conducted and documented during construction of the Alteration.

6. Professional Registration & Education, Training, and Experience

6.1 PROFESSIONAL REGISTRATION

Alterations of Elevating Devices in existing buildings that fall within the practices of architecture and professional engineering must be done by appropriately registered and experienced Architects and Engineering Professionals, respectively.

Engineering Professionals have met minimum education, experience, and character requirements for admission to their profession. However, the educational and experience requirements for professional registration do not necessarily constitute an appropriate combination of education and experience for professional services related to Alterations of Elevating Devices in existing buildings. Professional registration alone does not automatically qualify an Engineering Professional to take professional responsibility for all types and levels of professional services in this professional activity.

It is the responsibility of Architects and Engineering Professionals to determine whether they are qualified by training and/or experience to undertake and accept responsibility for carrying out professional services related to Alterations of Elevating Devices in existing buildings.

6.2 EDUCATION, TRAINING, AND EXPERIENCE

Architects and Engineering Professionals may undertake and accept responsibility for professional assignments only when qualified by education, training, or experience, according to the *Code of Ethics* and Professional Conduct of the Architectural Institute of BC (AIBC) or the *Code of Ethics* of Engineers and Geoscientists BC, respectively.

Appropriate qualifications for Architects and Engineering Professionals must include core competencies that are considered basic and fundamental to the provision of services in their respective disciplines. These core competencies include theoretical and academic knowledge as well as practical experience as described in these guidelines.

The level of education, training, and experience required of Architects and Engineering Professionals must be adequate for the complexity of the project. This competency includes being able to apply informed and professional judgment where risk assessment is required, including by:

- identifying risks and the benefits of alternatives;
- assessing the consequences of the selection of alternatives, decisions, and actions;
- assessing the relative costs of various acceptable alternatives; and
- considering the application and implication of local construction practices.

6.2.1 EDUCATION

Architects and Engineering Professionals must have appropriate theoretical and technical knowledge, gained through education and continuing education, related to the Alteration of Elevating Devices in existing buildings. As it relates to the various disciplines, some examples of required knowledge include that of:

- specific *Building Code* requirements for Elevating Devices;
- specific requirements of the *CSA B44-16*, *Safety Code for Elevators and Escalators* and the *Elevating Devices Safety Regulation* of the *Safety Standards Act* for Elevating Devices; and
- specific *BC Fire Code* and *Canadian Electrical Code* requirements for Elevating Devices.

6.2.2 CONTINUING EDUCATION

In keeping with professional standards set by both professions, Architects and Engineering Professionals must remain current with evolving topics through continuing education. This may include:

- acquiring specific training in the use of software tools;
- attending courses, workshops, seminars, webinars, technical talks, and conferences;
- reading texts and periodicals;
- attending training sessions and/or reading technical documentation and information published by manufacturers; and
- engaging in demonstrable self-study.

7. Quality Management in Professional Practice for Engineering Professionals

7.1 ENGINEERS AND GEOSCIENTISTS BC QUALITY MANAGEMENT REQUIREMENTS

Engineering Professionals must adhere to applicable quality management requirements during all phases of the work, in accordance with the Engineers and Geoscientists BC Bylaws and quality management standards.

To meet the intent of the quality management requirements, Engineering Professionals must establish, maintain, and follow documented quality management policies and procedures for the following activities:

- Use of relevant professional practice guidelines
- Authentication of professional documents by application of the professional seal
- Direct supervision of delegated professional engineering activities
- Retention of complete project documentation
- Regular, documented checks using a written quality control process
- Documented field reviews of engineering designs and/or recommendations during implementation or construction
- Where applicable, documented independent review of structural designs prior to construction
- Where applicable, documented independent review of high-risk professional activities or work prior to implementation or construction

Engineering Professionals employed by a registrant firm are required to follow the quality management policies and procedures implemented by the registrant firm as per the Engineers and Geoscientists BC's permit to practice program.

7.1.1 USE OF PROFESSIONAL PRACTICE GUIDELINES

Engineering Professionals are required to comply with the intent of any applicable professional practice guidelines related to the engineering work they undertake. As such, Engineering Professionals must implement and follow documented procedures to ensure they stay informed of, knowledgeable about, and meet the intent of professional practice guidelines that are relevant to their professional activities or services. These procedures should include periodic checks of the Engineers and Geoscientists BC website to ensure that the latest version of available guidance is being used. For more information, refer to the *Quality Management Guides – Guide to the Standard for the Use of Professional Practice Guidelines* (Engineers and Geoscientists BC 2023a), which also contains guidance for how an Engineering Professional can appropriately depart from the guidance provided in professional practice guidelines.

7.1.2 AUTHENTICATING DOCUMENTS

Engineering Professionals are required to authenticate (seal with signature and date) all documents, including electronic files, that they prepare or deliver in their professional capacity to others who will rely on the information contained in them. This applies to documents that Engineering Professionals have personally prepared and those that others have prepared under their direct supervision. In addition, any document that is authenticated by an individual Engineering Professional must also have a permit to practice number visibly applied to the document. A permit to practice number is a unique number that a registrant firm receives when they obtain a permit to practice engineering in BC.

Failure to appropriately authenticate and apply the permit to practice number to documents is a breach of the Engineers and Geoscientists BC Bylaws.

Because professional involvement and responsibilities for the Alteration of Elevating Devices varies from project to project, and permit requirements from Authorities Having Jurisdiction and Technical Safety BC also vary, there is often confusion about which documents related to the Alteration of Elevating Devices require authenticating, and by whom.

Regardless of whether a building permit is required by the Authority Having Jurisdiction, or a "sealed [authenticated] drawing" is required by Technical Safety BC, Registered Professionals (RPs) are required to authenticate all documents prepared in their professional capacity. This requirement exists for RPs providing services either as a Registered Professional of Record (RPR) or as a Supporting Registered Professional (SRP); see Section 5.2.2 Letters of Assurance of these guidelines for guidance on authenticating accountability documents.

For more information, refer to the *Quality Management Guides – Guide to the Standard for the Authentication of Documents* (Engineers and Geoscientists BC 2023b).

7.1.3 DIRECT SUPERVISION

Engineering Professionals are required to directly supervise any engineering work they delegate. When working under the direct supervision of an Engineering Professional, an individual may assist in performing engineering work, but may not assume responsibility for it. Engineering Professionals who are professional licensees (engineering) may only directly supervise work within the scope of their licence.

When determining which aspects of the work may be appropriately delegated using the principle of direct supervision, the Engineering Professional having ultimate responsibility for that work should consider:

- the complexity of the project and the nature of the risks associated with the work;
- the training and experience of individuals to whom the work is delegated; and
- the amount of instruction, supervision, and review required.

Careful consideration must be given to delegating field reviews. Due to the complex nature of field reviews, Engineering Professionals with overall responsibility should exercise judgment when relying on delegated field observations, and should conduct a sufficient level of review to have confidence in the quality and accuracy of the field observations.

When delegating field review activities, Engineering Professionals must document the field review instructions given to a subordinate. (See Section 7.1.6 Documented Field Reviews During Implementation or Construction)

For more information, refer to the *Quality Management Guides – Guide to the Standard for Direct Supervision* (Engineers and Geoscientists BC 2023c).

7.1.4 RETENTION OF PROJECT DOCUMENTATION

Engineering Professionals are required to establish and maintain documented quality management processes to retain complete project documentation for a minimum of 10 years after the completion of a project or 10 years after an engineering document is no longer in use.

These obligations apply to Engineering Professionals in all sectors. Project documentation in this context includes documentation related to any ongoing engineering work, which may not have a discrete start and end, and may occur in any sector.

Many Engineering Professionals are employed by firms, which ultimately own the project documentation. Engineering Professionals are considered compliant with this quality management requirement when reasonable steps are taken to confirm that (1) a complete set of project documentation is retained by the organizations that employ them, using means and methods consistent with the Engineers and Geoscientists BC Bylaws and quality management standards, and (2) they consistently adhere to the documented policies and procedures of their organizations while employed there.

For more information, refer to the *Quality Management Guides – Guide to the Standard for Retention of Project Documentation* (Engineers and Geoscientists BC 2023d).

7.1.5 DOCUMENTED CHECKS OF ENGINEERING AND GEOSCIENCE WORK

Engineering Professionals are required to perform a documented quality checking process of engineering work, appropriate to the risk associated with that work. All Engineering Professionals must meet this quality management requirement.

The checking process should be comprehensive and address all stages of the execution of the engineering work. This process would normally involve an internal check by another Engineering Professional within the same organization. Where an appropriate internal checker is not available, an external checker (i.e., one outside the organization) must be engaged. In some instances, self-checking may be appropriate. Where internal, external, or self-checking has been carried out, the details of the check must be documented. The documented quality checking process must include checks of all professional deliverables before being finalized and delivered.

Engineering Professionals are responsible for ensuring that the checks being performed are appropriate to the level of risk associated with the item being checked. Considerations for the level of checking should include:

- the type of item being checked;
- the complexity of the subject matter and underlying conditions related to the item;
- the quality and reliability of associated background information, field data, and elements at risk; and
- the Engineering Professional’s training and experience.

As determined by the Engineering Professional, the individual doing the checking must:

- have current expertise in the discipline of the type of work being checked;
- be sufficiently experienced and have the required knowledge to identify the elements to be checked;
- be objective and diligent in recording observations; and
- understand the checking process and input requirements.

For more information, refer to the *Quality Management Guides – Guide to the Standard for Documented Checks of Engineering and Geoscience Work* (Engineers and Geoscientists BC 2023e).

7.1.6 DOCUMENTED FIELD REVIEWS DURING IMPLEMENTATION OR CONSTRUCTION

Field reviews are reviews conducted at the site of the construction or implementation of the engineering work. They are carried out by an Engineering Professional or a subordinate acting under the Engineering Professional's direct supervision (see Section 7.1.3 Direct Supervision).

Field reviews enable the Engineering Professional to ascertain whether the construction or implementation of the work substantially complies in all material respects with the engineering concepts or intent reflected in the engineering documents prepared for the work.

For more information, refer to the *Quality Management Guides – Guide to the Standard for Documented Field Reviews During Implementation or Construction* (Engineers and Geoscientists BC 2023f).

7.1.7 DOCUMENTED INDEPENDENT REVIEW OF STRUCTURAL DESIGNS

Engineering Professionals developing structural designs are required to engage an independent review of their structural designs. An independent review is a documented evaluation of the structural design concept, details, and documentation based on a qualitative examination of the substantially complete structural design documents, which occurs before those documents are issued for construction or implementation. It is carried out by an experienced Engineering Professional qualified to practice structural engineering, who has not been involved in preparing the design.

The Professional of Record must conduct a risk assessment after conceptual design and before detailed design to (1) determine the appropriate frequency of the independent review(s), and (2) determine if it is appropriate for the independent reviewer to be employed by the same firm as the Professional of Record, or if the independent reviewer should be employed by a different firm.

The risk assessment may determine that staged reviews are appropriate; however, the final independent review must be completed after checking has been completed and before the documents are issued for construction or implementation. Construction must not proceed on any portion of the structure until an independent review of that portion has been completed.

For more information, refer to the *Quality Management Guides – Guide to the Standard for Documented Independent Review of Structural Designs* (Engineers and Geoscientists BC 2023g).

7.1.8 DOCUMENTED INDEPENDENT REVIEW OF HIGH-RISK PROFESSIONAL ACTIVITIES OR WORK

Engineering Professionals must perform a documented risk assessment prior to initiation of a professional activity or work, to determine if that activity or work is high risk and requires a documented independent review.

If the activities or work are deemed high risk, and an independent review is required, the results of the risk assessment must be used to (1) determine the appropriate frequency of the independent review(s); and (2) determine if it is appropriate for the independent reviewer to be employed by the same firm as the Professional of Record, or if the independent reviewer should be employed by a different firm.

The documented independent review of high-risk professional activities or work must be carried out by an Engineering Professional with appropriate experience in the type and scale of the activity or work being reviewed, who has not been involved in preparing the design.

The documented independent review must occur prior to implementation or construction; that is, it must occur before the professional activity or work is submitted to those who will be relying on it.

For more information, refer to the *Quality Management Guides – Guide to the Standard for Documented Independent Review of High-Risk Professional Activities or Work* (Engineers and Geoscientists BC 2023h).

7.2 OTHER QUALITY MANAGEMENT REQUIREMENTS

Engineering Professionals must also be aware of any additional quality management requirements from other sources that are relevant to their work, which may include, but are not limited to:

- legislation and regulations at the local, regional, provincial, and federal levels;
- policies of Authorities Having Jurisdiction at the local, regional, provincial, and federal levels;
- agreements and service contracts between clients or owners and Engineering Professionals or their firms; and/or
- standards for engineering firms, particularly those that apply to quality management system certification, such as the ISO 9000 family.

Engineering Professionals should assess any areas of overlap between the Engineers and Geoscientists BC quality management requirements and the requirements of other applicable sources. If the requirements of different sources overlap, Engineering Professionals should attempt to meet the complete intent of all requirements.

Where there are conflicts between requirements, Engineering Professionals should negotiate changes or waivers to any contractual or organizational requirements that may conflict with requirements of legislation, regulations, or the Engineers and Geoscientists BC *Code of Ethics*. Generally, no contractual obligation or organizational policy that may apply to an Engineering Professional will provide justification or excuse for breach of any of the Engineering Professional's obligations under any legislation, regulation, or the Engineers and Geoscientists BC *Code of Ethics*.

Where such conflicts arise and cannot be resolved, Engineering Professionals should consider seeking legal advice from their own legal advisers on their legal rights and obligations in the circumstances of the conflict, and they may also seek practice advice from Engineering and Geoscientists BC on any related ethical dilemma that they may face in the circumstances.

8. Practice Advice

The Architectural Institute of BC (AIBC) and Engineers and Geoscientists BC provide their registrants and others with assistance addressing inquiries related to professional practice and ethics.

Practice advisors at the AIBC and Engineers and Geoscientists BC can answer questions regarding the intent or application of the professional practice or quality management aspects of these guidelines.

- To contact a practice advisor at the AIBC, email practiceadvice@aibc.ca.
- To contact a practice advisor at Engineers and Geoscientists BC, email practiceadvisor@egbc.ca.

9. References and Related Documents

Documents referenced in these guidelines appear in Section 9.1 Legislation, Section 9.2 References, and Section 9.3 Codes and Standards.

9.1 LEGISLATION

The following legislation is referenced in these guidelines:

Architects Act [RSBC 1996], Chapter 17.

Architects Regulation, B.C. Reg. 33.2023

Engineers and Geoscientists Act [RSBC 1996], Chapter 116.

Engineers and Geoscientists Regulation, B.C. Reg. 14.2021

Professional Governance Act [SBC 2018], Chapter 47.

Safety Standards Act [SBC 2003], Chapter 39.

Safety Standards Act, *Elevating Devices Safety Regulation*, BC Reg. 101//2004.

9.2 REFERENCES

The following documents are referenced in these guidelines:

Architectural Institute of BC (AIBC) and Engineers and Geoscientists BC. 2023. *Joint Professional Practice Guidelines – Design and Installation of Elevating Devices in New Buildings.* Version 3.0. Vancouver and Burnaby, BC: AIBC and Engineers and Geoscientists BC. [accessed: 2023 Aug 15]. https://www.egbc.ca/app/Practice-Resources/Individual-Practice/Guidelines-Advisories.

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Technical Safety BC. 2017. *Request for Variance Form 1076*. [FRM-1076-07 (2017-09-13)]. Vancouver, BC: Technical Safety BC. [accessed: 2023 July 17]. https://legacy.technicalsafetybc.ca/sites/default/files/resource/GEN%20Request%20For%20Variance%20Form%201076.pdf

9.3 CODES AND STANDARDS

The following codes and standards are referenced in these guidelines.

ASHRAE 62, Ventilation for Acceptable Indoor Air Quality.

ASME A17.1-2016/CSA B44-16, *Safety Code for Elevators and Escalators*.

BC Building and Safety Standards Branch. *BC Building Code 2018*. [accessed: 2023 July 17]. http://www.bccodes.ca/building-code.html.

BC Building and Safety Standards Branch. *BC Plumbing Code 2018*. [accessed: 2023 July 17]. http://www.bccodes.ca/plumbing-code.html.

BC Building and Safety Standards Branch. *BC Fire Code 2018*. [accessed: 2023 July 17]. http://www.bccodes.ca/fire-code.html.

CAN/CSA-C282, Emergency Electrical Power Supply for Buildings.

CAN/CSA-Z32, Electrical Safety and Essential Electrical Systems in Health Care Facilities.

CAN/ULC-S101, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

CAN/ULC-S104, Standard Method for Fire Tests of Door Assemblies.

CAN/ULC-S115, Standard Method of Fire Tests of Firestop Systems.

CAN/ULC-S524, Standard for Installation of Fire Alarm Systems.

CAN/ULC-S1001, Integrated Systems Testing of Fire Protection and Life Safety Systems.

CSA B651, Accessible Design for the Built Environment.

CSA C22.1-18, Canadian Electrical Code, Part I, Safety Standard for Electrical Installations.

City of Vancouver. 2019. *Vancouver Building By-law 2019*. [accessed: 2023 July 17]. http://www.bccodes.ca/vancouver-bylaws.html.

NFPA 13, Standard for the Installation of Sprinkler Systems.

NRC. 2015. *National Building Code of Canada 2015*. [accessed: 2023 July 17]. https://nrc.canada.ca/en/certifications-evaluations-standards/codes-canada/codes-canada-publications/national-building-code-canada-2015.

9.4 DOCUMENT AMENDMENT HISTORY

VERSION NUMBER	PUBLISHED DATE	DESCRIPTION OF CHANGES
1.0	November 15, 2023	Initial version.

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