

# TransLink Building Code Criteria 2020

## Fixed Guideway Rapid Transit Systems





# TransLink

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Rev. 4  
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2020

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## REVISION INDEX

<i>Revision No.</i>	<i>Revision Date</i>	<i>Approved By + Date</i>	<i>Sections Revised</i>	<i>Description of Changes</i>
0	2010-04-06		-	First issue
1	2012-04-11		All	<p>Significant technical changes include:</p> <ul style="list-style-type: none"> <li>▪ Requirements for combustible furnishings and contents added.</li> <li>▪ NFPA 130 requirements for wires and cables restricted to enclosed stations.</li> <li>▪ Clarification of compartmentation requirements.</li> <li>▪ Clarification that a 2-stage FAS is required.</li> <li>▪ Standpipe and hose system requirements clarified.</li> <li>▪ Lighting requirements applicable to exterior portions of the means of egress added.</li> <li>▪ Clarification that means of egress are permitted to provide more than one-half of required egress capacity.</li> <li>▪ Minimum platform width deleted.</li> <li>▪ Fare barrier requirements added.</li> <li>▪ Duplication of NFPA 130 requirements eliminated, required width for platform end gates modified.</li> <li>▪ Left margin keywords added.</li> </ul>
2	2015-12-08	Issued to TransLink	All	<p>Significant technical changes include:</p> <ul style="list-style-type: none"> <li>▪ Annex A material is included below each related requirement for convenience.</li> <li>▪ Intent and fire scenarios sections added to Section 1.2.</li> <li>▪ Expanded Annex A material attached to 'applicable building code' and use of the term throughout the document.</li> <li>▪ 'Open/enclosed' terminology replaced by 'aboveground/underground'.</li> <li>▪ Elaboration on spatial separation and exposure protection requirements.</li> <li>▪ In stations: <ul style="list-style-type: none"> <li>– Revisions to requirements for interior finish and compartmentation.</li> <li>– Clarification of requirements for fire alarm &amp; detection and related systems.</li> <li>– Clarification of intent for fire suppression.</li> <li>– Change to calculation of required platform clearance time.</li> <li>– New 'guard' section added.</li> <li>– Change to requirement for egress doors in proximity to security grilles.</li> <li>– Revisions to tactile warning system requirements.</li> </ul> </li> </ul>
R3	2019-06-14 2019-09-20	INTERIM FINAL	All	<p>Revisions to R2 are indicated by lines in the right margin; double lines indicate revisions since the 2019-06-14 interim issue.</p> <p>Significant technical changes include:</p> <ul style="list-style-type: none"> <li>▪ 'Emergency telephone' and 'emergency equipment cabinet' terminology</li> <li>▪ Egress requirements added for 'normally unoccupied service areas'.</li> <li>▪ Information relative to status of station as fully sprinklered building.</li> <li>▪ Requirements added for CRUs with cooking facilities.</li> <li>▪ Requirements for wires and cables revised to refer to locally applicable codes.</li> <li>▪ Clarification of intent relative to ULC S561 supervision.</li> </ul>

<i>Revision No.</i>	<i>Revision Date</i>	<i>Approved By + Date</i>	<i>Sections Revised</i>	<i>Description of Changes</i>
				<ul style="list-style-type: none"> <li>▪ Clarification of requirements for clean agent system verification.</li> <li>▪ Requirements for annunciation of domestically supplied sprinkler systems.</li> <li>▪ Clarification of station egress calculations and requirements.</li> <li>▪ Clarification of spatial separation and exposure protection requirements for buildings adjacent to the guideway.</li> <li>▪ Consolidation of TL BCC and NFPA 130 guideway egress requirements.</li> <li>▪ Revision to requirements relative to spacing of exits in underground guideways.</li> </ul>
R4	2019-09-30	Issued to TransLink as FINAL.	All	Revised to update NFPA 130 references to the 2020 edition, effective as of August 25, 2019.
R4	2019-12-06	Re-issued to TransLink as FINAL	All	Cross-passage requirements revised for consistency with Canada Line design. Revisions to R3-FINAL are indicated by triple lines in the right margin.

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## PART 1 – INTRODUCTION

### 1.1 GENERAL

#### 1.1.1 Numbering System

Numbering system

(1)\* The numbering system used in the *building code* shall be applicable to this document.

A-1.1.1(1) In referring to criteria in this document, the following is the numbering nomenclature that should be used:

X	Part
X.1	Section
X.1.1	Subsection
X.1.1.1	Article
X.1.1.1(1)	Sentence
X.1.1.1(1)(a)	Clause
X.1.1.1(1)(a)(i)	Subclause

The numbering does not necessarily include all of the divisions named above—i.e., the numbering can move directly from a Section or Subsection to a Sentence where no intermediate headings are required.

#### 1.1.2 Format

Format - order

(1)\* This document is arranged such that general information applicable to *fixed guideway rapid transit systems* is listed in Part 1, criteria applicable to *stations* is in Part 2 and criteria applicable to *guideways* is in Part 3.

A-1.1.2(1) An asterisk beside the criteria number indicates that Annex A supplementary information is included. The Annex A material is not part of the requirements of this document and is included for explanatory purposes only. The supplementary Annex A information is located below the related requirement to facilitate access and indicated by the prefix "A-" and shading.

### 1.2 PURPOSE AND APPLICATION

#### 1.2.1 Purpose

Purpose

(1)\* The purpose of this document is to define requirements for fire protection and life safety for *fixed guideway rapid transit systems* based on the applicable requirements of the *building code* and NFPA 130 Standard for Fixed Guideway Transit and Passenger Rail Systems, 2020 edition (NFPA 130).

	A-1.2.1(1)	<p>The currently applicable building codes in Metro Vancouver are identified in A-1.4(8). Those codes have limitations in terms of application to rapid transit systems—e.g., the building descriptions in Subsection 3.2.2. of those codes: do not consider an assembly occupancy having trains running through the building; do not address guideways, which are an integral part of a rapid transit system; and do not anticipate the level of remote surveillance and control that is required for the safe and efficient operation of rapid transit systems. Therefore, the applicable codes were modified for the original construction of stations in Metro Vancouver by the Vancouver Regional Rapid Transit Building Code Equivalencies document (VRRT BCED) dated October 9, 1984. The VRRT BCED has been revised and re-issued under various titles with the expansion of the rapid transit system network, with this version of the TransLink Building Code Criteria being the most current iteration as of the publication date of this document.</p> <p>Regarding cross-reference to NFPA 130, the intent is that this document refers only to the 2020 edition. (See A-1.4(8) regarding applicable editions for other codes and standards.)</p>
	<b>1.2.2</b>	<b>Intent</b>
Intent	(1)	The <i>rapid transit system</i> shall be designed, constructed, and maintained to protect <i>rapid transit system</i> occupants for the time needed to evacuate or relocate them or to defend such occupants in place during a fire or fire-related emergency.
	<b>1.2.3</b>	<b>Fire Scenarios</b>
Fire event assumption	(1)	The protection methods described in this document shall assume a single fire event from a single fire source.
Fire event assumption	(2)*	For purposes of implementing requirements in this document, a train fire is assumed to be the most significant fire event that can occur in a <i>station</i> or <i>guideway</i> .
	A-1.2.3(2)	Requirements in this document for station and guideway design such as provisions for evacuation and smoke control, are intended to enhance occupant safety in case of a train fire. Fire scenarios other than those associated with the train are addressed through compliance with requirements for fire hardening, compartmentation and fire suppression in this document and in the applicable building code.
	<b>1.3</b>	<b>APPLICATION</b>
	<b>1.3.1</b>	<b>Application</b>
Application	(1)*	Except as provided in this document, the requirements in the current edition of the <i>building code</i> and other applicable codes and standards shall apply to <i>fixed guideway rapid transit systems</i> .
	A-1.3.1(1)	The intended 'current edition' of the building code is the edition in force at the time of application for a Building Permit or Authority to Proceed with Construction (ATPC). Refer also to Sentences 1.4(8), 2.1.1(1) and 3.1.1(1).

### 1.3.2 Alternative Solutions

Supporting documentation (1) Nothing in this document is intended to limit or discourage the use of methods, materials, systems or devices that are equivalent or superior to the requirements herein with respect to fire protection and life safety, provided sufficient data is submitted to the *authority having jurisdiction* to demonstrate such equivalence.

Level of compliance (2) An alternative method, material, system or device that is *approved* as being equivalent as described in Sentence (1) shall be recognized as being in compliance with this document.

### 1.4 DEFINITIONS

(1) *Italicized words and phrases* in this document have the meanings listed below.

Aboveground (2) *Aboveground* means a *station* or *guideway* or portion thereof that is located on or above the surface of the earth.

Alternate means of egress (3) *Alternate means of egress* means an egress route which does not comply with the conventional requirements for means of egress as specified in the *building code* but which will provide an *approved* egress route from the *platform*.

Ancillary room (4)\* *Ancillary room* means a room or space used by transit operations personnel.

A-1.4(4) Examples of ancillary rooms include: multi-purpose rooms, security rooms used by the Transit Police Service, crew rooms, rooms for dispensing rapid transit system information and other similar rooms used for only limited storage of combustible materials.

Approved (5) *Approved* means acceptable to the *authority having jurisdiction*.

Authority having jurisdiction (6)\* *Authority having jurisdiction* means the governmental body, organization, agency or person responsible for enforcing the requirements of this document or designated by that body to perform such a function.

A-1.4(6) The South Coast British Columbia Transportation Authority Act establishes TransLink as the regional transportation authority in Metro Vancouver, responsible for planning, financing and managing most public transit and associated facilities in the region. Accordingly, TransLink is the Authority Having Jurisdiction (AHJ) for design and construction of SkyTrain projects.

Blue Light Station (7)\* *Blue Light Station* means a location along the *guideway*, indicated by a blue light, where emergency service or authorized personnel can disconnect traction power.

A-1.4(7) The NFPA 130 requirement relative to communication associated with a blue light station is specifically omitted per a BCRTC agreement with the local fire department authorities regarding the use of alternative communication strategies for rapid transit systems in Metro Vancouver. (See also requirements related to two-way communication devices in Articles 2.3.3.2 and 3.3.3.1.)

Building code	(8)*	<i>Building code</i> means the locally applicable building code.
	A-1.4(8)	<p>The locally applicable building codes at the time of publication of this document are</p> <p>(a) In Vancouver, the City of Vancouver Building By-Law (2014 edition), and</p> <p>(b) In other regions of Metro Vancouver, the BC Building Code (2018 edition).</p> <p>Where this document refers to other codes and standards that are also referenced in the building code, the applicable edition for such codes and standards is as stipulated in the building code.</p>
	(9)	<i>Detraining</i> means alighting from a train at a <i>platform</i> .
Egress capacity	(10)	<i>Egress capacity</i> means the number of people able to move either from a given area or through a given egress route in a specified period of time expressed as pedestrians per minute.
	(11)	<i>Emergency Equipment Cabinet (EEC)</i> means a cabinet or panel located within <i>station public circulation areas</i> for co-location of emergency equipment that is accessible to the public and emergency responders.
	A-1.4(11)	<p>The intent is for the EECs to be recognizable as such throughout the rapid transit system and to house emergency equipment and devices in central locations throughout station public circulation areas. EECs provided in stations include the following types:</p> <ul style="list-style-type: none"> <li>- EEC Type 1 – One per platform located at the DWA, containing an emergency telephone (ETel) and a portable fire extinguisher, plus a train stop button, a Wayside Monitoring System (WMS) reset switch and a crew telephone (ATel),</li> <li>- EEC Type 3 – One per platform usually located at the non-DWA furniture island, containing an ETel and a portable fire extinguisher, plus a train stop button, and</li> <li>- EEC Type 2 – One per ticketing concourse and at other stations levels that provide egress from the station, located within the fare paid zone and containing an ETel and a portable fire extinguisher, plus a WMS reset switch and an ATel.</li> </ul> <p>Refer also to Article 2.3.3.2 regarding emergency telephones and to Article 2.3.4.4 regarding fire extinguishers. For information regarding Blue Light Stations, refer to Sentence 1.4(7) and Subsection 2.3.8.</p>
	(12)	<i>Emergency Telephone</i> means a subsystem that is part of the fire alarm system, which provides two-way voice communication from the location of the device to the Operations Control Centre and the station Firefighter Command Post.
	A-1.4(12)	Emergency telephones are also referred to as ETels in Annex A material throughout this document and in common usage on the SkyTrain rapid transit system. Refer to Article 2.3.3.2.
Engineering Analysis	(13)	<i>Engineering Analysis</i> means a system analysis that evaluates all of the various factors relative to specific objectives for performance of that system.

	A-1.4(13)	An engineering analysis may require an application for formal acceptance by the AHJ backed by supporting documentation. In the building code, such documentation is referred to as an 'alternative solution'; for rapid transit systems in Metro Vancouver, the documentation may be referred to as a 'Request for Amendment or Exemption (RFAE)'.
Entraining	(14)	<i>Entraining</i> means waiting to board a train at a <i>platform</i> .
Exposing Hazard Face	(15)*	<i>Exposing hazard face</i> means: (a) for buildings, the exposing building face, and (b) for <i>stations</i> , (i) the exterior wall of a train, or (ii) where a <i>station</i> is divided into fire compartments, the exterior wall of a fire compartment that faces one direction.
	A-1.4(15)	For stations, the intent is generally that Subclause (i) refers to exposure from the platform level, whereas Subclause (ii) refers to exposure from the concourse and other levels. Refer also to <b>Figure 1 in Annex A</b> at the end of this document.
Fare-paid area	(16)	<i>Fare-paid area</i> means that portion of a <i>station</i> where public access is intended to be restricted to passengers who have paid a fare or hold a valid pass.
Firefighter Command Post	(17)*	<i>Firefighter Command Post (FCP)</i> means a location at a <i>station</i> or along the <i>guideway</i> where the status of the fire alarm, communications and other emergency systems is displayed and from which the system(s) can be controlled.
	A-1.4(17)	The use of this term is inconsistent across the SkyTrain rapid transit system and differs from the terminology used in NFPA 130. For aboveground portions of the <i>guideway</i> , the emergency coordination location will typically be the FCP at the nearest station but may vary depending on the emergency. For underground portions, the location will normally be the closest FCP/ emergency ventilation system control panel located at an access point to the <i>guideway</i> , typically either an adjacent station, a portal or an exit stair that discharges to grade. For stations, refer also to Article 2.3.1.1.
Fixed guideway rapid transit system	(18)*	<i>Fixed guideway rapid transit system (rapid transit system)</i> means an electrified transportation system used for the mass movement of passengers within a metropolitan area, which operates on a fixed <i>guideway</i> within a dedicated right-of-way and includes the <i>stations</i> , <i>guideway</i> , rolling stock, maintenance and operations facilities and buildings, and power and other systems that facilitate operation of the <i>rapid transit system</i> .
Guideway	(19)*	<i>Guideway</i> means that portion of the <i>fixed guideway rapid transit system</i> within the transit right-of-way that is dedicated for the movement of passenger carrying vehicles as well as appertaining equipment and facilities.
	A-1.4(19)	The guideway includes all appertaining equipment. The term 'guideway' as defined above and as used in this document is intended to replace both 'guideway' and 'trainway' as defined in NFPA 130.
Limiting Distance	(20)*	<i>Limiting distance</i> means the distance from an <i>exposing hazard face</i> to a property line, <i>rapid transit system</i> statutory right-of-way, the edge of the <i>guideway</i> , or the centre line of a street, lane or public thoroughfare, measured at right angles to the <i>exposing hazard face</i> .

	A-1.4(20)	Refer also to <b>Figure 1</b> and <b>Figure 2</b> in <b>Annex A</b> at the end of this document.
Link Load	(21)	<i>Link Load</i> means the number of passengers travelling between two <i>stations</i> on board a train or trains.
Normally unoccupied service areas	(22)	<i>Normally unoccupied service area</i> means a building service support area in which people are not expected to be present on a regular basis.
	A-1.4 (22)	In stations, areas that may be considered under this definition may include: fan rooms and traction power substations. Areas that are routinely visited for maintenance, testing, or inspection would be excluded from this definition. Storage and fuel-fired equipment are not permitted in these locations. Emergency ventilation system plenums and vent shafts are considered 'confined spaces' and addressed under WorkSafe BC regulations.
Operations Control Centre	(23)*	<i>Operations Control Centre (OCC)</i> means the location from which the movement of the <i>rapid transit system</i> passengers and trains is controlled and coordinated and from which communication is maintained with supervisory and operating personnel of the <i>rapid transit system</i> and with participating agencies when required.
	A-1.4(23)	Refer also to Section 2.3 re: monitoring and control of emergency systems and equipment.
Peak direction	(24)	<i>Peak direction</i> means, for each route, the direction of train travel having the largest passenger flow volume based on the sum of the incoming <i>link load</i> plus the <i>entraining</i> load per peak hour.
Platform	(25)	<i>Platform</i> means the area of a <i>station</i> immediately adjacent to a <i>guideway</i> , used primarily for loading and unloading passengers.
Point of safety	(26)*	<i>Point of safety</i> means an exit, an area outside of the <i>station</i> or <i>guideway</i> or an area that is otherwise protected from exposure to a train fire, which has sufficient capacity for the occupant load that may accumulate there during evacuation from the train fire and access to a public thoroughfare.
	A.1.4(26)	Protection from exposure to a train fire is intended to imply that such locations will remain tenable for the anticipated period of evacuation. In open aboveground stations, concourses may be considered as providing such protection, depending on station configuration. In underground stations and guideways, protection may require fire separation and/or emergency ventilation/smoke control conforming to Subsection 2.3.6.
Public circulation area	(27)	<i>Public circulation area</i> means the areas used for the movement of passengers within a <i>station</i> , including stairs, ramps and escalators connecting public areas on different levels of the <i>station</i> , but not including tenant occupancies or exits.
Service room	(28)*	<i>Service room</i> means a room provided in a <i>station</i> to contain equipment associated with <i>station</i> services or facilities required to operate the <i>rapid transit system</i> .

	A-1.4(28)	The definitions for <i>service rooms</i> and <i>service spaces</i> are intended to be equivalent to those stipulated in the building code but expanded to include rooms and spaces for equipment associated with operating the rapid transit system. Examples of such rooms and spaces in stations include: mechanical and electrical rooms, fan rooms and shafts, switch control systems rooms, radio rooms and electronic equipment rooms.
Service space	(29)*	<i>Service space</i> means space provided in a <i>station</i> to facilitate or conceal the installation of <i>station</i> or <i>rapid transit system</i> service facilities such as ducts, pipes, shafts or wires.
	A-1.4(29)	Refer to A-1.4(28).
Station	(30)	<i>Station</i> means a <i>building</i> where passengers can board and alight from trains at a <i>platform</i> .
Tenable	(31)*	<i>Tenable</i> means, in a portion of the <i>rapid transit system</i> , atmospheric conditions that allow for the survivability of occupants during evacuation from a fire emergency.
	A-1.4(31)	Refer also to NFPA 130 Annex B for requirements related to tenable environments.
Tenant occupancy	(32)*	<i>Tenant occupancy</i> means a leased room or space used for commercial or other purposes that are not related to operation of the <i>rapid transit system</i> .
	A-1.4(32)	As described in Subsection 2.1.2 the occupancies anticipated by the requirements in this document are smaller commercial units for passenger use as limited by Sentence 2.1.2(4). Larger units or units for non-passenger use require special consideration as described in Sentence 2.1.2(5). Although the definition refers to these as leased areas, the fire protection measures stipulated for such areas would also apply if a room or space was used for similar purposes by the rapid transit system owner or operator.
Track	(33)	<i>Track</i> means that portion of the <i>guideway</i> on which the vehicles operate.
Train crush load	(34)*	<i>Train crush load</i> means the maximum number of people who can occupy a train.
	A-1.4(34)	The train crush load is determined by multiplying the crush capacity per car by the maximum number of cars per train in the peak period. The crush capacity per car is the sum of the seating capacity or number of seats in the car, and the standing capacity or 0.2 m <sup>2</sup> per person for the standing area measured 300 mm in front of the seats.
Train headway	(35)*	<i>Train headway</i> means the interval of time between the arrival of consecutive trains at the <i>platform</i> .
	A-1.4(35)	The train headway used in calculating the occupant load can have a significant impact on the calculation outcome—i.e., a longer headway will result in more accumulation time and thus a higher output value, whereas the reverse is true for shorter headways. Therefore, the train headway interval chosen should accurately represent the average headway interval during the peak hour for the design year and should be consistent with the headway anticipated in ridership data used in the calculations.



Underground (36)

*Underground* means located beneath the surface of the earth or water.

## PART 2 – STATIONS

### 2.1 GENERAL

#### 2.1.1 Application

Building code applicability

(1)\* Except as provided in this Part, applicable requirements in the *building code* shall apply to *stations*.

A-2.1.1(1) The overall intent of requirements listed in subsequent sections of this Part is to provide a level of fire protection and life safety for stations that is equivalent to the level provided for a fully sprinklered building—e.g., where Subsection 2.3.4 exempts specific station areas from the provision of automatic sprinklering, Subsections 2.2.1 and 2.2.2 stipulate construction and compartmentation requirements that limit fire hazards in the exempted areas and Subsection 2.3.6 protects those areas from potential impacts associated with train fires.

Applicability of this Part

(2) The requirements of this Part apply only to *stations*.

Other structures

(3) Where stipulated, the requirements of this Part shall also apply to other structures associated with the *rapid transit system*.

#### 2.1.2 Use and Occupancy

Primary use is for passengers

(1) The primary use of a *station* shall be for transit passengers who normally stay in a *station* for only the period of time that is necessary to wait for and enter a departing transit vehicle or to exit the *station* after arriving on an incoming transit vehicle.

Primary occupancy is public circulation areas

(2) The primary occupancy in a *station* shall be the *public circulation areas* required for the movement of passengers between the street and *platform* areas or between *platforms* within the *station* and including areas for issuing and collecting tickets and fares.

Other rapid transit system uses

(3) A *station* may include *ancillary rooms* and *service rooms*.

Business and commercial uses

(4)\* *Tenant occupancies* are permitted in *stations* provided,  
 (a) The occupancy is intended only for the incidental use of *rapid transit system* passengers,  
 (b) The use is limited to those listed in Table 2.1.2,  
 (c) The occupancy is not located on the *platform*,  
 (d) The occupancy is located so as to maintain the required capacity of means of egress routes serving the *station*, and  
 (e) The occupancy complies with the requirements of Subsection 2.2.2.

**TABLE 2.1.2.**  
**Tenant Occupancies Permitted in Stations**  
 Forming Part of Sentence 2.1.2(4)

Classification	Requirements / Examples
Business	Units and kiosks involving short term services such as ticket sales and banking machines
Commercial – retail	Units selling convenience items such as candy, magazines, newspapers, books and flowers
Commercial – food & beverage	Units and kiosks serving take-away items
Miscellaneous	Bike storage rooms

Commercial occupancies involving cooking

A-2.1.2(4) For clauses (d) & (e), moveable displays and goods located in the public circulation area outside the perimeter walls of a commercial unit are prohibited except where the level of protection for such displays complies with the protection that is otherwise required for the occupancy and where the displays do not interfere with the required width of the means of egress.

(5) Where commercial occupancies include cooking equipment that is used in processes producing grease-laden vapours, such occupancies shall, in addition to the *building code* requirements, comply with the following:

- (a) Cooking equipment shall be installed with floor markers to indicate the correct location relative to hoods and vents,
- (b) Ducts serving the cooking equipment shall have no runs through *station public circulation areas*,
- (c) Ducts serving the cooking equipment shall exhaust directly to the exterior of the *station* at a location that
  - (i) Limits the potential migration of contaminants to *public circulation areas* and public waiting areas adjacent to the *station*, and
  - (ii) Will not impact *station* and *guideway* smoke control systems and strategy.
- (d) Activation of fire suppression systems for commercial cooking equipment shall be annunciated at the locations described in Article 2.3.2.3.

A-2.1.2(5) Refer also to City of Vancouver BULLETIN 2007-005-BU/PL/EL/EV/AD for best practices regarding Kitchen Ventilation Systems. Commercial occupancies that include cooking as described in Sentence 2.1.4(5) are discouraged in underground stations due in part to depth versus venting requirements.

For clause (a), this refers to requirements in NFPA 96 (Section 12.1.2.3.1. in the 2008 edition). The indicators should be designed to provide positive feedback that the location is accurate—e.g., through using ‘cupped’ receptors. Clause (b) is applicable for duct runs in related commercial units for all new stations. In existing stations, compliance with Clause (b) shall be evaluated by TransLink on a case-by-case basis. Routing of ducts and location of hatches should facilitate access for service and maintenance. For clause (c), odours are a primary consideration; the use of an ‘ecology unit’ as described in the above-referenced City of Vancouver Bulletin is preferred, which will substantially reduce odours provided the unit is maintained appropriately. ‘Public waiting areas adjacent to the station’ refers to areas that are within close proximity to the station where people may need to congregate, such as bus waiting zones or entrances to crosswalks.

Other uses and occupancy (6) Special consideration beyond these guidelines shall be required where uses and occupancies other than those described above are included within or adjacent to a *station*, or where the *station* is integrated into another building.

## 2.2 CONSTRUCTION REQUIREMENTS

### 2.2.1 Construction and Structural Fire Protection

#### 2.2.1.1 Structural Fire Protection

Fire-resistance of structure (1)\* Walls, partitions, floor and roof assemblies in a *station* shall be constructed in conformance with Table 2.2.1.1.

**Table 2.2.1.1.**  
**Structural Fire-Resistance of Loadbearing Assemblies**  
Forming Part of Sentence 2.2.1.1(1)

Configuration	Required Fire-Resistance Rating	
	Horizontal Element	Supporting Assembly
(a) <i>Aboveground stations</i> : (i) Roof assemblies with no occupancy above (ii) Floor-ceiling assemblies <sup>(1)</sup>	None 1-hour <sup>(3)(4)</sup>	None 1-hour <sup>(3)(4)</sup>
(b) <i>Underground stations</i> : (i) <i>Aboveground</i> roof assemblies with no occupancy above <sup>(2)</sup> (ii) Floor-ceiling assemblies <sup>(1)</sup>	None 2-hour <sup>(3)</sup>	None 2-hour <sup>(3)</sup>

**Notes to Table 2.2.1.1.**

- (1) Refers to horizontal structural assemblies over occupied floor areas.
- (2) Refers to roof assemblies over headhouses serving underground stations. Where other occupancies are above the headhouse roof, refer to requirements in Subsection 2.2.3.
- (3) Not required to be a fire separation, except where required by Subsection 2.2.2 for occupancies within the *station*.
- (4) Except a fire-resistance rating is not required for the assembly over and supporting areas used only as *public circulation areas*.

A-2.2.1.1(1) Note (3) to Table 2.2.1.1 is intended to permit interconnection of public areas on different levels in a *station*. (Refer also to Sentence 2.2.2(2).)

#### 2.2.1.2 Construction Materials

Noncombustible construction (1) Except as permitted in Sentence (2), *stations* shall be of noncombustible construction.

Heavy timber construction (2)\* Heavy timber construction is permitted for  
(a) In an *aboveground station* or an *aboveground* portion of a *station*, a roof assembly with no occupancy above and structural members supporting such a roof assembly, and  
(b) Walkways conforming to the requirements of Sentence 2.2.3(5).

	A-2.2.1.2(2)	Clause (2)(a) is intended to apply to roof assemblies over station platform and concourse areas that are entirely aboveground, provided there are no occupied areas above the heavy timber assembly. Site-specific engineering analysis is required for other situations.
Interior finishes	(3)	Interior finishes in a <i>station</i> shall comply with the requirements of the <i>building code</i> except (a) the restrictions applicable to exits shall apply to <i>public circulation areas</i> in an <i>underground station</i> , and (b) the restrictions applicable to corridors in sprinklered buildings shall apply to <i>public circulation areas</i> in an <i>aboveground station</i> .
	<b>2.2.1.3</b>	<b>Combustible Furnishings and Contents.</b>
Fire hazard analysis	(1)*	Where combustible furnishings or contents not specifically addressed in this standard are installed in a <i>station</i> , a fire hazard analysis shall be conducted to determine that the level of occupant fire safety is not adversely affected by the furnishings and contents.
	A-2.2.1.3(1)	The fire hazard analysis should determine that the fire does not propagate beyond the component of fire origin, and that a level of fire safety is provided within the station commensurate with this standard. Computer modelling, material fire testing, or full-scale fire testing should be conducted, as appropriate, to assess fire performance in potential fire scenarios
Rubbish containers	(2)	Waste containers shall be manufactured of noncombustible materials.
Seating	(3)	Seating furniture in <i>stations</i> shall be noncombustible, or it shall have limited rates of heat release when tested in accordance with ASTM E 1537, as follows: (a) The peak rate of heat release for the single seating furniture item shall not exceed 80 kW, and (b) The total energy released by the single seating furniture item during the first 10 minutes of the test shall not exceed 25 MJ.
	<b>2.2.1.4</b>	<b>Wires and Cables</b>
Reference to building code	(1)	Except as required in Sentence (2), wires and cables in <i>stations</i> shall comply with the requirements in Subsection 3.1.5 of the <i>building code</i> for regulating the flammability characteristics of wires and cables installed in buildings required to be of non-combustible construction.
Underground stations	(2)	For <i>underground stations</i> , where an FT4 rating is stipulated in accordance with Sentence (1), those requirements shall be modified to require FT4-ST1 rating in accordance with CSA C22.2 No. 2556, "Test Methods for Electrical Wires and Cables."
Protection for electrical conductors	(3)	Wires and cables in <i>stations</i> shall comply with the requirements in Article 3.2.7.10 of the <i>building code</i> for protection of electrical conductors in buildings regulated by Article 3.2.6.1.

## 2.2.2 \* Compartmentation and Fire Separation

	A-2.2.2	These requirements are in addition to requirements of the building code with regard to fire separation of janitor's rooms, storage rooms, and other areas not mentioned herein.
Public circulation area fire separation	(1)	Except as otherwise permitted in this Subsection, <i>public circulation areas</i> are required to be protected by fire separation from adjacent <i>station</i> areas in accordance with the requirements of this Subsection.
Public circulation area interconnection	(2)*	<i>Public circulation areas</i> on and connecting different levels of a <i>station</i> , are permitted to be interconnected, provided the design achieves fire protection and life safety as otherwise required by this document.
	A-2.2.2(2)	The intent of this requirement is to permit interconnected floor spaces that provide continuous and uninterrupted pedestrian flow through the station. Such design needs to be supported by provisions for alternate egress that comply with the requirements of Subsection 2.4.2 for at least two separate and independent means of egress from the platform to a point of safety and, in underground stations, by smoke control that maintains tenability for egress routes as required by NFPA 130 Chapter 7.
Ancillary rooms	(3)*	Except as provided in Sentence (4), <i>ancillary rooms</i> and washrooms shall be separated from the remainder of the <i>station</i> by a fire separation not required to have a fire-resistance rating.
	A-2.2.2(3)	As stated in the supplementary information attached to the definition for <i>ancillary rooms</i> , this article is intended to apply to rooms which are used for only limited and incidental storage of combustible materials. Where more than incidental storage is intended, the room should be protected in accordance with the requirements of the building code for storage rooms.
Service rooms	(4)*	Except as required in Sentence (5), <i>service rooms</i> shall be separated from the remainder of the <i>station</i> and from adjacent <i>underground guideways</i> by a fire separation having a 1-hour fire-resistance rating.
	A-2.2.2(4)	The intent is that the requirement for 1-hour fire separation is applicable for service rooms that are protected by either automatic sprinklering as described Article 2.3.4.1 or by other automatic fire suppression systems as described in Article 2.3.4.2. (Refer also to A-2.2.2(8).) For electrical vaults, the requirements in this Sentence are not intended to supersede more stringent fire separation ratings required by the building code.
Unsprinklered service rooms	(5)	The fire separation required in Sentence (5) shall provide a 2-hour fire-resistance rating where the occupancy is unsprinklered in accordance with Sentence 2.3.4.1(3).
Service rooms	(6)*	Unsprinklered <i>service rooms</i> shall not open directly to <i>public circulation areas</i> .
	A-2.2.2(6)	For unsprinklered service rooms, this will generally require a vestibule. Exceptions would be on a site-specific basis. The fire separation required between the service room and the public circulation area may be provided between the room and the vestibule or between the vestibule and the public circulation area.

Grouped rooms	(7)*	Fire separations as required by Sentences (3) and (4) are not required between adjacent <i>service rooms</i> and <i>ancillary rooms</i> where the adjacent rooms are sprinklered.
	A-2.2.2(7)	The intent is to permit service and ancillary rooms to be grouped within a common fire separation between the group of rooms and adjacent public circulation areas. This Sentence does not exempt the fire separation required by Sentence 2.2.2(5) for unsprinklered electrical rooms (2-hours) and for rooms protected by automatic fire suppression systems as described in Article 2.3.4.2 (1-hour).
Tenant occupancies	(8)	Except as provided in Sentences (10) and (11), <i>tenant occupancies</i> shall be fire separated from the remainder of the <i>station</i> by a fire separation having a 1-hour fire-resistance rating.
Tenant occupancies	(9)	Where the <i>tenant occupancy</i> is located in an <i>aboveground station</i> or an <i>aboveground</i> portion of a <i>station</i> , a fire separation not required to have a fire-resistance rating is permitted between the occupancy and an adjacent <i>public circulation area</i> .
Tenant occupancies	(10)	Where the <i>tenant occupancy</i> is equipped with a smoke exhaust system that is designed to maintain a <i>tenable</i> environment in the adjacent <i>public circulation area</i> for the period of evacuation, a fire separation is not required between the occupancy and an adjacent <i>public circulation area</i> .
Smoke-actuated dampers required	(11)	For <i>underground stations</i> , where fire dampers are required by the <i>building code</i> and where the opening in the fire separation or duct discharges into a <i>public circulation area</i> , the damper is required to be released upon activation of a smoke detector connected to the <i>station</i> fire alarm system.
	<b>2.2.3</b>	<b>Spatial Separation and Exposure Protection</b>
Engineering analysis	(1)*	Except as permitted in this Subsection, spatial separation and exposure protection requirements between a <i>station</i> or a train in a <i>station</i> and an adjacent building shall be determined based on engineering analysis that considers site-specific hazards and fire risks.
	A-2.2.3(1)	Where requirements are established on a site-specific basis, exposure protection requirements shall be evaluated based on such factors as the extent of openings, fire-resistance rating and combustibility of exposing roof/wall assemblies and reliability/type of automatic fire suppression systems in the exposing portions of the station. For exposure from an aboveground station to an adjacent building—given the requirements for non-combustible construction, restrictions on interior finish and furnishings in public areas, as well as suppression and fire separation of subsidiary occupancies—the most significant hazard to be evaluated is the transit vehicle
Aboveground stations	(2)*	For <i>aboveground station</i> floor areas that are open to the outdoors (a) where the <i>limiting distance</i> for an <i>exposing hazard face</i> is equal to or greater than 3 m, exposure protection from the <i>exposing hazard face</i> to the adjacent property is not required, and (b) where the <i>limiting distance</i> for an <i>exposing hazard face</i> is less than 3 m, and the exposing hazard is not a train, exposure protection for the <i>exposing hazard face</i> shall be determined in accordance with the <i>building code</i> .

	A-2.2.3(2)	Refer also to <b>Figure 1 in Annex A</b> at the end of this document.
Underground stations	(3)	Exposure protection for <i>underground stations</i> shall comply with the requirements of the <i>building code</i> for construction and unprotected openings.
Walkways between buildings	(4)*	<i>Stations</i> connected to other <i>buildings</i> by a walkway are not required to be fire separated from the connecting walkway where (a) the walkway is constructed as an open air storey in accordance with the <i>building code</i> , and (b) the walkway is of noncombustible construction.
	A-2.2.3(4)	The requirements in this Sentence refer to fire separation requirements at the station end of the walkway. Requirements for fire separation between the walkway and the other buildings are to be determined in accordance with the building code.
Heavy timber construction for walkways	(5)	The walkway in Sentence (4) is permitted to be of heavy timber construction if, in addition to the requirements of Clause (4)(a), (a) not less than 50% of the area of any perimeter wall enclosing the walkway is open to the outdoors, and (b) the walkway does not serve as a required means of egress from the <i>station</i> .
Underground stations	(6)*	Where an <i>underground station</i> is connected to another building, a smoke control system designed in accordance with the requirements of Subsection 2.3.6 shall satisfy requirements in the <i>building code</i> for limiting the movement of contaminated air from a train fire to the adjacent building.
	A-2.2.3(6)	This Sentence refers to additional requirements for high buildings in the building code (Article 3.2.6.3. in BCBC 2018/VBBL 2014). Where it is necessary to consider other potential fire sources, measures should be determined based on engineering analysis.
	<b>2.3</b>	<b>FIRE PROTECTION &amp; LIFE SAFETY SYSTEMS</b>
	<b>2.3.1</b>	<b>Fire Department Access</b>
	<b>2.3.1.1</b>	<b>Access Facilities</b>
Fire department response point	(1)*	A-2.3.1.1(1) Where two entrances are provided for the station, the municipal fire department should be consulted to determine whether separate designated response points are required at each entrance, and if so, the equipment to be provided at each response point. Where fire alarm annunciation is required at a second response point, provision of a 'remote' annunciator at the second location is preferred.



Fire department response equipment	<p>(2)* The following equipment shall be provided in the vicinity of the response point described in Sentence (1)</p> <ul style="list-style-type: none"> <li>(a) a <i>Firefighter Command Post</i> conforming to the requirements of Subsection 2.3.2. and located to be readily accessible to firefighters entering the building,</li> <li>(b)</li> <li>(c) fire department connections for the sprinkler and standpipe and hose systems required by Articles 2.3.4.1 and 2.3.4.3, and</li> <li>(d) a municipal fire hydrant located in accordance with the requirements of the <i>building code</i>.</li> </ul>
	<p>A-2.3.1.1(2)</p>
	<p><b>2.3.2 Fire Alarm and Detection</b></p>
	<p><b>2.3.2.1 Application</b></p>
2-stage fire alarm system	<p>(1)* A 2-stage fire alarm system conforming to the requirements of the <i>building code</i>, except as modified by this Subsection, shall be installed in a <i>station</i>.</p>
	<p>A-2.3.2.1(1) See also A-2.3.2.3(1) regarding central supervision of the fire alarm system. In accordance with principles of the building code for fire alarm systems that are monitored in a continuously staffed location (3.2.4.18.(1)(b) in BCBC 2018, 3.2.4.19.(1)(b) VBBL 2014), first stage alert signals are permitted to be silent in station public areas when the fire alarm system is monitored by the OCC. It is intended that the 1<sup>st</sup> stage alert will initiate the required sequences to release ancillary devices such as door hold-open devices and shut down of HVAC fans.</p>
PA generated alarm signals	<p>(2)* For <i>stations</i>, alert and alarm signals as required by the <i>building code</i> are permitted to be generated by a public address system conforming to Sentence 2.3.3.1(4).</p>
	<p>A-2.3.2.1(2) This provision is consistent with the building code (3.2.4.17.(2) in BCBC 2018, 3.2.4.18.(2) in VBBL 2014).</p>
	<p><b>2.3.2.2 Fire Detection</b></p>
Location of fire detectors	<p>(1)* Fire detectors connected to the <i>station</i> fire alarm system shall be installed in every <i>ancillary room</i>, <i>service room</i> and <i>tenant occupancy</i> except where separate annunciation for each room is provided by an automatic fire protection system installed in such rooms and areas, as described in Articles 2.3.4.1 or 2.3.4.2.</p>

	A-2.3.2.2(1)	Refer also to the building code (3.2.4.10.(2) in BCBC 2018, 3.2.4.11.(2) in VBBL 2014) for additional requirements related to service rooms and service spaces. Refer also to the building code for requirements for exit stair shafts (Clause 3.2.4.11.(1)(e) in BCBC 2018, 3.2.4.12.(1)(e) in VBBL 2014).
Detectors for AC electrical rooms	(2)*	<i>Smoke detectors</i> shall be installed in AC electrical rooms which are not sprinklered.
Detectors for domestically supplied sprinklers	(3)*	Fire detectors connected to the <i>station</i> fire alarm system shall be installed: (a) in every room protected by the domestically supplied sprinkler system described in Sentence 2.3.4.1(4), and (b) in each room protected by a sprinkler system that provides zoned annunciation of groups of rooms.
	A-2.3.2.2(3)	The intent is to provide annunciation via the fire alarm system where such annunciation would not otherwise be provided by the domestically-supplied or zoned system. Provision of detectors separate from the sprinkler supply will also provide early warning of a potential fire incident. Where this requirement is applicable, smoke detectors are preferred, except as noted in A-2.3.2.2(1).
Manual devices in public areas	(4)*	Manual pull stations are not required in <i>public circulation areas</i> equipped with communication facilities conforming to Article 2.3.3.2.
	A-2.3.2.2(4)	Manual pull stations are required in non-public areas where emergency telephones are not installed. For groups of service rooms and ancillary rooms, the intent is for one manual pull station to be located in the path of egress from that group of rooms, generally within the service corridor. For single rooms, an emergency telephone located between the egress door from that room and the exit from the station may be considered as satisfying the requirement for a manual pull station with the approval of the AHJ. Refer also to A-2.3.3.2(1).
	<b>2.3.2.3</b>	<b>Annunciation</b>
Monitoring of fire alarm system	(1)*	The <i>station</i> fire alarm and detection system shall be monitored by: (a) the <i>operations control centre</i> , and (b) an annunciator installed within the <i>Firefighter Command Post</i> at each <i>station</i> in accordance with Sentence 2.3.1.1(2).
	A-2.3.2.3(1)	In accordance with requirements in the building code (Sentence 3.2.4.8.(4) in BCBC 2018, 3.2.4.7.(4) in VBBL 2014), it is intended that the OCC will function as a Proprietary Fire Signal Receiving Centre as described in CAN/ULC-S561 "Standard for Installation and Services for Fire Signal Receiving Centres and Systems". The 2-stage system required by Sentence 2.3.2.1(1) is to be monitored at the OCC where response to the first stage can be initiated and coordinated. Given the critical role in managing emergency response throughout the rapid transit system, the OCC should be designed as a post-disaster facility.
Requirements for connected buildings	(2)	Where direct access is provided between a <i>station</i> and an adjoining building, any alarm signal originating in that building shall (a) be indicated on the <i>station</i> and building annunciators and at the <i>operations control centre</i> , and (b) cause a warning message to flash on signs located as required by Sentence (3) indicating that the access to the adjoining building shall not be used.

	A-2.3.2.3(2)	These requirements are in addition to requirements in the building code for activation of closures in the fire separation between the station and the adjoining building.
Location of signs at building connections	(3)*	The signs required by Sentence (2) shall be located: (a) at the entrances to the access route between the <i>station</i> and the adjoining building, and (b) at the point of discharge from the access route into the <i>station</i> or adjoining building.
	A-2.3.2.3(3)	The intent is to locate the signs where they will be easily visible to persons proceeding into the connecting access route who are not aware of an emergency in the adjoining building or station. The prescribed locations may be adjusted to provide better visibility.
	<b>2.3.3</b>	<b>Voice Communication Systems</b>
	<b>2.3.3.1</b>	<b>Public Address</b>
PA operational requirements	(1)*	A public address system shall be installed in each <i>station</i> and designed such that (a) it can be operated from the <i>station Firefighter Command Post</i> and the <i>operations control centre</i> , and (b) voice messages can be heard intelligibly throughout the <i>station</i> .
	A-2.3.3.1(1)	For Clause (b), refer also to requirements for audibility and silencing of fire alarm signals in the building code (3.2.4.22.(2) & (4) in BCBC 2018/VBBL 2014) and to A-2.3.3.1(4).
PA operation from other locations	(2)	The public address system described in Sentence (1) is permitted to be designed to be operated from other locations accessible only to <i>rapid transit system</i> personnel.
Priority order for PA operational inputs	(3)	The priority of the public address system inputs shall be such that (a) operation from the <i>operations control centre</i> shall override all non-emergency input sources, and (b) operation from the <i>station Firefighter Command Post</i> shall override all other input sources.
PA use for revenue operations	(4)*	A public address system used during normal operation of the <i>rapid transit system</i> shall be considered as fulfilling the requirements of Sentence (1) provided it can be demonstrated that the system meets the intent of the <i>building code</i> with respect to design and installation, including notification of equipment failure or malfunction.
	A-2.3.3.1(4)	Listed PA systems do not typically provide the technical design features that are necessary for audibility and survivability in a rapid transit system environment. For SkyTrain, non-listed PA systems are permitted to be connected to and function in conjunction with the fire alarm system (i.e., for silencing of fire alarm bells during emergency announcements), provided they meet the intent of the Code for supervision of faults. Refer also to related criteria in the building code (3.2.4.18.(2) and 3.2.4.22. in BCBC 2018, 3.2.4.17.(2) and 3.2.4.22. in VBBL 2014).

### 2.3.3.2 Two-Way Communication

2-way communication connection requirements

- (1)\* A two-way voice communication system that is separate and distinct from all other communication systems shall be installed in each *station* and designed to provide two-way communication from all *public circulation areas* in the *station* to
- (a) the *station Firefighter Command Post*, and
  - (b) the *operations control centre*.

A-2.3.3.2(1) The two-way voice communication system described in this Article consists of emergency telephones that are intended to take the place of manual pull stations in public circulation areas and be connected to the fire alarm system. The emergency telephones are intended for reporting fire emergencies, but also for reporting other incidents that require response from emergency services or the rapid transit system. The intent is for the two-way voice communication system to be designed in accordance with CAN/ULC-S524, except that, considering the challenges associated with audibility and survivability in a rapid transit system environment, the use of unlisted handsets may be considered acceptable where supported by engineering analysis.

Location of 2-way communication devices

- (2)\* *Emergency telephones* shall be provided as part of the two-way voice communication system and located
- (a) with a minimum of one on each floor level that provides egress from the *station*, and
  - (b) with a minimum of two on each *platform*.

A-2.3.3.2(2) The building code specifies that manual pull stations or two-way communication devices be located near exits, based on such locations being readily accessible to occupants evacuating each floor area. For stations, the intent is to locate emergency telephones in emergency equipment cabinets (refer to additional requirements in A-1.4(new) and requirements in 2.3.3.2(5)) such that they are readily visible and accessible. A distance of 90 m can be used as a guideline for the appropriate approximate distance between emergency telephones in stations, based on comparison to requirements referenced in the building code for the distance between exits in assembly occupancies in sprinklered buildings (where manual pull stations would be located). Additionally, for shorter platforms, one emergency telephone may be acceptable where it is located such that it will be

- easily accessible to any person standing at any location on the platform, and
- passed by the maximum number of platform occupants should an emergency evacuation of the platform be required.

In Clause (a), the intent is that emergency telephones are only required where intermediate levels provide connections to other buildings or to the street such that passengers evacuating the station could exit the station at that level. CSA B44 also requires a telephone connected to a central telephone exchange within each elevator. In stations, this device is connected to the OCC, but is not part of the two-way voice communication system described in this Article.

2-way communication operational requirements	<p>(3) The two-way voice communication system shall be designed such that</p> <ul style="list-style-type: none"> <li>(a) except as provided in Clause (b), accessing an <i>emergency telephone</i> within a <i>station</i> will automatically <ul style="list-style-type: none"> <li>(i) cause an alert signal at the <i>operations control centre</i> identifying the location of the device, and</li> <li>(ii) establish a connection with the <i>operations control centre</i>,</li> </ul> </li> <li>(b) from a <i>station Firefighter Command Post</i>, two-way communication within that <i>station</i> can be operated as a standalone subsystem within that <i>station</i>, and</li> <li>(c) when two-way communication within a <i>station</i> has been established as described in Clause (b) <ul style="list-style-type: none"> <li>(i) a signal shall be transmitted to the <i>operations control centre</i>, and</li> <li>(ii) communication from the <i>Firefighter Command Post</i> shall be capable of selective connection to the <i>operations control centre</i>.</li> </ul> </li> </ul>
2-way communication reset requirements	<p>(4) <i>Emergency telephone</i> systems shall be designed to automatically reset after each use.</p>
EECs	<p>(5) <i>Emergency telephones</i>, except those in elevators, shall be installed in <i>emergency equipment cabinets</i> that are appropriately signed and coloured such that they are easily distinguishable in their environment.</p>
<p><b>2.3.4 Fire Suppression</b></p>	
<p><b>2.3.4.1 Automatic Sprinklers</b></p>	
Sprinkler system required	<p>(1) Except as permitted by this Article, an automatic sprinkler system that is designed, constructed, installed and tested in conformance with the <i>building code</i> shall be provided in <i>stations</i>.</p>
Areas not requiring sprinkler protection	<p>(2)* Automatic sprinkler protection shall be provided throughout the <i>station</i> except as permitted in Sentence (3), in Article 2.3.4.2 and in the following areas</p> <ul style="list-style-type: none"> <li>(a) <i>Public circulation areas</i>,</li> <li>(b) <i>Guideways</i>,</li> <li>(c) Escalator truss areas, and</li> <li>(d) Areas of <i>aboveground stations</i> that are remotely located from <i>public circulation areas</i>.</li> </ul>
<p>A-2.3.4.1(2) Refer also to A-2.1.1(1). The intent of the requirements in Articles 2.3.4.1 and 2.3.4.2 is to require automatic fire suppression for all areas with combustible loads, such as 'back of house' areas and tenant occupancies, with only limited exceptions as stated.</p> <p>In Clause (a), public circulation areas may also include equipment associated with fare collection and ticket dispensing.</p> <p>In Clause (d), which mimics a similar provision in NFPA 130, the intent is that 'remotely located' areas would not be physically connected to the remainder of the station such that occupants in the remainder of the station would not be exposed to hazards associated with a fire in the remote occupancy.</p>	

Other areas not requiring sprinkler protection	(3)*	Sprinkler protection need not be installed in electrical rooms and smoke control fan rooms where such rooms are (a) fire separated from the remainder of the <i>station</i> in accordance with Sentence 2.2.2(4), and (b) provided with smoke detectors in accordance with Sentence 2.3.2.2(2).
	A-2.3.4.1(3)	These requirements are in addition to requirements in NFPA 13 (Subsection 8.15.10 Electrical Equipment in the 2013 edition). Traction power substations are permitted to be considered electrical rooms for purposes of applying these provisions where the equipment in such rooms complies with the restrictions in NFPA 13.
Domestically supplied sprinklers	(4)	Where the <i>station</i> contains less than 9 sprinkler heads and is therefore permitted by the <i>building code</i> to be supplied from the domestic water system (a) a fire department connection to supply the sprinklers is not required, (b) a flow alarm is required to annunciate the initiation of sprinkler flow, and (c) fire detectors shall be installed in conformance with Sentence 2.3.2.2(3)
	A-2.3.4.1(4)	Refer to requirements in the building code (3.2.5.12.(4) in BCBC 2018/VBBL 2014).
Fire department connection marking	(5)	The fire department connection for a sprinkler system in a <i>station</i> shall clearly indicate the location and system it serves.
	2.3.4.2	<b>Other Automatic Fire Suppression Systems</b>
Other fire suppression systems	(1)*	Sprinkler protection need not be installed in <i>service rooms</i> equipped with another type of <i>approved</i> automatic fire suppression system.
	A-2.3.4.2(1)	'Another type of approved automatic fire suppression system' refers to systems described in NFPA 2001 Clean Agent Fire Extinguishing Systems. These systems are typically used in rooms with critical equipment that could be damaged by water, such as electronic equipment rooms, switch control rooms and radio rooms. Where these systems are used, it is intended that they be installed and tested in accordance with NFPA 2001 and connected to the station fire alarm system so as to provide annunciation of initiation. Verification of the clean agent system should include field review and sign-off by a responsible engineer for integration of the various systems that are required to achieve effective fire protection (i.e., room integrity, fire detection, initiation and alarm, and connection to the suppression agent).
Design of abort system	(2)*	Where an automatic fire suppression system other than sprinkler protection is installed, a latching abort system shall be permitted.
	A-2.3.4.2(2)	This provision is not mandatory and is intended to be at the discretion of the system designers.
	2.3.4.3	<b>Standpipe Systems</b>
Standpipe system required	(1)	A standpipe system conforming to the requirements of the <i>building code</i> , except as modified in this Article, shall be installed in all <i>stations</i> .

Dry system permitted in aboveground stations	(2)*	A manual dry standpipe system shall be considered acceptable for <i>aboveground stations</i> not integrated with an adjoining building.
	A-2.3.4.3(2)	This Sentence permits the installation of dry standpipe systems that are not connected to a water supply for aboveground stations as described in NFPA 14. The Sentence is intended to override requirements in the building code (3.2.5.9.(2) in BCBC 2018/VBBL 2014).
Separation of station and guideway systems	(3)	The standpipe system serving a <i>station</i> shall be independent of standpipe systems serving <i>guideways</i> .
Exemption from fire separation	(4)*	Standpipe systems shall not be required to be enclosed in fire-rated construction where a fire within the <i>station</i> will not result in failure through fire exposure for the portion of the system protecting that area.
	A-2.3.4.3(4)	The intent is to provide the performance objective rather than prescriptive criteria. For example, where portions of the standpipe system serving the platform level are routed through sprinklered fire-separated back of house areas, those portions of the system would not be exposed to a fire in the platform area and are therefore not required to be further fire-protected.
Size of supply piping	(5)	All supply piping for the standpipe system shall have a diameter of not less than 100 mm.
Location of hose connections	(6)*	Hose connections shall be located such that (a) every portion of the <i>station</i> that is not otherwise protected by automatic fire suppression can be reached by a hose stream and is within 3 m of a hose nozzle attached to 30.5 m of hose, and (b) a minimum of two hose connections are provided on each <i>platform</i> .
	A-2.3.4.3(6)	For Clause (a), hose connections may not be required at street level concourses where approved by the responding fire department. For Clause (b), the number and location of the platform hose connection(s) should consider the coverage required for suppression of a train fire. For shorter platforms, one hose connection may be considered acceptable where it is located such that it provides adequate coverage. Refer also to Sentence 3.3.4.1(5) for requirements related to the location of hose connections in proximity to the ends of platforms.
Fire hose not required	(7)	Hose racks and fire hoses are not required in <i>stations</i> .
Size of hose connection	(8)*	Each hose connection shall be for a 64 mm diameter hose.
	A-2.3.4.3(8)	The required type of hose connection may vary. Local fire departments should be consulted to confirm the type of hose connection used in each jurisdiction.
Fire department connection marking	(9)	Fire department connections shall clearly indicate the location and system each serves.

	<b>2.3.4.4</b>	<b>Portable Fire Extinguishers</b>
Fire extinguishers required	(1)	Except as provided in Sentence (2), portable fire extinguishers shall be installed in <i>stations</i> in conformance with the requirements of the <i>building code</i> .
Location in public areas	(2)*	For <i>public circulation areas</i> in <i>stations</i> , portable fire extinguishers rated for Class A and C type hazards shall be located in the vicinity of the two-way communication devices required in accordance with Article 2.3.3.2.
	A-2.3.4.4(2)	The required fire extinguisher classification is intended primarily for platform levels. Other types may be provided for other station levels in accordance with the identified fire hazards. The intent is for fire extinguishers to be located within the emergency equipment cabinets described in Section 1.4 and required in Sentence 2.3.3.2(5) such that two fire extinguishers will be located on each station platform and one on each other level providing egress from the station. For shorter platforms, one fire extinguisher may be considered acceptable where it is located such that it complies with the travel distance requirements of the building code and will be easily accessible to any person standing at any location on the platform (e.g., for a 50 m platform, a fire extinguisher located near the mid-point of the platform).
	<b>2.3.5</b>	<b>Lighting</b>
	<b>2.3.5.1</b>	<b>Application</b>
Basis for design in public areas	(1)	All <i>public circulation areas</i> shall be considered as providing access to exit for the purposes of applying requirements in the <i>building code</i> .
	A-2.3.5.1(1)	Refer to requirements in the building code (3.2.7.1.(1) and 3.2.7.3.(1) in BCBC 2018/VBBL 2014).
Application to exterior egress routes	(2)	The requirements in Sentence (1) shall apply to exterior portions of the egress route to the point of discharge to a public thoroughfare.
	<b>2.3.5.2</b>	<b>Lighting Requirements for Normal Conditions</b>
Light-activated devices	(1)	An automatic light-activated device, <i>approved</i> for the purpose, may be used to control separately the lights located in an area that is adequately illuminated during daylight hours without the need for artificial lighting.
	A-2.3.5.2(1)	Where automatic light-activated devices are used to control lighting in <i>stations</i> , such devices should be designed such that emergency lighting will be automatically initiated in case of failure of the light-activated device.
	<b>2.3.5.3</b>	<b>Emergency Lighting</b>
Protection against lamp failure	(1)	Emergency light fixtures shall be so arranged that the failure of any one lamp will not leave the area it normally serves in total darkness.



## 2.3.6 Smoke Control

### 2.3.6.1 Emergency Ventilation

Basis for design	(1)	<i>Stations</i> shall be provided with emergency ventilation in accordance with the requirements of NFPA 130.
Underground stations	(2)	Except as provided in Sentence (3), emergency ventilation for <i>underground stations</i> shall be designed and installed in accordance with the specific criteria, engineering analysis and safety objectives outlined in the requirements for enclosed <i>stations</i> in Chapter 7 and Appendix B of NFPA 130.
Exceptions from NFPA 130	(3)*	In NFPA 130 Chapter 7, Clause 7.2.1(2) is not applicable for design of a smoke control system in an underground station.
	A-2.3.6.1(3)	For Sentence 7.2.1(1) in NFPA 130, the intent for application in stations is to provide tenability to the extent possible, but as a minimum, for egress routes serving the platform and along those routes to a point of safety. In addition to the exemptions noted for NFPA 130 Sentence 7.2.1(2), in NFPA 130 Appendix B, <ul style="list-style-type: none"> <li>- The first sentence of Clause B.3.2 should read "Smoke obscuration levels should be maintained below the point at which a sign internally illuminated at 80 lx is discernible at 30 m and doors and walls are discernible at 10 m along paths of egress for the required time of tenability,</li> <li>- In Clause B.5.1(4), the third Sentence should read "The ventilation system should have sufficient capacity to counter this pre-ventilation smoke spread once it is fully operational".</li> </ul>

## 2.3.7 Emergency Power

Duration for lighting	(1)*	The emergency power supply required by the <i>building code</i> for emergency lighting shall provide power for a minimum period of (a) 30 minutes in <i>aboveground stations</i> , and (b) 90 minutes in <i>underground stations</i> .
	A-2.3.7(1)	Refer to requirements in the building code (3.2.7.4. in BCBC 2018/VBBL 2014).
Duration for fire alarm systems	(2)*	The emergency power supply required by the <i>building code</i> for fire alarm systems shall provide power after the required period for emergency supervisory power for a minimum period of (a) 30 minutes in <i>aboveground stations</i> , and (b) 90 minutes in <i>underground stations</i> .
	A-2.3.7(2)	Refer to requirements in the building code (3.2.7.8. in BCBC 2018/VBBL 2014).

## 2.3.8 Facilities in Stations For Guideways

Blue light stations	(1)	<i>Blue light stations</i> shall be provided at designated points of access to the <i>guideway</i> , including the ends of <i>station platforms</i> , in accordance with the requirements in Subsection 3.3.1.
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Protective coverboards	(2) Where traction power rail technology is utilized, protective coverboards designed in accordance with Subsection 3.2.3 shall be installed over the power rails at points of access to the <i>guideway</i> to prevent inadvertent contact with traction power.
	<b>2.4* MEANS OF EGRESS</b>
	A-2.4 For a station, the design of the means of egress is to be based on an emergency condition requiring evacuation of the train(s) and station occupants to a point of safety. In the event of an emergency requiring train evacuation, it is preferable that the train be brought into a station where emergency facilities are readily available. The intent is that the means of egress will remain tenable for the period of evacuation in an aboveground station or through mechanical ventilation in an underground station (see A-2.3.6.1(2)). Refer also to Part 3 criteria for means of egress for guideways.
	<b>2.4.1 Occupant Load</b>
	<b>2.4.1.1 Application</b>
Basis for determination	(1) Except as described in this Article, the occupant load for <i>public circulation areas</i> within a <i>station</i> shall be <ul style="list-style-type: none"> <li>(a) determined from the peak hour patronage as projected for design of the <i>rapid transit system</i>, and</li> <li>(b) based on the <i>platform</i> occupant load calculated in accordance with Article 2.4.1.2.</li> </ul>
Multi-line stations	(2)* At <i>stations</i> serving more than one transit line <ul style="list-style-type: none"> <li>(a) each line shall be considered separately,</li> <li>(b) where egress routes from <i>platforms</i> serving separate lines converge, simultaneous loads for all routes passing through that area shall be taken into account, and</li> <li>(c) for non-incident <i>platforms</i> that are remote from the incident <i>platform</i>, the determination of the converging occupant load from such <i>platforms</i> need only consider the off-peak <i>entraining</i> plus <i>detraining</i> loads.</li> </ul>
	A-2.4.1.1(2) Clause (c) may also be applied for remote platforms serving the same line. The intent is to recognize that where platforms are remote from each other, a train fire emergency at one platform may not require evacuation of trains at a non-incident platform; therefore, the detraining rather than the link load may be considered in determining the occupant load for such platforms.
Stations serving special event venues	(3)* In <i>stations</i> serving areas which include facilities such as civic centres, sports complexes, and convention centres, the determination of occupant load shall consider events that may result in passenger demand not included in normal ridership projections.
	A-2.4.1.1(3) For such stations, means to control access to the station and platform may be required so that the occupant load does not exceed the station egress capacity and to avoid excessive congestion.

Stations including non-transit uses	(4)* Where an area within a <i>station</i> is intended for use by occupants other than transit patrons or personnel (a) the occupant load for that area shall be determined in accordance with the provisions of the <i>building code</i> , and (b) that additional occupant load shall be included in determining the required egress from that area.
	A-2.4.1.1(4) This refers to areas that may attract non-transit occupants or personnel into the station—e.g., display spaces or ticket vendors. The intent is that those occupants be considered and included in designing provisions for egress from that area.
	<b>2.4.1.2 Calculation</b>
Consider both AM and PM loads	(1) The <i>platform</i> occupant load for each <i>platform</i> in a <i>station</i> shall be the greater of the a.m. or p.m. peak period loads calculated in accordance with this Article.
Consider both entraining and link loads	(2) The a.m. and the p.m. peak period occupant load for each <i>platform</i> shall be based on the simultaneous evacuation of the <i>entraining</i> load and the <i>link load</i> for that <i>platform</i> .
Entraining load	(3)* The <i>entraining</i> load for each <i>platform</i> shall be the sum of the <i>entraining</i> loads for each track serving that <i>platform</i> and the <i>entraining</i> load for each track shall be based on the <i>entraining</i> load per <i>train headway</i> multiplied by (a) a factor of 1.3 to account for surges, and (b) in the peak direction for each route, an additional factor of 2 to account for a missed headway.
	A-2.4.1.2(3) Where the calculated entraining load exceeds the crush capacity of the platform, it can be anticipated that passengers may be queued at platform access routes. These passengers will delay clearance of the platform. Therefore, the entraining load determined in accordance with these requirements should be used for calculating the platform occupant load, unless otherwise substantiated by engineering analysis.
Link load	(4) The <i>link load</i> for each <i>platform</i> shall be the sum of the incoming <i>link loads</i> for each track serving that <i>platform</i> and, except as provided in Sentence (5), the <i>link load</i> for each track shall be based on the <i>link load</i> per train headway multiplied by (a) a factor of 1.3 to account for surges, and (b) in the peak direction for each route, an additional factor of 2 to account for a missed headway.
Maximum link load	(5) The <i>link load</i> at each track calculated in accordance with Sentence 2.4.1.2(4) shall not exceed the <i>train crush load</i> for the largest capacity train operating on that track during the peak period.
	A-2.4.1.2(5) Refer to A-1.4(34) for values to be used in calculating the train crush load.

	<b>2.4.2</b>	<b>Number and Location of Means of Egress</b>
	<b>2.4.2.1</b>	<b>Number of Egress Routes</b>
2 means of egress from each platform	(1)*	Each <i>platform</i> in a <i>station</i> shall be served by not less than 2 means of egress which are independent of and remote from each other from the <i>platform</i> to a <i>point of safety</i> .
	A-2.4.2.1(1)	For aboveground platforms, where the egress capacity required by Article 2.4.3.1 is provided by the primary means of egress, an alternate means of egress may be approved as the secondary egress route from the platform, where supported by engineering analysis. Refer to A-2.4.2.2(2) for examples of alternate means of egress from aboveground platforms.
Exemption from 50% rule	(2)	A means of egress serving public areas including <i>platforms</i> shall be permitted to provide more than one-half of the required means of egress from such areas.
Converging egress routes	(3)	Except as required in Sentence (1), two or more means of egress are permitted to converge in conformance with Article 2.4.3.2.
	<b>2.4.2.2</b>	<b>Location of Egress Routes</b>
Distance to means of egress from platforms	(1)	Means of egress from <i>platforms</i> shall be located so that the travel time from the most remote point on a <i>platform</i> to a means of egress from the <i>platform</i> does not exceed 4 minutes based on travel speeds of (a) 38 m/minute for horizontal travel, and (b) 15 m/minute for vertical rise.
Maximum length of platform dead ends	(2)*	<i>Platform</i> areas having access to a means of egress in one direction only shall not exceed the greater of one car length or 25m unless an approved alternate means of egress is provided.
	A-2.4.2.2(2)	The determination of dead end conditions on platforms should consider the configuration—e.g., width and enclosure—of the platform versus the anticipated exposure to a train on fire at the platform. Where the platform is sufficiently wide to allow passengers to move away from the radiation effects of the train fire, or where engineering analysis supports tenability of the egress route, it is reasonable to consider that a dead end condition does not exist. For aboveground platforms, an alternate means of egress may include: alternate egress via the non-incident side of a centre platform, or access via the end of the platform to a holding area that is remote from the platform.
	<b>2.4.3</b>	<b>Required Egress Capacity</b>
	<b>2.4.3.1</b>	<b>Required Egress Capacity from the Platform</b>
Basis for determination	(1)	For a <i>station</i> , the required aggregate <i>egress capacity</i> from each <i>platform</i> shall be determined by dividing the <i>platform</i> occupant load determined in accordance with Subsection 2.4.1 by the required <i>platform</i> clearance time determined in accordance with Sentence (2).
Platform clearance time	(2)	The required <i>platform</i> clearance time shall be 4 minutes.

	<b>2.4.3.2</b>	<b>Maintaining Required Egress Capacity</b>
Continuity of egress capacity	(1)*	Except as provided in Sentence (3), for each means of egress the required <i>egress capacity</i> from each <i>platform</i> shall be maintained for the entire length of the means of egress.
	A-2.4.3.2(1)	Where it can be demonstrated through engineering analysis that an intermediate <i>point of safety</i> provides sufficient holding capacity for the evacuating occupant load and that tenability can be maintained for the time required to evacuate the intermediate <i>point of safety</i> , the required <i>egress capacity</i> beyond that location may be reduced.
Converging egress routes	(2)	Except as permitted in Sentence (3), where 2 or more means of egress converge the required <i>egress capacity</i> beyond that point shall be cumulative.
Exemption for converging routes	(3)	The <i>egress capacity</i> need not be cumulative when 2 or more egress routes from separate platforms converge where it can be shown that the required <i>platform</i> clearance time as determined by Sentence 2.4.3.1(2) will not be exceeded.
	A-2.4.3.2(3)	This provision is intended to permit calculations that diminish the required width of converging egress routes from separate platforms in consideration of incident versus non-incident occupant loads. In such cases, the calculation of required egress capacity subsequent to the point of convergence is permitted to consider pedestrian flows based on peak direction calculations from the incident platform (i.e., considering a service delay) converging with pedestrian flows from other platforms based on either off-peak direction calculations (i.e., no service delay) or non-incident platform calculations (i.e., single headway entraining plus detraining) . The capacity of the subsequent portions of the egress routes must be such that the platform clearance time for all platforms does not exceed 4 minutes.
	<b>2.4.4</b>	<b>Width of Means of Egress</b>
	<b>2.4.4.1</b>	<b>Required Egress Width</b>
Basis for determination	(1)	Except as otherwise required in this Section, the required width of means of egress serving <i>platforms</i> in <i>stations</i> shall be based on (a) the required <i>egress capacity</i> determined in conformance with Subsection 2.4.3, and (b) the pedestrian flow rate for the type of means of egress facility as listed in Table 2.4.4.1.

**Table 2.4.4.1.  
Pedestrian Flow Rates**  
Forming Part of Sentence 2.4.4.1(1)

Type of Egress Facility	Flow Rate people/minute/metre
a) <i>platforms</i> , corridors and ramps not more than 4%	81.9
b) stairs, ramps more than 4% and escalators	55.5
c) single leaf doors and gates <sup>(1)(2)</sup>	60 people/minute

**Notes to Table 2.4.4.1.**

- (1) The pedestrian flow rate through double leaf doors is the same as for corridors, except that the requirements of Sentence 2.4.4.1(2) are not applicable.  
(2) Applies only to gates that swing on a vertical axis. See Article 2.4.5.5 for fare collection gates.

Effective width

(2)\*

In calculating the required width of corridors and ramps with a grade of less than 4%, the required width based on *egress capacity* shall be increased by  
(a) 300 mm at each sidewall and  
(b) 450 mm at each *platform* edge.

A-2.4.4.1(2)

For Clause (b), where platform edge doors are installed, the added width at platform edges should be 300 mm as in Clause (a) for corridors.

Escalator discount

(3)\*

In calculating the required width of vertical egress routes which will include escalators, the contribution of one escalator at each level in a *station* shall be discounted in accordance with Sentence 2.4.5.4(4).

A-2.4.4.1(3)

In calculating the egress capacity contribution for each escalator, the attributed width should be based on the width of the tread plus 100 mm at each side—i.e., for escalators having a tread width of 1000 mm, the attributable width would be 1200 mm. This is consistent with the provisions of the building code which allows a 100 mm intrusion into the required stair width at and below handrail height.

**2.4.4.2****Minimum Width of Egress Routes**

Minimum width for platform egress routes

(1)\*

The minimum width of means of egress facilities serving *platforms* shall be  
(a) 1100 mm for corridors and ramps,  
(b) 1100 mm for stairs,  
(c) 600 mm measured at tread level for escalators, and  
(d) 900 mm for each single door or gate leaf.

A-2.4.4.2(1)

In Clause (d), the minimum width is intended for application to gates in the station means of egress. For platform end gates refer to Sentence 3.4.3.2(3).

**2.4.5****Means of Egress Components****2.4.5.1****Integrity**

Restricted uses for egress routes

(1)\*

Except as provided in Sentence (2), means of egress may be used for ventilation purposes only under emergency conditions in accordance with the provisions of Article 2.3.6.1.

	A-2.4.5.1(1)	In stations, public egress routes used for passenger circulation are not required to be fire-separated from other public areas on each level--i.e., the egress route from the station platform is one continuous passageway leading from the platform to the exterior of the station. These routes serve as means of egress in the event of an emergency evacuation. During a train fire emergency in an underground station, the smoke control system is typically designed to draw 'fresh' air from the exterior of the station down the normally-used circulation routes in order to maintain a tenable means of egress from the station platform.
Use of egress routes as plenums	(2)*	Under normal operating conditions, means of egress may be used as a plenum for heating, ventilation and air conditioning systems when such systems are designed to deactivate in the presence of smoke or heat.
	A-2.4.5.1(2)	This provision is intended to apply to egress routes that are used for normal public circulation and are permitted to be interconnected as described in Subsection 2.2.2(2).
	<b>2.4.5.2 *</b>	<b>Guards</b>
	A-2.4.5.2	Refer also to the building code for requirements related to transparent doors and panels (3.3.1.19. in BCBC 2018/VBBL 2014). Where a barrier such as glass panels is provided adjacent to an array of fare gates, gaps in and between the panels should comply with the requirements of the building code for climbability and size of openings, except that larger gaps may be considered acceptable where access is required to the fare gate equipment.
Requirements at platform edges	(1)	Except as required in Sentence (2), guards shall not be required along <i>platforms</i> edges that are adjacent to the <i>guideway</i> .
Requirements at platform edges	(2)	Where <i>public circulation areas</i> are adjacent to <i>guideways</i> and are not used for <i>entraining</i> and <i>detraining</i> , guards shall be provided that (a) are a minimum of 1500 mm in height, and (b) have no openings that would permit passage of sphere whose diameter is more than 25 mm.
	<b>2.4.5.3</b>	<b>Landings</b>
Vertical rise limits	(1)	For stairs in a <i>station</i> , the maximum vertical rise between floors or landings shall be 3.85 m.
Restrictions on stair slope	(2)*	Where the vertical rise between floors or landings in any flight of stairs exceeds 3.7 m, the slope of the stairway shall be no greater than 30°.
	A-2.4.5.3(2)	The riser and tread geometry of stairs designed in accordance with Sentences (1) and (2) must otherwise comply with the <i>building code</i> .
	<b>2.4.5.4</b>	<b>Escalators</b>
Escalators permitted as means of egress	(1)	Except as provided in Sentence (2) and (3), escalators conforming to the requirements of Sentences (4) through (6) shall be acceptable as part of a required means of egress in a <i>station</i> .

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| 50% of egress capacity                  | (2) | Except as permitted by Sentence (3) escalators forming part of a required means of egress shall not comprise more than one-half of the required <i>egress capacity</i> from any one level.   |
| Requirements where capacity exceeds 50% | (3) | Escalators are permitted to comprise more than one-half of the <i>egress capacity</i> from any one level where <ul style="list-style-type: none"> <li>(a) escalators running reverse to the direction of egress are capable of being remotely brought to a stop after a warning announcement from a location complying with Sentence (5),</li> <li>(b) a portion of the means of <i>egress capacity</i> from each <i>station</i> level is comprised of stairs, and</li> <li>(c) for <i>underground stations</i>, at least one exit stair or passageway shall provide continuous access from <i>platform</i> levels to the exterior of the <i>station</i>.</li> </ul> |
| Discounted escalator                    | (4) | To account for the possibility of maintenance or malfunction, one escalator at each level in a <i>station</i> shall be deemed to be out of service for the purposes of determining egress requirements.  |
| Remote operation and control            | (5) | Facilities for operation and control of escalators from the <i>operations control centre</i> as required in Clause (3)(a) shall provide <ul style="list-style-type: none"> <li>(a) visibility of the entire escalator,</li> <li>(b) remote monitoring for each escalator of running, not running, direction of travel, operating speed (if more than one), out of service and indication of activation of a local safety device to stop the escalator, and</li> <li>(c) remote control of stop, start and direction of travel.</li> </ul>  |
| Local control                           | (6) | Local control for each escalator shall override control from the <i>operations control centre</i> .  |

#### 2.4.5.5 Fare Barriers

A-2.4.5.5 This section applies to fare barriers intended for passenger use. 'Service gates' that are intended only for use by rapid transit system personnel are not required to comply with these requirements (e.g., they may be key-locked) provided they are not counted as contributing to the available egress capacity. Refer also to A-2.4.5.2 for requirements related to transparent doors and panels adjacent to fare barriers.

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| Fare barriers permitted in means of egress | (1)  | Fare barriers complying with this Subsection shall be permitted in the means of egress serving <i>stations</i> .   |
| Automatic release of fare barriers         | (2)* | Except as permitted in Sentence (3), fare barriers in the required means of egress shall be designed to release, allowing unimpeded travel in the direction of egress, under the following conditions: <ul style="list-style-type: none"> <li>(a) Power failure or ground fault condition,</li> <li>(b) Activation of the <i>station</i> fire alarm system, and</li> <li>(c) Manual activation from a switch located within the <i>station FCP</i> or <i>operations control centre</i>.</li> </ul> |



	A-2.4.5.5(2)	<p>“Unimpeded travel in the direction of egress” means that any barriers in the fare control equipment (such as paddles, gates or turnstiles) either drop away to create a clear opening, or swing or revolve freely in the direction of egress with no latching mechanism.</p> <p>In reference to Clause (b), the fire alarm system will cause the fare gates to release automatically</p> <ul style="list-style-type: none"> <li>– in the event of a second stage fire alarm condition, or</li> <li>– where the station fire alarm system loses communication with the OCC, in the event of a first stage fire alarm condition.</li> </ul>
Requirements where automatic release is not provided	(3)	
Gate-type fare barriers	(4)*	<p>Fare gates shall meet the following criteria:</p> <ul style="list-style-type: none"> <li>(a) Each unit shall provide a minimum of 455 mm clear width at and below a height of 1000 mm and 530 mm clear width above that height, and</li> <li>(b) Each unit shall be credited with a capacity of 50 people per minute (ppm) for egress calculations.</li> </ul>
	A-2.4.5.5(4)	<p>The ‘clear width’ means the clear width between any protrusions with the fare barriers open. The stipulated clear widths are based on anthropomorphic data from NASA and NFPA 101 and assume that pedestrians are able to adjust their position for short egress passages. The dimensions are appropriate where the length of the equipment console is less than 2500 mm in the egress direction. Where the equipment exceeds 2500 mm in length, increased widths are recommended based on the anthropometric body sway data from NFPA 101 as follows: Each unit should provide a minimum width of 560 mm clear width at and below a height of 1000 mm and 760 mm clear width above that height.</p>
	<b>2.4.5.6</b>	<b>Security Grilles</b>
Security grilles permitted	(1)*	<p>Devices which do not swing on a vertical axis, and which are used to secure egress openings while the <i>station</i> is not publicly occupied, may be installed in a means of egress provided the devices are held clear of the egress openings in a fail-safe manner during public occupancy.</p>
	A-2.4.5.6(1)	<p>Fail-safe in this context implies that an open coiling grille remains open regardless of failure of the power supply or braking mechanism.</p>
Alternate egress required	(2)*	<p>Where devices described in Sentence (1) are installed, alternate egress shall be provided by means of a vertically-hinged door located</p> <ul style="list-style-type: none"> <li>(a) for <i>underground stations</i>, in the immediate floor area, or</li> <li>(b) for <i>aboveground stations</i>, in the <i>station</i>.</li> </ul>
	A-2.4.5.6(2)	<p>Regardless of the above, provision of a vertically-hinged door in each station concourse is desirable, preferably outside of the fare-paid zone. The door is not required to be equipped with hardware and signage as would be required for an exit door but is required to be openable by personnel who may be working in the station during non-operating hours.</p>

**2.4.5.7 Horizontal Exits**Permitted  
egress capacity(1) Except as required in Sentence (2), horizontal exits may provide all of the required *egress capacity* from a *station*.50% limit to one  
building(2) Horizontal exits to any one building shall not comprise more than one-half of the required *egress capacity* from any area within a *station*.**2.4.6 Means of Egress for Ancillary Rooms, Service Rooms and Tenant Occupancies**Within non-  
public areas(1) Except as permitted in Sentences (2) through (6), means of egress within *ancillary rooms*, *service rooms* and *tenant occupancies*, and within areas containing such rooms and occupancies, shall be provided in accordance with the requirements of the *building code*.

A-2.4.6(1) For travel distance and room area requirements as they pertain to the number of means of egress required or provided, refer to Articles 3.3.1.5. and 3.3.1.6. of the building code. Service rooms in stations will generally be Group F, Division 3 occupancies, except refer to Sentences (4) through (6) regarding egress requirements for normally unoccupied service areas.

Through public  
areas(2) Means of egress serving the areas described in Sentence (1) shall be permitted to discharge into *station public circulation areas*.

A-2.4.6(2) The intent is for public circulation areas to be considered equivalent to public corridors as referred to in Sentences 3.3.1.3.(8) and (9) of the building code. At the point of discharge into the public circulation area, egress will be via normal station egress routes.

Rooms beyond  
the end of the  
platform(3) For rooms and areas located beyond the end of the *platform*, egress to the *platform public circulation area* via a service walkway designed in accordance with Section 3.4 shall be considered acceptable.

A-2.4.6(3) Where egress from rooms and areas beyond the end of the platform is via a service walkway, travel distance should be measured from within the room or area to the egress door leading to the service walkway. Where more than one means of egress is required, two separate paths that both discharge to the platform will be considered acceptable.

Normally  
unoccupied  
service areas(4) For a *normally unoccupied service area*  
(a) a single means of egress is permitted where the area is less than 4180 m<sup>2</sup>, and  
(b) two independent and remotely located means of egress are required where the area is greater than 4180 m<sup>2</sup>.

A-2.4.6(4) This Sentence exempts normally unoccupied service areas from requirements associated with travel distance—i.e., unlimited travel distance is permitted within the area provided the number of means of egress requirements are satisfied. Requirements related to access to an exit on each level remain applicable. Where egress from the normally unoccupied service area discharges into a corridor serving ancillary and service rooms, travel distance and the number of required egress routes should be assessed from that point onward in accordance with Sentence 2.4.6(1).

Normally unoccupied service areas	<p>(5) For <i>normally unoccupied service areas</i> where equipment is housed, a designated egress path shall be provided within the area that shall:</p> <ul style="list-style-type: none"> <li>(a) Be a minimum of 710 mm in clear width</li> <li>(b) Have a minimum headroom of 2030 mm</li> <li>(c) Be within 7.6 m of any portion of the space that involves crossing over or under obstructions, unless the space is completely inaccessible.</li> </ul>
	<p>A-2.4.6(5) For Clause 2.4.6(5)(b), occasional deviations from the minimum headroom requirements may be considered acceptable where special markings are applied to the obstructions.</p>
Normally unoccupied service areas	<p>(6) For <i>normally unoccupied service areas</i>, egress doors shall be designed in accordance with the <i>building code</i>, except egress hatches shall be permitted in lieu of egress doors where the area does not house equipment.</p>
	<p>A-2.4.6(6) Sentence (6) is intended to apply to areas such as fan plenums.</p>
	<p><b>2.5 HEALTH REQUIREMENTS</b></p>
	<p><b>2.5.1 Plumbing Facilities</b></p>
	<p><b>2.5.1.1 Water Closets</b></p>
Building code applicability	<p>(1) Except as provided in this Article, every <i>station</i> shall be equipped with water closets in accordance with the requirements of the <i>building code</i>.</p>
Requirements for rapid transit system occupancies	<p>(2)* Where only <i>rapid transit system</i> occupancies are included in the <i>station</i></p> <ul style="list-style-type: none"> <li>(a) only one water closet in one washroom is required,</li> <li>(b) such facilities need not be open to the public without the assistance of authorized personnel, and</li> <li>(c) the washroom must be designed to be accessible in accordance with the requirements of the <i>building code</i>, except that signage is not required for the washroom.</li> </ul>
	<p>A-2.5.1.1(2) The intent is that, for security reasons, washrooms in stations should require the assistance of station or other personnel to access. For clause (c), the purpose of signage required by the code contradicts that approach.</p>
Requirements for other occupancies	<p>(3)* Where other <i>occupancies</i> are included in the <i>station</i></p> <ul style="list-style-type: none"> <li>(a) they shall be provided with water closets in accordance with the <i>building code</i>, and</li> <li>(b) where a single water closet is required, access to the water closet required in Sentence (2) may be considered as satisfying that requirement.</li> </ul>
	<p>A-2.5.1.1(3) See A-2.5.1.1(2).</p>
	<p><b>2.6 BARRIER-FREE DESIGN</b></p>
	<p><b>2.6.1* Tactile Warning Systems</b></p>
Reference to building code	<p>(1) Tactile warning systems are to be provided at stair landings in accordance with the <i>building code</i> except as permitted in Sentence 2.6.1(3).</p>

Platform edge tactile warning zones	(2)* Where <i>platforms</i> are open to the <i>guideway</i> , a 600 mm wide tactile warning zone shall be installed at the edge of the <i>platform</i> adjacent to the <i>guideway</i> .
	A-2.6.1(2) A tolerance of $\pm 50$ mm is permitted. Tactile warning zones that are 500 mm wide are acceptable where installed in existing stations and the project does not involve replacement of the tactile warning zone.
Design of tactile warning surfaces	(3)* Tactile warning surfaces in <i>stations</i> shall (a) be composed of a pattern of truncated domes that are configured in accordance with the requirements of CSA B651-12 Section 4.3.5.3.1, (b) provide pattern differentiation between <i>platform</i> edges and stair landings, and (c) provide colour contrast to the flooring surrounding the tactile surface. A-2.6.1(3) For clause (b), provision of truncated domes complying with CSA-B651-12 that are laid in a diagonal pattern at platform edges and a rectilinear pattern at stair landing satisfies the requirement for differentiation. For clause (c), the tactile zone should provide a 70% contrast in light reflectance with the adjoining surface, except that where "safety yellow" is used either across the tactile surface or for the tactile texture, a reflectance value of 40% may be considered acceptable. "Safety yellow" is described in the USA as ANSI Z535.1-1991,6.3 and internationally as ISO 3864-1984(E).
Underground station levels	<p><b>2.6.2 Provisions for Barrier-Free Egress</b></p> <p><b>2.6.2.1 Underground Stations</b></p> <p>(1)* <i>Underground</i> levels in <i>stations</i> not having an accessible means of egress leading directly to a level of exit discharge shall  (a) be served by an elevator conforming to the requirements of the <i>building code</i> for elevators providing accessible egress from floor areas, and  (b) at <i>platforms</i>, provide for alternate egress at a location that is remote from the elevator required by Clause (a) by means of  (i) an additional elevator complying with Clause (a) above,  (ii) a designated location in an exit stair, or  (iii) a designated location adjacent to a means of egress from the <i>platform</i> that will remain <i>tenable</i> in the event of a train fire.</p> <p>A-2.6.2.1(1) Clause (1)(a) is intended to be in reference to BCBC 2018 3.3.1.7.(1)(a)/VBBL 2014 3.8.3.19.(1)(a). The applicable requirements of the building code for vestibule or other enclosures at entrances to elevators (3.3.1.7.(1)(a)(ii) in BCBC 2018, 3.8.3.19.(1)(a)(ii) in VBBL 2014) are waived based on the requirement for a station smoke control system and the provisions of Clause (b) for alternate egress. However, engineering analysis is required to provide evidence that at least one of either (a) or (b) will remain tenable for the period required to achieve egress, regardless of the location of the fire.</p>
Aboveground station levels	<p><b>2.6.2.2 Aboveground Stations</b></p> <p>(1) Accessible floor levels at <i>aboveground stations</i> are not required to provide areas of refuge.</p>

## PART 3 – GUIDEWAYS

### 3.1 GENERAL

#### 3.1.1 Application

- NFPA 130 applicability (1) Except as provided in this Part, the requirements in NFPA 130, Chapters 6 and 7 shall apply to *guideways*.
- Applicability of this Part (2) The requirements of this Part apply only to *guideways*.

#### 3.1.2 Use and Occupancy

- Primary use is for transit vehicles (1) The primary use of a *guideway* shall be for the movement of transit vehicles between *stations*.
- Occupancy by employees (2) A *guideway* may also be occupied by employees and emergency personnel whose work assignments require their presence within the *guideway*.
- Restricted use by passengers (3) It is intended that passengers will enter the *guideway* only in the event that it becomes necessary to evacuate a disabled train, preferably under the guidance and control of authorized and trained *rapid transit system* or emergency response agency personnel.
- Warning signs (4) At entrances to the *guideway*, on fences and barriers adjacent to the *guideway*, and at other locations where non-authorized persons might trespass, warning signs shall be posted that clearly state the potential hazards.

### 3.2 CONSTRUCTION REQUIREMENTS

#### 3.2.1 Structural Fire Protection, Materials and Interior Finish

- Fire protection through construction (1) The structural fire protection, fire characteristics of materials and interior finish for *guideways* shall be in accordance with the requirements of NFPA 130, Chapter 6 except as described herein.

#### 3.2.2 Wires and Cables

- Reference to building code (1) Except as required in Sentence (2), wires and cables in *guideways* shall comply with the requirements in Subsection 3.1.5 of the building code for regulating the flammability characteristics of wires and cables.
- Requirements for enclosed guideways (2) For *underground guideways*, where an FT4 rating is stipulated in accordance with Sentence (1), those requirements shall be modified to require an FT4-ST1 rating in accordance with CSA C22.2 No. 2556, "Test Methods for Electrical Wires and Cables."

Protection of electrical conductors	(3) Wires and cables in <i>guideways</i> shall comply with the requirements in Article 3.2.7.10 of the <i>building code</i> for protection of electrical conductors.
Coverboard materials & design	<p><b>3.2.3 Traction Power Rail Coverboards</b></p> <p>(1) The coverboards required in Sentence 3.4.3(8) shall</p> <ul style="list-style-type: none"> <li>(a) be constructed of electrical insulating fire retardant material,</li> <li>(b) have a flame spread rating of not more than 25, and, for <i>underground guideways</i>, a smoke developed index not exceeding 450 when tested in accordance with CAN/ULC-S102,</li> <li>(c) be capable of supporting a vertical load of 1112 N at any point with no visible permanent deflection, and</li> <li>(d) be securely anchored.</li> </ul>
Alternative testing for coverboard material	<p>(2) Materials that comply with the following flame test criteria when tested in accordance with NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth, shall be considered as satisfying the requirements of Clause (1)(b):</p> <ul style="list-style-type: none"> <li>(a) flames shall not spread to the ceiling during the 40-kW exposure,</li> <li>(b) during the 160-kW exposure, <ul style="list-style-type: none"> <li>(a) flame shall not spread to the outer extremities of the sample on the 2440 mm x 3660 mm wall, and</li> <li>(b) flashover shall not occur,</li> </ul> </li> <li>(c) the peak heat release rate throughout the test shall not exceed 800 kW, and</li> <li>(d) the total smoke released throughout the test shall not exceed 1000 m<sup>3</sup>.</li> </ul>
	<p><b>3.2.4 Spatial Separation and Exposure Protection</b></p>
	<p><b>3.2.4.1* Aboveground Guideways</b></p>
	<p>A-3.2.4.1 Refer also to <b>Annex A, Figure 2</b> included at the end of this document. Given the non-combustible construction of the guideway and the construction of and operational criteria for rapid transit system vehicles, adjacent properties and buildings require no protection against exposure from an aboveground guideway. Therefore, this section addresses only exposure protection from adjacent buildings to the guideway. For existing buildings, the requirements in this Article should be considered guidelines for site-specific determination of measures to achieve appropriate fire protection. (Refer also to Subsection 3.3.2 for requirements related to firefighters' access.)</p>
Limiting distance	<p>(1)* Except as required in this Article, buildings along the <i>guideway</i> shall comply with the requirements of the <i>building code</i> for construction and unprotected openings.</p>
	<p>A-3.2.4.1(1) Refer to requirements in the building code (3.2.3. in BCBC 2018/VBBL 2014). Where a guideway is located in or adjacent to a public thoroughfare and is between the building and that public thoroughfare, the intent is that the limiting distance for the <i>building</i> will be measured from the centre line of the public thoroughfare except as otherwise required by this Article for protection of the guideway.</p>

No exposure protection required

(2) Where the adjacent *exposing hazard face* is equal to or greater than 3 m horizontally from the edge of the *guideway* and equal to or greater than 5 m above the top of the *guideway* parapet, no provisions are required for protection of the *rapid transit system*.

Engineering analysis required

(3)\* Where the adjacent *exposing hazard face* is less than 3 m from the edge of the *guideway*, less than 5 m above the top of the *guideway* and the *exposing hazard face* contains unprotected openings in a non-fire-rated wall, exposure protection for the *rapid transit system* shall be evaluated and provided on a site-specific basis.

A-3.2.4.1(3) Where requirements are established on a site-specific basis, exposure protection requirements shall be evaluated based on such factors as the extent/proximity of openings, fire-resistance rating and combustibility of exposing roof/wall assemblies and reliability/type of automatic fire detection/suppression systems in the exposing building.

Buildings below the guideway

(4) Where a building is located below a *rapid transit system* statutory right of way containing a *guideway*,  
 (a) the roof assembly of the building shall have a fire-resistance rating not less than 1 h,  
 (b) the building shall be sprinklered throughout, and  
 (c) provision shall be made for annunciating an alarm condition in the building to the *rapid transit system OCC*.

**3.3 FIRE PROTECTION & LIFE SAFETY SYSTEMS**

**3.3.1 Blue Light Stations**

**3.3.1.1 Application**

Location of blue light stations

(1)\*

A-3.3.1.1(1)

**3.3.1.2 Design**

Required equipment

(1) Where installed, each *blue light station* shall be equipped with  
 (a) a blue light connected to emergency power for identification of its function, and

Door alarms	(2)*	The door of each blue light station shall be equipped with a door alarm sensor that will annunciate (a) opening of the door, and (b) the location of the blue light station, identified by track section number.
	A.3.3.1.2(2)	The intent is that annunciation in accordance with this requirement will be transmitted to the OCC via the Wayside Monitoring System.
Required signage	(3)	Where installed, information shall be provided adjacent to each <i>blue light station</i> that identifies the location of the <i>blue light station</i> .
	<b>3.3.2 *</b>	<b>Fire Department Access</b>
	A-3.3.2	Where an emergency requires fire department response to the guideway, it is intended that access be coordinated with the OCC to confirm that trains are not operating on that portion of the guideway and that traction power has been disconnected and grounded.
	<b>3.3.2.1</b>	<b>Aboveground Guideways</b>
Access locations	(1)	Fire department access to <i>aboveground guideways</i> shall be from <i>stations</i> and from adjacent or cross streets.
Additional considerations	A-3.3.2.1(1)	The local municipal fire department should be consulted to determine if additional provisions are warranted where access is limited by an absence of adjacent or cross streets or by proximity between the guideway and adjacent buildings.
	<b>3.3.2.2</b>	<b>Underground Guideways</b>
Access coordinated with means of egress	(1)	Facilities for fire department access to <i>underground guideways</i> shall be coordinated with the egress requirements outlined in Section 3.4.3.3 of this document.
Access locations	(2)	Fire department access to <i>underground guideways</i> shall be from (a) adjacent <i>stations</i> , (b) portals, (c) emergency exit stairways, or (d) cross-passages leading to an adjacent <i>guideway</i>
Provisions for entry	(3)*	Means to ensure entry at the locations described in Sentence (2) shall be provided for use by the fire department.
	A-3.3.2.2(3)	Sentence (3) is intended to ensure that the design of facilities at the locations listed do not prohibit access, as could be the case for hatches or locked doors and gates. The fire department should be consulted regarding appropriate provisions at such locations.
Equipment at points of access	(4)	Other firefighting, fire protection and life safety provisions for <i>underground guideways</i> as referenced in this Section shall be coordinated with the fire department access points outlined in Sentence (2) above.



### 3.3.3 Voice Communication Systems

#### 3.3.3.1 Two-Way Voice Communication

Location of devices	(1) Where the length of an <i>underground guideway</i> is equal to or greater than twice the maximum distance required in Sentence 3.4.3.3(1) to a point of exit from the <i>guideway</i> , a two-way emergency communication system separate and distinct from all other communication systems shall be installed, with two-way communication devices located <ul style="list-style-type: none"> <li>(a) at portals,</li> <li>(b) at cross-passages,</li> <li>(c) at the entrance to emergency exit stairs from the <i>guideway</i>, and</li> <li>(d) with the designated permanent <i>Firefighter Command Post</i> for that portion of the <i>underground guideway</i>.</li> </ul>
Operational requirements	(2) The emergency communication system shall be provided with connections to the designated <i>Firefighter Command Post</i> and to the <i>operations control centre</i> such that <ul style="list-style-type: none"> <li>(a) except as provided in Clause (b), lifting of an <i>emergency telephone</i> handset will automatically             <ul style="list-style-type: none"> <li>(i) cause an alert signal at the <i>operations control centre</i> identifying the location of the device, and</li> <li>(ii) establish a connection with the <i>operations control centre</i>,</li> </ul> </li> <li>(b) from the designated <i>Firefighter Command Post</i>, the <i>emergency telephones</i> within the associated <i>underground guideway</i> can be disconnected from the centrally monitored <i>emergency telephone</i> system as a group and operated as a standalone “subsystem”, and</li> <li>(c) when the <i>emergency telephones</i> have been disconnected as described in Clause (b)             <ul style="list-style-type: none"> <li>(i) a signal shall be transmitted to the <i>operations control centre</i>, and</li> <li>(ii) the <i>emergency telephone</i> at the designated <i>Firefighter Command Post</i> shall be capable of selective connection to either the <i>guideway</i> subsystem or the <i>operations control centre</i>.</li> </ul> </li> </ul>
Reset requirements	(3) <i>Emergency telephone</i> systems shall be designed to automatically reset after each use.
Requirements for marking	(4) <i>Emergency telephones</i> shall be appropriately signed and coloured such that they are easily distinguishable in their environment.

A-3.3.3.1(4) Red is the preferred colour for emergency telephones.

### 3.3.4 Fire Suppression

#### 3.3.4.1 Standpipe Systems

Basis for design	(1)* A Class I manual dry standpipe system conforming to the requirements of NFPA 14, except as modified in this Subsection, shall be installed in <i>underground guideways</i> .
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A-3.3.4.1(1) Standpipes are permitted to be of the dry-type due to the nature and length of guideways.

Protection	(2)*	Standpipe systems in <i>guideways</i> shall be (a) Cross-connected or fed from two locations. (b) Provided with isolation valves in the vicinity of each cross-passage
	A-3.3.4.1(2)	It is assumed that the fire department will approach a fire incident in an underground guideway either from the 'upstream' direction or from an adjacent fire-separated guideway section that is not affected by the fire incident. The intent of Sentence (2) is to facilitate approach choices by providing the means to charge the system from locations at either end of each segment of the underground guideway. Compliance with this Sentence, together with location of the standpipe outside of the vehicle dynamic envelope, will be considered as satisfying the requirements of NFPA 14 for mechanical protection of standpipe system piping. In Clause (b), the stipulated location for the isolation valves is intended to facilitate firefighters' access to the valves. Location of the valves may vary at the discretion of the responding fire department.
Protection	(3)*	Standpipe systems complying with Sentence (2) shall not be required to be enclosed in fire-rated construction.
	A-3.3.4.1(3)	Where standpipes serving guideways are routed through stations, location of the supply piping for the standpipe in areas that are fire-separated from public areas will be considered as satisfying the requirements of NFPA 14 for fire protection of the standpipe piping.
Fire hose not required	(4)	Hose racks and fire hoses are not required in <i>underground guideways</i> .
Location of hose connections	(5)*	Hose connections shall be located within <i>guideways</i> : (a) at entrances to the <i>underground guideway</i> , not more than 20 m from the portal or end of the <i>platform</i> , and (b) additionally, at intervals of not more than 60 metres.
	A-3.3.4.1(5)	Clause (5)(a) refers to hose connections that are intended to serve the underground guideway; therefore, such hose connections in proximity to the ends of platforms should be part of the standpipe system in the underground guideway.
Fire department connection location	(6)	The location of fire department connections shall be coordinated with fire department access/response points as described in Sentence 3.3.2.2(2).
Fire department connection marking	(7)	Fire department connections shall clearly indicate the location and system each serves.
	<b>3.3.5</b>	<b>Lighting and Exit Signage</b>
Building code applicability	(1)	Except as required in this subsection, provisions for lighting and exit signage in <i>underground guideways</i> shall be installed and maintained in accordance with the requirements of Subsection 3.2.7. of the <i>building code</i> .
Basis for design in underground guideways	(2)*	Except as required in Sentences (1), (3) and (4), <i>underground guideways</i> shall be provided with lighting and exit signage in accordance with NFPA 130.

	A-3.3.5(2)	In designing the lighting system for egress, illumination levels above those prescribed by NFPA 130 Clause 6.3.5.9 may be required to provide adequate visibility at crossovers and special trackwork, and at points of egress from the guideway. Illumination levels for emergency exit stairs and cross-passages are required to be in accordance with the building code (3.2.7. in BCBC 2018/VBBL 2014).
Protection against lamp failure	(3)	Emergency light fixtures shall be so arranged that the failure of any one lamp will not leave in total darkness the area it normally serves.
Point of exit from the guideway	(4)	Points of exit from the <i>guideway</i> shall be illuminated and shall be provided with illuminated exit signage.
Clearances	(5)	All emergency lighting and exit signage shall be installed at a height sufficient to maintain clearances required in the <i>building code</i> for means of egress.
	<b>3.3.6</b>	<b>Smoke Control</b>
	<b>3.3.6.1</b>	<b>Emergency Ventilation</b>
Basis for design	(1)	<i>Guideways</i> shall be provided with emergency ventilation in accordance with the requirements of NFPA 130.
underground guideways	(2)	Except as provided in Sentence (3), emergency ventilation for <i>underground guideways</i> shall be designed and installed in accordance with the specific criteria, engineering analysis and safety objectives outlined in Chapter 7 and Appendix B of NFPA 130.
	A-3.3.6.1(2)	For Sentence 7.2.1(1) in NFPA 130, the intent for application in guideways is to provide tenability to the extent possible, but as a minimum, for the egress path upstream from the incident train.
Exceptions from NFPA 130	(3)	In NFPA 130 Chapter 7, Clause 7.2.1(2) is applicable where a longitudinal ventilation strategy is employed.
	<b>3.4*</b>	<b>EMERGENCY EGRESS</b>
	<b>3.4.1</b>	<b>Application</b>
Egress from train to point of safety	(1)*	The <i>rapid transit system</i> shall incorporate a walk surface or other approved means for passengers to evacuate a train at any point along the <i>guideway</i> so that they can proceed to the nearest <i>station</i> or other <i>point of safety</i> .

	A-3.4.1(1)	In the event of an emergency requiring train evacuation, it is preferable that the train be brought into a station where emergency facilities (including egress routes, firefighting and communications equipment) are more readily available and where the train is more accessible for emergency response or maintenance. Therefore, it is intended that passengers will enter the guideway only in the event of an emergency requiring evacuation of a disabled train which is stranded between stations. Wherever possible, rapid transit system personnel and/or emergency response personnel will attend at the scene before the evacuation is initiated to supervise and control such an evacuation. The use of rescue trains may also be considered where appropriate.
	<b>3.4.2</b>	<b>Acceptable Egress Facilities</b>
Types of egress facilities	(1)	Subject to the requirements of this Section, one of the following, used singly or in combination, shall be considered acceptable for egress as required by Subsection 3.4.1: (a) an egress walkway, (b) an exit stairway, (c) a cross-passage, (d) a doorway, (e) a gate, or (f) an exterior walkway.
Reference to building code	(2)	The design of egress facilities listed in Clauses (b), (d), (e) and (f) of Sentence 3.4.2(1) shall comply with the <i>building code</i> except as modified in this Section.
	<b>3.4.3</b>	<b>Configuration of Egress Facilities</b>
	<b>3.4.3.1</b>	<b>General</b>
Alternate egress and egress route continuity	(1)*	Except as permitted in Sentence (2), at any point along the <i>guideway</i> (a) it shall be possible to go in opposite directions to an exit from the <i>guideway</i> , and (b) the egress path to each exit shall be continuous.
	A-3.4.3.1(1)	An 'exit from the guideway' refers to either a station, an exit stair or another egress route leading from the guideway to a public right-of-way. Compliance with this requirement should consider unintentional train-stopping incidents, especially in the vicinity of stations, where egress from a train stopped outside of the station may be blocked by guards installed along platform extensions, or where the position of the train may interrupt access to guideway cross-overs.
Maximum length of dead ends	(2)*	Areas having access to an exit from the <i>guideway</i> in one direction only shall not exceed one car length unless an <i>alternate means of egress</i> is provided.
	A-3.4.3.1(2)	Refer also to A-3.4.3.1(1).
Walk surfaces	(3)	Walking surfaces shall have a uniform, slip resistant design.

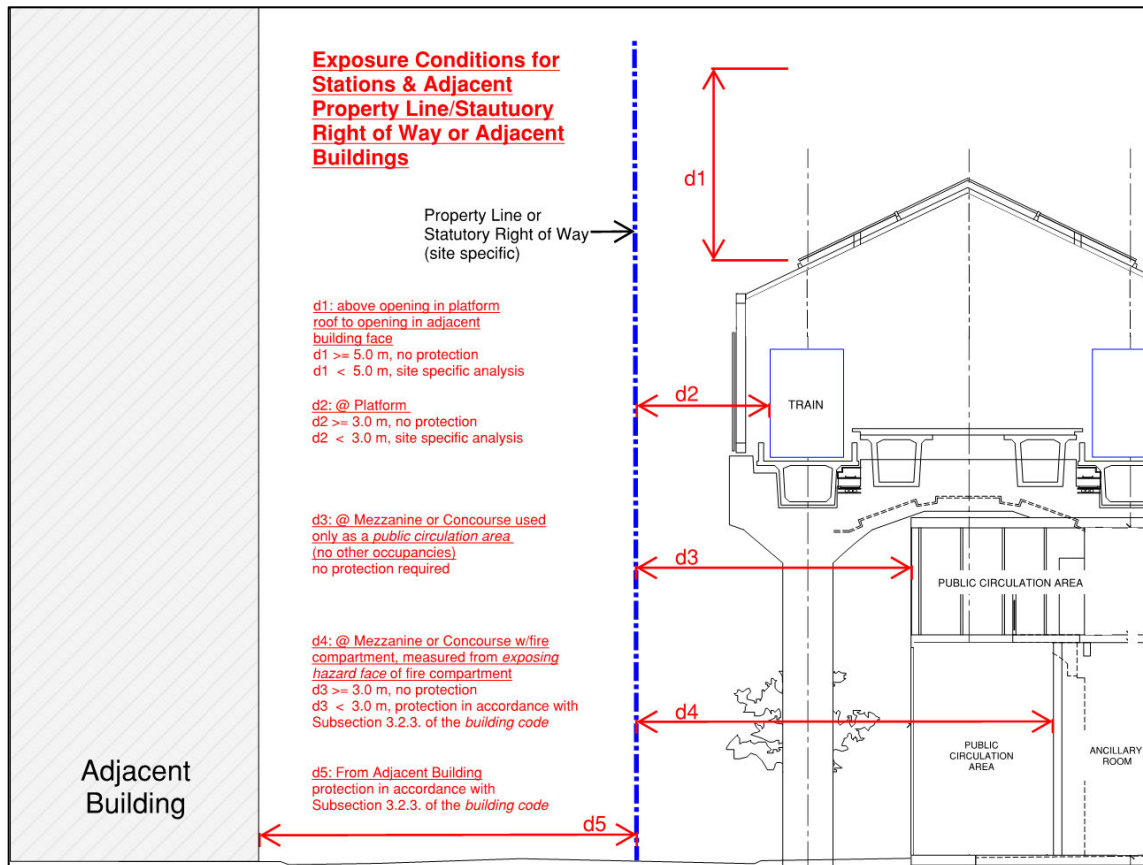
Guideway crossings	(4)	Where the egress path crosses the <i>guideway</i> (a) means such as intermediate steps shall be provided to facilitate access to track level, (b) a crosswalk shall be provided at track level to assure walkway continuity, and (c) the crosswalk shall have as uniform a walking surface as possible at the top of rail.
Guards	(5)	Egress walkways that are more than 760 mm (30 in.) above the floor or grade below shall be provided with a continuous guard to prevent falls over the side opposite the track.
	A-3.4.3.1(5)	It is important that guards be configured so that they do not interfere with either the vehicle dynamic envelope or with egress from the train onto the walkway. For that reason, guards are not required on the track side of walkways, provided that the bottom of the guideway is closed by deck or grating so that persons could not fall through. Small gaps in continuity of the guard—as may be required for expansion joints—may be considered acceptable provided the gaps do not exceed the dimension that would be permitted for openings in guards by the locally applicable building code.
Handrails	(6)	Except as required in Sentence 3.4.3.1(7), egress walkways, ramps and stairs shall be provided with a handrail that shall not obstruct egress from the train and shall not intrude into the vehicle dynamic envelope.
	A-3.4.3.1(6)	Handrails along walkways are intended for guidance and support and should therefore be continuous to the extent practicable, but gaps to facilitate access to emergency equipment and egress doors may be considered acceptable. The intent is that handrails should be designed and installed in accordance with dimensional and loading requirements in the building code. It may be necessary to eliminate handrails for some portions of the egress path where egress walkways cross over the tracks.
Handrails	(7)	Handrails are not required where walkways are greater than 1120 mm (44 in.) wide and located between two trainways.
	A-3.4.3.1(7)	Handrails can provide guidance and stability during evacuation but may not be feasible in all situations for centre walkways—i.e., they may block egress from a stopped train or they may interfere with the ability to provide the required walkway clearances on either side of the handrail.
Coverboards	(8)	Where traction power rail technology is utilized, protective coverboards designed in accordance with Subsection 3.2.3 shall be installed over the power rail at points of access to the <i>guideway</i> or where the power rail is adjacent to the walkway to prevent inadvertent contact with traction power.
Platform end gates	(9)	<i>Platform</i> end gates or doors shall be vertically hinged and shall swing in the direction of egress from the <i>guideway</i> .
	<b>3.4.3.2</b>	<b>Size of Egress Facilities</b>
Minimum width	(1)*	Except as provided in Article 3.4.3.3, the minimum width for egress facilities serving <i>guideways</i> shall be in accordance with Sentences (2) and (3).

Minimum width	(2) The minimum width for walkways serving as an egress path within the <i>guideway</i> shall be 610 mm (24 in.) at the walking surface, graduating symmetrically to 760 mm (30 in.) at 1575 mm (62 in.) above the walking surface and to 430 mm (17 in.) at 2025 mm (80 in.) above the walking surface.
	A-3.4.3.2(2) The intent is for the required widths to be measured to the vehicle static envelope in consideration that the criteria anticipates an emergency evacuation condition when the train would be stopped. The rapid transit system owner or operator should be consulted to confirm if other requirements are applicable—e.g., measurement to the vehicle dynamic envelope may be applicable if the egress route is also intended to be used for rapid transit system service personnel during train-running. Handrails are permitted to intrude into the minimum width in accordance with provisions in the building code. Other intrusions are discouraged but may be permitted where the intrusions are occasional and intermittent and maintain at least the clear widths stipulated in Sentence 3.4.3.3(4) for platform end gates.
Platform end gates	(3)* <i>Platform</i> end gates or doors shall provide not less than 455 mm clear width at and below a height of 1000 mm and at least 530 mm clear width above that height.
	A-3.4.3.2(3) Refer also to Sentence 3.4.3.1(9)
	<b>3.4.3.3 Underground Guideways</b>
Distance to exit	(1)* Except as required by Sentence (2), egress paths from <i>underground guideways</i> shall be configured such that the maximum distance between exits is 762 m.
	A-3.4.3.3(1) When measuring the distances prescribed in Sentence (1), the following considerations should be taken into account: <ul style="list-style-type: none"> <li>– Entry through the end-platform gate onto the station platform may serve as an exit from the guideway.</li> <li>– Where a segment of the underground guideway includes track cross-overs, they should be included as part of the measured guideway segment and should not be considered as exits.</li> <li>– The configuration and location of exits should be compatible with prescribed emergency evacuation procedures for the rapid transit system as determined through consultation with the owner and/or operator of the rapid transit system.</li> </ul>

Design of egress via cross-passages	<p>(2)* Where cross-passages leading to an adjacent <i>guideway</i> serve as exits from an <i>underground guideway</i> as permitted in Sentence 3.4.2(1)</p> <p>(a) the cross-passages shall be located such that</p> <p>(i) the distance between a station platform and adjacent cross-passage is not more than 381 m, and</p> <p>(ii) the distance between adjacent cross-passages is not more than 244 m,</p> <p>(b) the minimum clear width and ceiling height of the cross-passage shall be 1100 mm and 2100 mm respectively,</p> <p>(c) the adjacent <i>guideways</i> shall be separated by a fire separation having a fire-resistance rating of not less than 2 hours, and</p> <p>(d) any opening in the fire separation shall be protected with a closure which</p> <p>(i) has a fire protection rating of not less than 1½ hours,</p> <p>(ii) is permitted to be a sliding door, and</p> <p>(iii) is equipped with a self-closing device designed to return the closure to a closed position after each use.</p>
	<p>A.3.4.3.3(2) For Clause (a),</p> <ul style="list-style-type: none"> <li>– In Subclause (i), the distance is derived from the maximum permitted distance between exits as stipulated in Sentence 3.4.3.3(1)—i.e., 381 m is equivalent to one-half of 762 m.</li> <li>– In addition to the information listed in A.3.4.3.3(1), cross-passages should be located away from cross-overs to minimize the potential for degraded performance of the emergency ventilation system (e.g., re-circulation through the cross-passage or increased spill-over from the cross-over). A minimum separation distance of 100 m is suggested but should be confirmed through engineering analysis.</li> </ul> <p>For Clause (c), the cross-passage door or closer should also be equipped with a sensor that will annunciate door opening and the location of the door to the OCC via the Wayside Monitoring System.</p>
Coordination of cross-passage and service walkway	<p>(3) Where cross-passages are provided, egress walkways shall be provided on the cross-passage side of the <i>guideway</i> for unobstructed access to the cross-passage.</p>
Doors	<p>(4)* Doors providing egress from the <i>guideway</i> shall,</p> <p>(a) Except for cross-passage doors, open in the direction of exit travel.</p> <p>(b) Open fully when a force not exceeding 220 N (50 lb) is applied to the latch side of the door, and</p> <p>(c) Be adequate to withstand positive and negative pressures caused by passing trains and the emergency ventilation system.</p>
Means of egress serving underground guideways	<p>(5)* The minimum width of means of egress facilities serving <i>guideways</i> shall be</p> <p>(a) 1100 mm for corridors and ramps,</p> <p>(b) 1100 mm for stairs, and</p> <p>(c) 900 mm for each gate or door leaf.</p>
	<p>A-3.4.3.3(5) Egress facilities serving guideways are not required to exceed the minimum width, regardless of the occupant load. This is based on the assumption that evacuation flow would be essentially single file and would not converge with other egress routes.</p>

## ANNEX A – EXPLANATORY INFORMATION

As explained in A-1.1.2(1), Annex A explanatory information is included throughout the document as shaded text underneath the relevant requirements. This portion of the Annex A material is provided separately to present diagrammatic explanatory information associated with Sentence A-2.2.3(2) and Article A-3.2.4.1.



**Figure 1 - Spatial Separation and Exposure Protection Requirements for Aboveground Stations**



## ANNEX A – EXPLANATORY INFORMATION

**Exposure Conditions  
for Guideways &  
Adjacent Buildings**

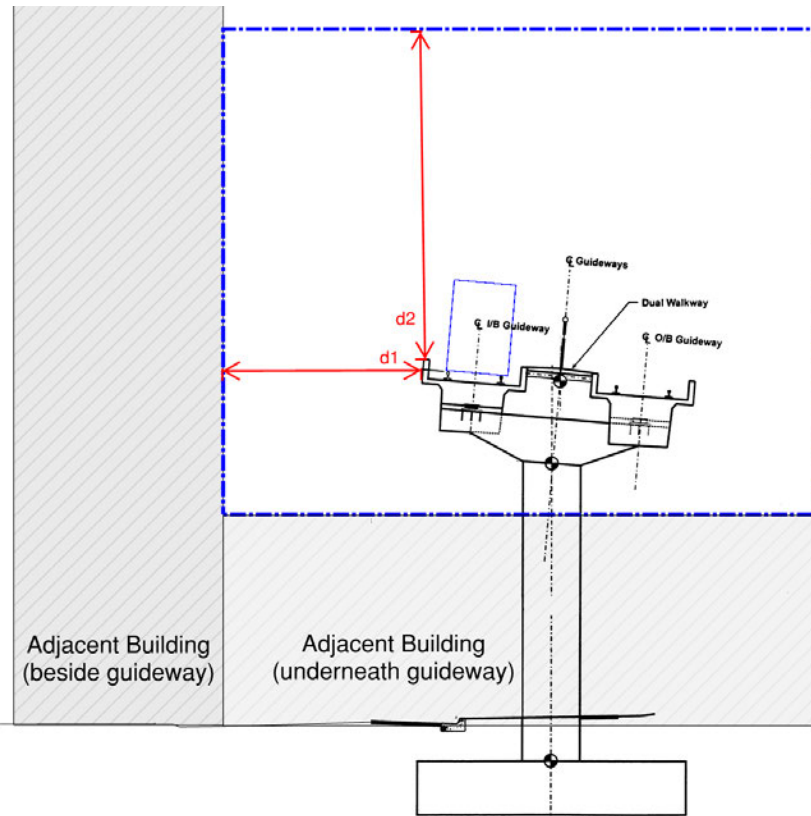
Guideway to adjacent building:  
no exposure protection required

Adjacent building to guideway:  
exposure protection in accordance  
with the building code, except for  
protection of the guideway -

d1:  
d1  $\geq$  3.0 m, no protection  
d1 < 3.0 m, site specific analysis

d2:  
d2  $\geq$  5.0 m, no protection  
d2 < 5.0 m, site specific analysis

Adjacent building underneath  
guideway:  
Adjacent building to be fully sprinklered  
and roof assembly to have a  
fire-resistance rating not less than 1 h.



**Figure 2 - Spatial Separation and Exposure Protection Requirements for Aboveground Guideways**