



City of Port Moody

Bylaw No. 2850

A Bylaw respecting internal radio communications and support systems in certain buildings.

WHEREAS certain buildings and structures constructed of steel, reinforced concrete or reflective glass can interrupt the operation of emergency services communications networks thereby affecting emergency response;

Radio support and amplification systems within buildings or structures can overcome the interruption of emergency communication networks and facilitate emergency response, thereby improving public safety, policing, and emergency services; and

Internal amplification systems would enhance the safety of occupants and emergency responders in buildings that use radio opaque construction;

NOW THEREFORE, the Council of the City of Port Moody, in open session assembled, enacts as follows:

1. Title

This bylaw may be cited for all purposes as “City of Port Moody Public Safety Radio Building Amplification System Bylaw, 2010, No. 2850”.

2. Interpretation

2.1 Definitions

In this Bylaw,

“**Adequate Radio Coverage**” has the meaning ascribed in section 3.1;

“**Amplification System**” means the internal booster radio support and amplification system that increases and supports the radio frequencies used by E-Comm;

“**Building Official**” includes Building Inspectors, Plan checkers and Plumbing Inspectors designated by the City of Port Moody;

“**City**” means the City of Port Moody;

“Dispatch Center” means the contracted Dispatch Service used by the Fire Department and the Police Department;

“E-Comm” means Emergency Communications for Southwest British Columbia Incorporated and all the features and functions of the 800 MHZ trunked radio telecommunications systems, including microwave and VHF/UHF radio systems, provided by E-Comm to fire services, law enforcement and other emergency services;

“Fire Chief” means the person appointed by the City to be the head of the Fire Rescue Department, and reference in this Bylaw to the Fire Chief includes the Deputy Fire Chief and Assistant Fire Chief acting on the Fire Chief’s behalf or during the absence of the Fire Chief;

“Fire Department” means the City of Port Moody Fire and Emergency Services Department;

Owner means the registered owner of real property on which is located a building or structure regulated by this Bylaw, including co-owners; and in the case of common property under the *Strata Property Act*, includes the strata corporation;

“Permit” means permission or authorization in writing by the Building Official to perform work regulated by City of Port Moody Building and Plumbing Code Administration Bylaw, No. 2577;

“Shadowed Area” means an area that suffers attenuation or obstruction of radio signals to or from the area as a result of the interposition of all or any part of a building or structure in the radio signal path (line of sight) between the area and the transmitting/receiving site of E-Comm;

“Test Operator” means an individual or company with experience in testing radio communications signals and whose credentials are deemed satisfactory to the Fire Chief.

2.2 Except as otherwise defined in this Bylaw, words and phrases herein are to be construed in accordance with their meanings under the *Community Charter*, the B.C. *Building Code* or the *Interpretation Act*, as the context and circumstances require. A reference to a statute in this Bylaw refers to a statute of the Province of British Columbia unless otherwise indicated, and a reference to any statute, regulation, code or bylaw refers to that enactment as it may be amended or replaced from time to time. Headings are for convenience only and must not be construed as defining or in any way limiting the scope or intent of this Bylaw. If any part of this Bylaw is declared or held to be invalid by a court of competent jurisdiction, that invalid part shall be severed and the remainder of this Bylaw shall be deemed to have been enacted and adopted without the invalid part.

2.3 This Bylaw shall apply to all building and construction in the City for which a permit is required, except:

- (a) any single-family detached or semi-detached residence;
- (b) any building or structure constructed of wood frame and not metal-clad;
- (c) any building or structure with a horizontal area less than 500 square metres; or
- (d) any building or structure less than 12 metres in height.

3. Requirements to Provide a Radio Communications Support System

3.1 For the purposes of this Bylaw, "Adequate Radio Coverage" shall include all of the following criteria:

- a) E-Comm system access and Delivered Audio Quality ("DAQ") of 3.4 or better allowing speech to be understandable without repetition, albeit with some noise or distortion may be present, to meet the standard of the U.S. Department of Commerce, Nation Telecommunication and Information Administration ("NTIA")'s five point scale for evaluating radio system performance. DAQ 3.4 has been measured by NTIA to be approximately equivalent to 22 dBs (22 dB signal-plus-noise-plus-distortion-to-noise-plus-distortion) for analog signals modulated with a 1 kHz tone at 1.5 kHz deviation, and to 2% bit error rate for P25 digital signals. DAQ 3.4 is also approximately equivalent to a received signal level of -109 dB/milliwatt (0.8 microvolts across a 50-ohm load), in the absence of other signals that may affect the receiver;
- b) the minimum signal strength available to the portable radio equipment shall be not less than 100 microvolt per metre (.0001 V/m or 100 µV/m); and
- c) the radio frequency range to be supported is 798-824 MHz (700 MHz and 800 MHz uplink to E-Comm base station receivers), 768-776 MHz (700 MHz downlink to portable radio receivers), and 851-869 MHz (800 MHz downlink to portable radio receivers).

Amended
by BL3005
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3.2 Except as otherwise provided, no person shall erect, construct, change the use of or provide an addition of more than 20% floor area to any building or structure, or cause suffer or allow the same to be done, unless adequate Radio Coverage is provided for two-way communication between a portable (handheld) radio using a simple flexible whip antenna and transmitting/receiving sites:

- a) within a building, for at least ninety percent (90%) of the area of each floor of the building, including underground areas; and
- b) within a building, for all (100%) of those areas designed or designated in the building as being fire command centres, stairwells, protect-in-place areas, lobby refuge areas, equipment rooms and high-hazard areas; and
- c) for areas that are in a Shadowed Area of a building or structure, for at least ninety percent (90%) of all areas where it is possible to provide Adequate Radio Coverage could be achieved before the erection, construction or modification of that building or structure that created the Shadowed Area.

3.3 The radio signal strength required within a building is not required to be greater than that delivered by the Dispatch Center to the receiving antenna location of the Amplification System; and the radio signal delivered to the Dispatch Center is not required to be greater than that delivered by an emergency service portable radio operated at head height by an emergency service provider standing at the location for the transmit antenna for the Amplification System. In each case, the location for the receive and transmit antennas of the Amplification System must be favourable for the reception and transmission of emergency service radio signals, as determined by the Fire Chief.

- 3.4 The radio signal strength required within a Shadowed Area of a building is not required to be greater than that which would be delivered by the Dispatch Center within the Shadowed Area prior to erection, construction or modification of the building or structure; and the radio signal strength delivered to the Dispatch Center is not required to be greater than that which would be delivered from the Shadowed Area prior to erection, construction or modification of the building or structure. If active amplification is required to restore communications quality in the shadowed Area, and Public Safety radio equipment operating in the frequency range noted in section 3.1 (c) utilizes simulcast technology, then the system design must be submitted for approval by the Fire Chief prior to construction.
- 3.5 All active amplification systems components must meet or exceed Industry Canada licensing requirements.

4. Amplification Systems Allowed

- 4.1 Where a building or structure must provide an Amplification System to achieve Adequate Radio Coverage to comply with section 3.2 of this Bylaw, such Amplification System shall include any of the following that achieve the required criteria:
- a) a passive antenna system or radiating cable system;
 - b) an internal multiple antenna system with uni-directional or bi-directional amplifiers as required;
 - c) a voting receiver systems; or
 - d) an alternative solution or equivalent measure acceptable to the Fire Chief.
- 4.2 If any part of the installed Amplification System contains an electrically powered component, the Owner must ensure that:
- a) the Application System is equipped to operate on an independent Uninterruptible Power Supply (“UPS”), using a battery or generator system or both, for a period of at least four hours without external input or maintenance;
 - b) if the UPS uses a battery, the UPS shall automatically charge the battery in the presence of external power; and
 - c) the UPS shall provide a monitored alarm signal to indicate failure of primary power, failure of the UPS system power output, and discharge of the batteries (as applicable).

Silencing of this alarm shall be the responsibility of the person maintaining the Amplification System. The Owner shall notify the Fire Chief of any failure of the UPS that extends beyond two (2) hours.

5. Procedures to Verify and Maintain Compliance

5.1 Every Owner must arrange for regular tests by a Test Operator to verify initial compliance with this Bylaw, at the sole expense of the Owner, using testing procedures that are acceptable to the Fire Chief and that observe the following requirements:

- a) Acceptance tests may only be performed
 - (i) after installation of the Amplification System is complete;
 - (ii) using radio frequencies assigned to the Dispatch Center; and,
 - (iii) with the City's Police Chief and Fire Chief sufficiently notified and available for a coordinated assessment with the manager of the Amplification System.
- b) If queuing occurs on the radio system while testing is underway, testing shall be terminated immediately and resumed only when traffic levels on the radio system drop to the level where queuing will no longer occur;
- c) Where the Shadowed Area, or the floor plate area of a building:
 - (i) is greater than 4,500 m², the area shall be divided into a uniform grid of not more than 15 m on a side, or
 - (ii) is smaller than 4,500 m², it shall be divided into a uniform grid of approximately 20 equal areas,

measurements shall be taken at the centre of each grid area.

The size of the grids shall also be reduced, or the number of grids increased, upon recommendation of the Fire Chief or Building Inspector in areas where special construction or other obstruction may significantly affect radio signals.

- d) Tests shall also be performed in fire command centres, stairwells, protect-in-place areas, lobby refuge areas, equipment rooms, and high-hazard areas without the use of a grid system.
- e) Tests shall first be made using a portable (handheld) radio of the type used by emergency service providers, held at head level and using a simple flexible whip antenna, and shall be deemed satisfactory if Adequate Radio Coverage can be achieved for a five-second test transmission in each direction. If system access is not reliable, or if Adequate Radio Coverage for five seconds cannot be achieved at any location, the Test Operator may move a maximum of 1.5 m in any direction from the centre of the grid and repeat the test. If system access continues to be unreliable, or if Adequate Radio Coverage still cannot be achieved, or if there is any doubt about whether it can be achieved, a failure shall be recorded for that grid area.
- f) A maximum of two (2) non-adjacent grid areas on a floor or in a Shadowed Area may be allowed to fail the test. In the event that three (3) or more grid areas on a floor or in a Shadowed Area fail the test, the floor or Shadowed Area may be divided into 40 approximately equal areas and the tests repeated. In such event, a maximum of four (4) non-adjacent grid areas may be allowed to fail the test. If the Amplification System fails the 40-area test, the Owner must have the Amplification System altered to meet

the 90% coverage requirement in subsection 3.2 (a); otherwise the Amplification System will not be accepted.

- g) If the Amplification System fails to provide Adequate Radio Coverage in any of the fire command centre, any portion of a stairwell, protect-in-place areas, lobby refuge areas, equipment rooms, or high-hazard areas, the Owner must have the Amplification System altered to meet the 100% coverage requirement for these areas in subsection 3.2(ii), otherwise the Amplification System will not be accepted.
 - h) UPS batteries and power supplies must be tested under full load for a duration of no less than one hour. If within the one-hour period, the UPS shows any symptom of failure or impending failure, the test must be continued to determine the integrity of the UPS. If the UPS fails within a four-hour continuous test period, such UPS will not be accepted.
- 5.2 For the purposes of this Bylaw, the maximum Shadowed Area of a building shall be the width of the building perpendicular to a line directed toward the serving Dispatch Center site multiplied by five times the maximum height of the building. Prior to construction or modification of the building, the Owner must ensure a Test Operator performs tests to determine the existing radio coverage in the Shadowed Area, and the results recorded. Tests must be repeated following construction, at the same locations, and the results compared. The test guidelines and acceptance criteria described in section 3.1 must be used for the Shadowed Area of a building; however, the tests must be performed at 20 approximately equally-spaced locations at ground level within the Shadowed Area and at 20 approximately equally-spaced locations on or in buildings within the Shadowed Area, as applicable. A failure must be recorded for any location that could support Adequate Radio Coverage prior to construction, but is unable to support Adequate Radio Coverage following construction.
- 5.3 The gain values of all amplifiers in an Amplification System shall be measured, using test equipment that has been calibrated by a certified laboratory within the past 12 months, and the results shall be kept on file by the Owner for future verification and monitoring of performance. In the event that the gain records become lost, the Owner shall re-run the acceptance tests at its sole expense.
- 5.4 At least once per calendar year, the Owner shall retain a Test Operator to test all active components of the Amplification System, including but not limited to all amplifiers, power supplies and back-up batteries, and shall keep a record of such tests for inspection by the Fire Chief or other inspector designated by the City. The Test Operator may adjust the amplifier gain if necessary to re-establish the gain recorded upon acceptance testing, and batteries and power supplies shall be tested under load for a period of at least one hour to verify that they will function properly during a power outage.
- 5.5 Additional tests or inspection of records may be conducted from time to time by the Fire Service at the discretion of the Fire Chief, after giving reasonable notice to the Owner. If the radio signal within the building or within the Shadowed Area appears to have degraded, or if the tests show Inadequate Radio Coverage, the Owner of the building or structure is required to remedy the problem and restore the Amplification System in a manner consistent with the original acceptance criteria, unless the Owner can demonstrate conclusively that the degradation is solely the result of external changes not under his or her control.

- 5.6 All test reports of tests described in this Section 5 must be certified by a professional engineer registered in the Province of British Columbia and qualified in radio communications, not directly affiliated with the Test Operator. Test reports will not be deemed conclusive or acceptable for the purposes of this Bylaw unless they bear the seal of a professional engineer.
- 5.7 SINAD (ratio of signal-plus-noise-plus-distortion-to-noise-plus-distortion) and signal strength measurements shall be made using appropriate instrumentation acceptable to the Fire Chief. The Test Operator shall ensure that the Test Operator's radios and measurement equipment have been tested for conformance to design specifications within twelve months prior to the conduct of Amplification System acceptance tests or re-tests.

6. Exemptions

This Bylaw shall not apply to:

- a) any single-family detached or semi-detached residence;
- b) any building or structure constructed of wood frame and not metal-clad;
- c) any building or structure with a horizontal area less than 500 square metres; or,
- d) any building or structure less than 12 metres in height.

7. Permit Conditions

An applicant for a Permit for a building where a radio amplification system is required under this Bylaw must provide the Building Official with a document signed by a professional engineer certifying that:

- (a) The building includes a radio amplification system that has been installed in accordance with sections 3, 4 and 5 of this Bylaw;
- (b) The radio amplification system has been tested and operates in accordance with section 5 of this Bylaw; and,
- (c) The professional engineer has the necessary knowledge, skill and experience to certify this document.

8. Right of Entry

The Building Official, the Fire Chief, or their authorized designate, in accordance with section 16 of the *Community Charter*, may enter into and inspect any building or structure to ascertain whether the regulations and provisions of this Bylaw are being obeyed.

9. Fees and Cost Recovery

- 9.1 For each coordinated assessment involving the City's Police Chief, Fire Chief or other City personnel to verify compliance with this Bylaw following an initial assessment under section 5, and for any subsequent inspections and assessments conducted by City officials where a building is found to be non-compliant with this Bylaw, the Owner must pay the fees set out in the *City of Port Moody Fees Bylaw, 1997 No. 2340 / Schedule B*.
- 9.2 Where it appears that a building or structure is in contravention of this Bylaw, or that a requirement under this Bylaw has not been met, the Manager of Building, Bylaws and Licensing may, by notice in writing, direct the Owner or another person to take the required action. If the person, having been delivered of the notice, fails to take the required action within the time period set out in the notice, the Manager may direct City staff to fulfill the requirements at the expense of the Owner or other person.
- 9.3 Any fees imposed under this Bylaw, and any costs incurred by the City for work done under subsection 9.2, become a debt owing to the City from the date an invoice is delivered to the Owner or other person. Any debt that remains owing and unpaid as of December 31st of the year in which the debt was incurred may be treated as taxes in arrears and recovered in the same manner and with the same remedies as for collection of property taxes.

10. Notices

10. A notice under this Bylaw shall be sufficiently delivered:
- (a) by mailing the notice to or leaving it with the person to whom it is directed, or by deposit in the person's mailbox or receptacle at the person's place of business or residence;
 - (b) to an owner, by mailing or otherwise delivering the notice to the address of the last known property owner; or
 - (c) if the person to whom it is directed cannot be found, is not known, or refuses delivery, by posting a copy of the order in a conspicuous place on any real property that is the subject of the notice.

11. Offences and Penalties

- 11.1 A person who:
- (a) contravenes, violates or fails to comply with any provision of this Bylaw;
 - (b) permits, suffers or allows any act or thing to be done in contravention of the Bylaw; or
 - (c) fails or neglects to do anything required to be done under this Bylaw,
- commits an offence, and where the offence is a continuing one, each day that the offence is continued shall constitute a separate offence.

11.2 Upon conviction of an offence under this Bylaw, a person shall be liable:

- (a) if issued a ticket under the *City of Port Moody Ticket Information Utilization Bylaw, 1996, No. 2298*, to pay a fine imposed under that Bylaw; and
- (b) if proceedings are brought under the *Offence Act*, to pay a fine of up to ten thousand dollars (\$10,000), and any further amounts that may be ordered by the court under the *Community Charter* or the *Offence Act*.

BYLAW 2850 ADOPTED
AMENDMENT No. 1, 2015, No. 3005

December 14, 2013
July 14, 2015