



# THE CORPORATION OF THE CITY OF PORT COQUITLAM

## BYLAW NO. 3738

### *A Bylaw to provide for Public Safety Radio Building Amplification Systems within the City*

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*WHEREAS there is a need for certain buildings and structures to have internal radio support systems to ensure the uninterrupted operation of the City's fire services, law enforcement, and other emergency-related radio communications networks essential to public safety, policing, and emergency response;*

*AND WHEREAS certain buildings and structures constructed of steel, reinforced concrete or reflective glass can be radio opaque thereby interrupting the operation of emergency services communications networks;*

*AND WHEREAS radio support and amplification systems within buildings or structures can overcome the interruption of emergency communication networks and are vital to public safety, policing, and emergency services;*

*AND WHEREAS Council has the authority to enact requirements under its statutory powers, including subsections 8(3), 8(7), 8(8), and 63 of the Community Charter, S.B.C. 2003, c. 26.*

*Now therefore Municipal Council of The Corporation of the City of Port Coquitlam, in open meeting assembled, enacts as follows:*

#### **1. CITATION**

This Bylaw may be cited for all purposes as the "Public Safety Radio Building Amplification System Bylaw No. 3738".

#### **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 Inspector"** means the person(s) appointed by the City to be building inspectors, or such person's authorized designate;

"City" means the City of Port Coquitlam;

"Dispatch Center" means the dispatch service used by the Fire Department;

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

"Fire Chief" means the person appointed by the City to be the head of the Fire 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 Coquitlam Fire and Emergency Services Department;

"Owner" means an owner of a building or structure regulated by this Bylaw, including co-owners;

"Permit" means authorization in writing by the Building Inspector to perform construction or demolition of a building or structure, or to permit occupancy of a building or structure, all as regulated by the City's current Building and Plumbing Bylaw, as amended;

"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; and

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

### **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 (speech understandable without repetition, some noise or distortion may be present), being 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  $\mu$ V/m); and
- c) the radio frequency range to be supported shall be 806-824 MHz (uplink to base station receivers) and 851-869 MHz (downlink to portable radio receivers). If signal amplifiers are used, they shall include filters that will protect the amplifiers from overload and the system from interference of out-of-band signals.

For the purposes of interpreting this Bylaw, "Inadequate Radio Coverage" means radio coverage that does not meet all of the above criteria.

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 the same to be done, which results in Inadequate Radio Coverage for two-way communication between a portable (handheld) radio using a simple flexible whip antenna and transmitting/receiving sites:

- a) within a building, for more than 10% of the area of each floor of the building, including underground areas; and
- b) within a building, for any part 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 more than 10% of all areas where Adequate Radio Coverage could be achieved before the erection, construction or modification of that building or structure that created the Shadowed Area.

3.3 In no case does this Bylaw require that the radio signal strength required within a building be greater than that delivered by the Dispatch Center to the receive antenna location of the Amplification System; nor the radio signal delivered to the Dispatch Center 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 shall be favourable for the reception and transmission of emergency service radio signals, as determined by the Fire Chief.

3.4 In no case does this Bylaw require that the radio signal strength required within a Shadowed Area of a building 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; nor shall the radio signal strength delivered to the Dispatch Center 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 in the event that 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 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 are sufficient to achieve the required criteria:

- a) passive antenna systems or radiating cable systems;
- b) internal multiple antenna systems with uni-directional or bi-directional amplifiers as required;
- c) voting receiver systems; or
- d) any other system acceptable to the Fire Chief, as signified in writing on a case by case basis.

4.2 If any part of the installed Amplification System contains an electrically powered component, the Owner shall 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 The Owner of a building regulated by this Bylaw shall arrange for regular tests by a Test Operator to verify initial compliance with this Bylaw, at the sole expense of the Owner. The procedures used for testing shall be developed by the Owner, subject to acceptance by the Fire Chief, and in compliance with the following testing guidelines:

- a) Acceptance tests shall be performed after completion of installation of the Amplification System. Tests shall be performed using radio frequencies assigned to the Dispatch Center, after proper coordination with the manager of that system, and

with the Fire Chief and the Officer in Charge of the RCMP for the City of Port Coquitlam;

- 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, is greater than 4,500 m<sup>2</sup> the area shall be divided into a uniform grid of not more than 15 m on a side, or if the floor area is smaller than 4,500 m<sup>2</sup> it shall be divided into a uniform grid of approximately 20 equal areas, and 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. 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;
  - d) 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;
  - e) A maximum of two (2) non-adjacent grid areas on a floor or in a Shadowed Area will 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 will be allowed to fail the test. If the Amplification System fails the 40-area test, the Owner shall have the Amplification System altered to meet the 90% coverage requirement in section 3.2(a); otherwise the Amplification System will not be accepted;
  - f) 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 shall have the Amplification System altered to meet the 100% coverage requirement for these areas in section 3.2(b), otherwise the Amplification System will not be accepted; and
  - g) UPS batteries and power supplies shall be tested under full load for 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 shall 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 shall ensure a Test Operator performs tests to determine the existing radio coverage in the Shadowed Area, and the results recorded. Tests shall be repeated following construction, at the same locations, and the results compared. The test guidelines and acceptance criteria described in section 3.1 shall be used for the Shadowed Area of a building; however, the tests shall 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 shall be recorded for any location that could support Adequate Radio Coverage prior to construction, but cannot 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 of less than 500 square metres; or
- d) any building or structure less than 12 metres in height.

## **7. PERMIT CONDITIONS**

No Permit shall be issued for any building or structure until the requirements of this Bylaw have been met to the satisfaction of the Building Inspector and the Fire Chief.

## **8. RIGHT OF ENTRY**

Every Owner or occupant of a building shall, at all reasonable times, permit the Building Inspector, the Fire Chief, or their authorized designate to enter into and inspect any building or structure to ascertain whether the regulations and provisions of this Bylaw are being obeyed and any person who refuses entry shall be in violation of this Bylaw and shall be liable to the penalties hereby imposed.

## **9. DEEMED NUISANCE**

The construction or erection of a building or structure which interferes with the City's fire services, law enforcement and other emergency related telecommunications networks shall constitute a nuisance because it threatens the health, safety and welfare of the residents and visitors to the City. In addition to any other remedies or enforcement procedures provided herein, the City may seek an injunction to restrain such a nuisance.

## **10. COST RECOVERY**

- 10.1 Wherever this Bylaw imposes a requirement on a person that something be done, Council may, by resolution, direct that the person take the action and then provide written notice of the resolution to the person. If, after receiving written notice, the person does not take the action within the time permitted in the resolution, the City staff may:
- a) fulfill the requirement at the expense of the person, and
  - b) recover the costs incurred from that person as a debt.
- 10.2 Any debt resulting from section 10.1 may be recovered pursuant to section 258 of the *Community Charter*.

## **11. SEVERABILITY OF PROVISIONS**

If any section, subsection or clause of this Bylaw is declared or held to be invalid by a court of competent jurisdiction, then that invalid portion will be severed and the remainder of this Bylaw will be deemed to have been enacted and adopted without the invalid and severed section, subsection or clause.

*Read a first time by the Municipal Council this 20<sup>th</sup> day of September, 2010.*

*Read a second time by the Municipal Council this 20<sup>th</sup> day of September, 2010.*

*Read a third time by the Municipal Council this 20<sup>th</sup> day of September, 2010.*

*Adopted by the Municipal Council of the Corporation of the City of Port Coquitlam this 12<sup>th</sup> day of October, 2010.*

**GREG MOORE**  
*Mayor*

**SUSAN RAUH**  
*Corporate Officer*