



POLICY REPORT  
DEVELOPMENT AND BUILDING

Report Date: November 2, 2010  
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Meeting Date: November 18, 2010

TO: Standing Committee on Planning and Environment

FROM: Director of Planning, in consultation with the Chief Building Official and the Director of Legal Services

SUBJECT: Northeast False Creek - Report Back on Event Noise - Noise Control By-law Amendments and Related Policies

**RECOMMENDATION**

- A. THAT Council approve amendments of the Noise Control By-law No. 6555 to identify Northeast False Creek as an event area, and to extend the day time permitted noise limits to 11 pm for BC Place Stadium, Rogers Arena and the proposed Civic Plaza, generally in accordance with Appendix A.
- B. THAT Council approve the 'Policies for the Mitigation of Event-related Noise for Residential Buildings,' as attached in Appendix B.
- C. THAT Council approve the 'Approach for Drafting Protocols for the Monitoring and Management of Event-related Noise,' as attached in Appendix C.

**GENERAL MANAGER'S COMMENTS**

The General Manager recommends approval of the foregoing noting that the recommended Noise Control By-law amendments and related policies reflect Council's support for Northeast False Creek to remain a district for hosting major sport, entertainment, cultural and community events while adding a significant amount of residential development in close proximity to the three event venues. It is prudent to understand the event-related noise impacts on the proposed housing and consider practical and effective solutions for noise attenuation.

Regarding Recommendation B, the introduction of a target for mitigating dBC or 'deep bass' sound levels related to events is a new requirement that goes beyond what has been applied elsewhere for residential development in the downtown. The frequency and type of events in

NEFC warrants a new approach to residential development beyond the consideration of traffic noise.

Mitigating event noise (especially deep base or dBC noise) is anticipated to require a change to the standard approach to the design of residential towers through either reduced glazed area or the use of thicker glazing for facades oriented to event noise sources.

The City's Sustainability Group is identifying reduced glazing as a demonstrated way to improve energy conservation. In endorsing the NEFC Directions, Council recognized that adding residential buildings in close proximity to the event venues in NEFC would be a challenge. The developers of NEFC must rise to the challenge and demonstrate that new residential towers in this area will respond appropriately to the unique noise context and advance sustainability with a focus on energy conservation.

### *COUNCIL POLICY*

In 1995, Council amended the Noise Control By-law to allow BC Place Stadium to exceed the permitted noise levels in the By-law up to no more than 10 times per year for concerts and motor vehicle events.

In 2005, Council resolved that existing special event, festival and entertainment functions would be the primary activities of the Plaza of Nations, BC Place and GM Place.

In 2008, the False Creek North Official Development Plan was amended identifying Northeast False Creek (NEFC) "as a centre for entertainment, sports, and cultural and public events, serving the City and region (see Appendix E).

In 2009, Council approved the 'Northeast False Creek: Directions for the Future,' calling for the pursuit of a series of measures to address the noise associated with events, including building design requirements, resident notification and event noise standards to address the compatibility of housing and events.

### *PURPOSE AND SUMMARY*

The following report has been prepared in response to Council's direction on February 4, 2010 to work with the Northeast False Creek developers and the community to prepare Noise By-law amendments, acoustical building design requirements and a preferred method for notifying future purchasers and existing residents about events.

This report presents: (1) Noise Control By-law amendments (see Appendix A) designating NEFC as an event zone and extending daytime noise limits to 11 pm for BC Place Stadium, Rogers Arena and the Civic Plaza; (2) policies guiding the preparation and review of rezoning and development permit applications for housing on sites impacted by event noise (see Appendix B); and (3) Protocols for the Monitoring and Management of Event Noise (see Appendix C).

Northeast False Creek (NEFC) will be a unique area of the city with more than 7,000 residents living in close proximity to three of the city and region's significant event venues. It is anticipated that there will be events occurring 80 days and/or evenings a year with noise levels impacting housing that will exceed the City's Noise Control By-law. The exact impact of event noise on housing will depend on the location of the housing and the orientation of units to event venues.

Staff are recommending these measures and additional standards because those living in NEFC will be impacted by noise that is greater than most locations in Vancouver and for longer periods of time. The measures are recommended to allow for the continued operation and viability of the venues; to address the liveability of the housing by proposing additional mitigation measures in the design of housing; and to monitor and manage event noise. The by-law amendments, policies and protocols seek to achieve a balance between the significant role of Northeast False Creek as a vibrant city-wide and regional event area, and the residential role of the area.

The boundaries of the proposed event area in NEFC are identified in Map 2 on page 9.

## ***BACKGROUND***

### Northeast False Creek as an Event Area

In 2009 Council adopted a vision for Northeast False Creek that included the following key principles for the future development of the area:

"1. Create a Special Destination - Create a city and regional destination focusing on existing and new sports, entertainment, community and cultural events and facilities;

2. Establish a Unique Mixed-use Neighbourhood - Create a high density, mixed-use area that is a place to "play, work and live." Provide a different kind of liveability differentiating it from other waterfront areas that are predominantly places to live with few opportunities to work and play."

### The Current Regulation of Noise in NEFC

Noise generated by events is regulated by the Noise Control By-law. Noise is measured for Noise Control By-law purposes in two ranges: broad spectrum (dBA) and broad spectrum plus deep bass levels (dBC). Generally, noise at:

- 60 or more dBA reflects the sound level of conversation in a meeting;
- 70 dBA or more makes telephone conversations difficult;
- 80 dBA or more is annoying (comparable to a heavy truck passing 15 m away); and
- 60 dBA is perceived as twice as loud as noise at 50 dBA.

The most significant proven health issues resulting from excessive noise are sleep deprivation and stress according to the World Health Organization (WHO). WHO has published two major guidelines related to the health effects of noise: Guidelines for Community Noise (1999) and the Night Noise Guidelines for Europe (2009). WHO considers that sleep disturbance is likely to occur if the maximum level inside bedrooms repeatedly exceeds 45 dBA or if the time-averaged level over 8 hours exceeds 30 dBA. Hearing loss from noise requires long exposures to much higher levels of noise (e.g. noise at 90 dBA for more than 8 hours).

Potential noise impacts on livability and health in NEFC will depend on such factors as the timing of the completion of events and the management of noise related to loading and unloading for events. The proximity of housing to the source of noise and the regularity of adjacent events will vary.

The Noise Control By-law includes the following provisions relevant to the NEFC circumstances:

- Maximum exterior daytime noise level (until 10 p.m.) is 70 dBA and dBC at point of reception;
- Maximum exterior night time noise level (after 10 p.m.) is 65 dBA and dBC at point of reception;
- Commercial premises cannot exceed the ambient level of noise by more than 3 decibels in cases where they exceed the noise limits above;
- For mixed use buildings that include businesses generating music or other sources of significant noise, it must be possible to mitigate the noise levels in the interior of dwelling units in the same building to no more than 55 dBC;
- The Noise Control By-law provides that up to 10 concerts or motor vehicle events per year at BC Place Stadium are exempted from the noise limits in the By-law; and
- The Noise Control By-law provides that exceptions to the Noise Control By-law may be granted for a program or festivals, races and parades authorized by Council, and the Mayor may grant exceptions for construction.

In addition, the Zoning and Development By-law requires that building design mitigate noise levels (typically generated by traffic) to the follow maximums in the interiors of apartments:

- Bedrooms - 35 dBA;
- Living and Dining Rooms - 40 dBA
- Kitchens and Bathrooms - 45 dBA.

It is assumed that windows would be shut to achieve these levels. The Zoning and Development By-law does not have provisions for the mitigation of dBC noise, associated with events. The Noise Control By-law target of 55 dBC only applies to mixed use buildings containing housing and commercial uses with the commercial use generating noise that must be mitigated (established for older wood frame hotels with taverns on the ground floor).

#### Current and Projected Noise levels in Northeast False Creek

On a day to day basis it can be expected that traffic noise from the busy arterials and the skytrain will be the most significant source of noise impacting Northeast False Creek residents. The typical peaks for noise levels anticipated from these sources would range from 63 - 73 dBA and for deeper bass tones, 65 - 75 dBC.

Based on discussions with the managers of the NEFC event venues and initial projections of the number of days and evenings that the proposed civic plaza will be hosting events, it is anticipated that, in total, the three venues will host about 200 or more events a year with at least one-third exceeding the sound levels permitted in the current provisions of the Noise Control By-law (see Appendix 'D' for a table of projected events in NEFC).

Unlike traffic noise which typically declines after 6 pm, event noise may occur through the evening. It will also occur on a more infrequent basis during the day on Saturdays or Sundays. Events rarely go beyond 10:30 pm, with most patrons vacating the area by 11 pm

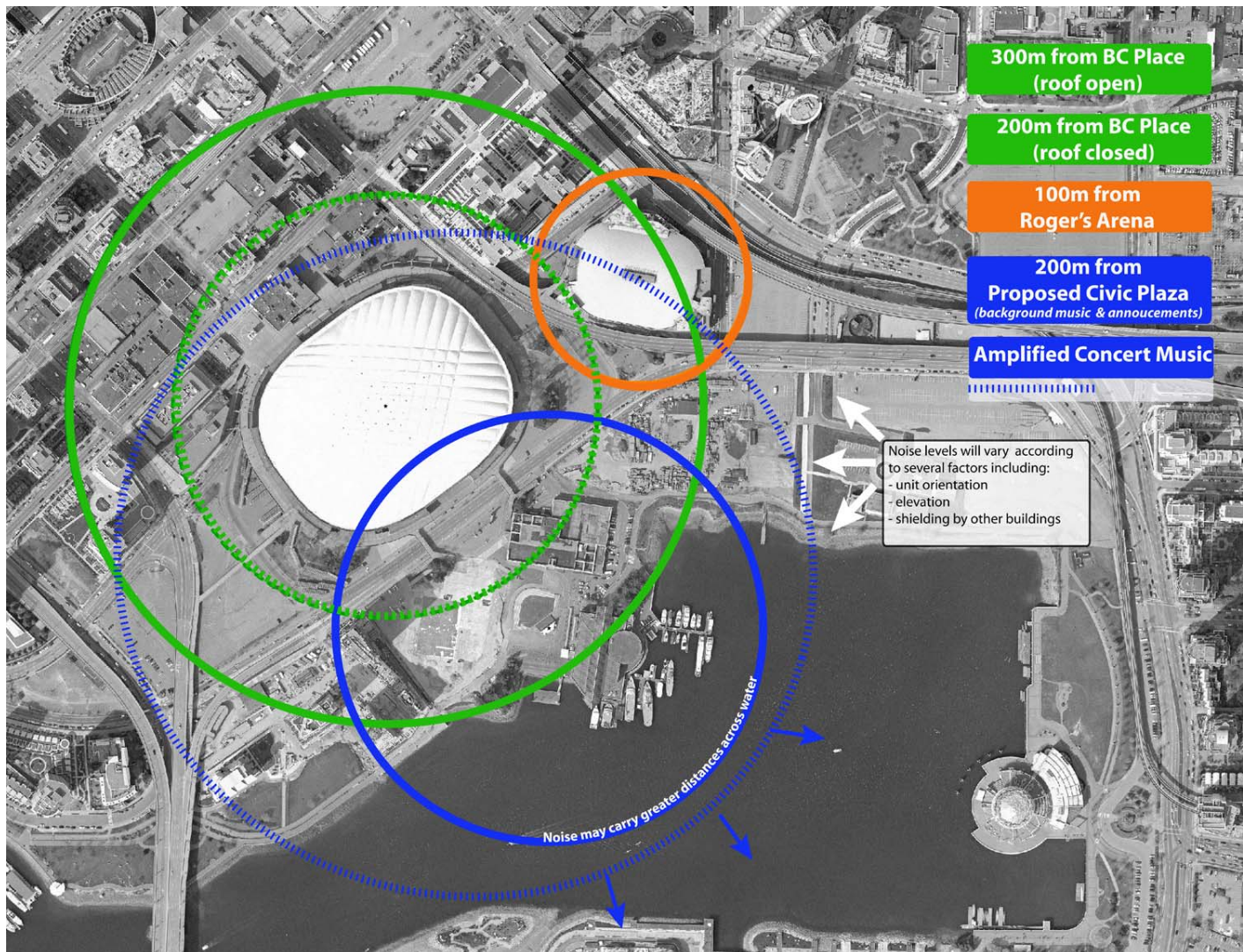
BKL Consultants Ltd., the City's acoustical consultants, advise that the most intrusive types of noise are repetitive concert bass lines, lyrics and public announcements. Traffic noise is

generally easier to tolerate as it becomes neutral 'white noise' and does not engage the mind to the same extent as other types of noise, with the exception of police and ambulance sirens. As discussed below, each of the three event venues have different 'noise' footprints. The major sources of traffic and event and noise in NEFC are and will be:

1. Traffic and Skytrain (current) - Residential facades facing the Skytrain, the viaducts, the Cambie Bridge or Expo or Pacific Boulevard are presently impacted by noise levels ranging from 63 - 73 dBA and for deeper bass tones, 65 - 75 dBC.
2. BC Place Stadium: BC Place Stadium is being up-graded with improved facilities and a new roof that can be opened. It is anticipated that with the addition of the Whitecaps Soccer games and other events, the number of events that generate crowd noise will increase from about 12 to roughly 40 or more per year, including sports and smaller performances. It is anticipated that crowd cheering will be the most significant event noise. This noise 'footprint' extends 300 metres from the centre of BC Place Stadium decreasing to about 200 metres or less when the roof is closed or for smaller crowds.
3. Rogers Arena: Concert noise (particularly deep bass noise or dBC) is predicted to impact apartments facing the arena, particularly those immediately adjacent to the arena with an unobstructed view of the roof. The metal roof mitigates noise creating a noise 'footprint' that is significantly smaller than that for BC Place Stadium, about 100 metres from the centre of the roof primarily impacting proposed residential buildings on the arena site. It is anticipated that there will be 25 - 30 concerts per year at this venue.
4. Civic Plaza (now the Plaza of Nations site): Background music and announcements could exceed the limits of the By-law up to 200 metres away from the stage. Amplified performances (i.e. rock or pop music concerts) could exceed the permitted limits for a much larger area. Staff will seek Council direction for the programming and design of the Civic Plaza in 2011, with particular attention paid to noise mitigation.

See Map 1 for the approximate critical noise 'footprints' of the NEFC venues.

(See Appendix D Table for further details on current and projected sources of noise)



Map 1 - Approximate Critical Noise 'Footprints' of Event Venues

(Note: the shape of the impact areas will not be symmetrical because the Noise 'Footprints' will vary depending on weather, sound levels, shielding buildings and the presence of water.)

### ***DISCUSSION***

The proposed initiatives are intended to:

- Recognize the unique role of NEFC as an event area and ensure that event venues operate within acceptable specified times and reasonable noise limits;
- Establish clear performance targets for the mitigation of event noise in new building construction for all buildings impacted by event noise to minimize the impact of event venues on residents; and
- Seek the co-operation of the operators of event venues in managing and monitoring event noise and notifying residents.



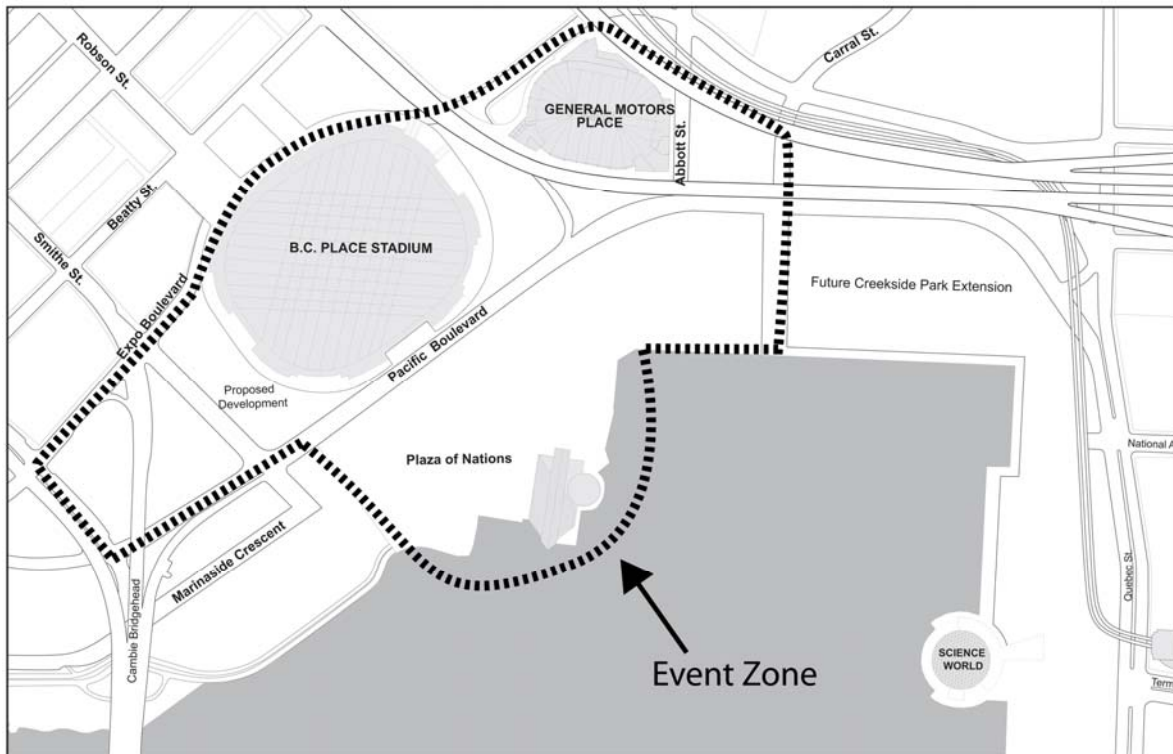
The proposals for each of the three key topic areas are summarized below with more details provided in Appendices A, B and C.

#### A. Proposed Noise Control By-law Amendments

- establish NEFC as an Event district (see proposed boundaries in Map 2);
- maintain night time noise limits and amend the definition of 'daytime' so that noise levels permitted during the day are allowed until 11 pm rather than the current 10 pm limit and further, this would apply to BC Place Stadium, Rogers Arena and the Civic Plaza (i.e. would not include other businesses generating noise in NEFC);
- exempt the sound of crowd cheering at BC Place Stadium from the Noise Control By-law regulations. (See Appendix 'A' for the proposed amendments)

These amendments are proposed for the following reasons:

- establishing the area as an Event district in the Noise Control Bylaw will signal for persons considering living in NEFC that it is an event district with louder and more frequent noise than other areas of the city;
- most events conclude by 10:30 pm. (Given the concern about sleep deprivation, existing night time noise limits should be respected after 11 pm);
- it is unlikely that there will be more than 10 large concerts or motor vehicle events per year in BC Place, although the upgrade will allow for scalability for more frequent smaller performances (these will need to be monitored to assess impact); and
- crowd cheering will be the most frequent loud noise generated by BC Place Stadium and it is unreasonable to expect the City to be taking enforcement action.



Map 2 - Proposed Boundaries of Event Zone in Noise Control By-law

## B. Policies for Noise Mitigation in Residential Buildings and Purchaser Notification

Staff propose that Council adopt policies to address the mitigation of noise through the design of residential buildings in NEFC. These policies will be used for the assessment of rezoning applications proposing housing in locations potentially impacted by event noise. (See Appendix B for the complete policies)

Staff have developed a terms of reference for Acoustic and Thermal Comfort Studies (Appendix B) to be prepared as part of each rezoning application proposing residential development in a location where it is potentially impacted by event-related noise in addition to traffic noise. The terms of reference for the noise mitigation of noise studies assume that:

- the mitigation of event-related noise will be based on responding to event noise rather than a 24 hour average of traffic noise as currently used for measuring noise attenuation (as required by the Zoning and Development By-law) because residents are generally at home during the evenings at typical event times;
- the target for the interior of dwelling units will be between 40 and 50 dBC;
- noise mitigation must be achievable with 'windows shut' and apartments remain at a comfortable temperature; and
- these studies will apply to new residential development in NEFC and within the critical noise 'footprints.' Staff will also review noise impact implications for sites outside of NEFC but within a predicted noise footprint area.

The Acoustic and Thermal Comfort Studies will be undertaken at the rezoning stage to guide the form of development, the location and orientation of dwelling units and the structural mitigation measures. Further refinements and implementation of the findings of these studies would be undertaken at the development permit and building permit stages to guide the more detailed design proposed for residential development.

Options will be considered for the design of residential facades to address noise mitigation including but not limited to a reduction in façade glazing or utilizing thicker glazing. Illustrations of alternative designs for residential facades can be found in Appendix F.

The City's Noise Control Bylaw identifies 55 dBC as the target interior noise level for mixed use buildings. This target was established for existing buildings, often wood frame older hotels with taverns on the ground floor (SRO's). With new concrete construction a higher level of noise mitigation should be possible in both new residential and mixed use buildings to achieve a reduced level of deep bass in the interior of apartments. At 55 dBC, the City's acoustic engineers (BKL Consulting Ltd.) advise that repetitive bass lines, music and lyrics when heard by residents will be intrusive and reduce livability and that greater mitigation should be sought to address livability objectives. Therefore staff are working with the developers and their consultants to determine whether mitigation can achieve 40 to 50 dBC in NEFC.

It is recognized that the easiest way to mitigate noise is to close windows. Many events will occur during the evening during the warmer months when residents typically have windows open in the evenings for cooling. Applicants will need to demonstrate that comfortable indoor temperatures can be achieved with windows closed on a frequent basis in the summer months.



Lastly, as a condition of rezoning, developers will be required to include in disclosure documents for the sale of strata units a notice to owners that the area is an event district and event-related noise can be anticipated.

### (C) Noise Monitoring and Noise Management Protocols

The following measures are proposed to be addressed by venue operators in consultation with City staff:

#### Testing and Monitoring Noise Levels

- Testing noise levels at the mixing board within the event venues and noise levels at points of reception at adjacent residential buildings;
- In the case of BC Place Stadium, undertaking noise level tests with the roof open and the roof closed for sport events and large and small performances;
- Identifying appropriate noise levels at the mixing board within the event venues that will result in noise levels at points of reception at adjacent residential buildings that are within those permitted by the applicable Noise Control By-law standard;
- Addressing noise makers (e.g. horns or vuvuzelas) if they emerge as a significant sound source that is exceeding the Noise Control By-law sound limits. If this is the case, it is proposed that venue operators limit or ban their use in the venue;

#### Addressing Noise Related to Staging Events and Patron Disbursement

- Identifying strategies for minimizing the impact of the unloading and loading for events;
- Having events conclude by 10:30 pm so that crowds and traffic can be dispersed by 11 pm, noting some will occasionally conclude after 10:30 pm.

#### Event Notification

- Continuing current notification practices for special events, including the organization of 'notification trees,' that include notices to Strata Councils, Individuals and Property Managers; and
- Having City Staff and the operators of NEFC event venues develop and maintain an on-line events calendar for events and road closures related to events in Northeast False Creek.

The Protocols for Noise Monitoring and Management will be prepared similarly to the 'Management Plans' currently in place for staging events to manage vehicular and pedestrian traffic, security and in some cases, event noise issues. In the case of housing proposed on one of the sites of the event venues, Council could also consider making measures recommended in the Protocols, a condition for venue site rezoning applications that include residential use.

### Public Engagement

There has been extensive discussion with stakeholders on the management and mitigation of event noise in NEFC over the past two years. First, this was discussed when BC PavCo came forward with a proposal for housing on the BC Place Stadium site and Council amended the FCN ODP with provisions respecting noise (see Appendix E for the approved provisions).

Second, there was public discussion on this issue and recommended measures as part of the preparation of the NEFC Directions during 2009 and 2010. More recently, the proposals in this report have been discussed with the operators of BC Place Stadium and Rogers arena, the developers of proposed residential development in NEFC, residents, City Special Events Staff and area stakeholders on the NEFC Joint Working Group.

Those representing the event venues have reservations about the proposed policies. Staff have heard the following messages from the developers and venue operators who believe that the noise issue is being overstated:

- The number of projected events exceeding the current By-law limits (up to 80 days and/or evenings a year, or possibly up to 100 per year depending on the use of the Civic Plaza) is a relatively small annual number and may be further reduced;
- The developers would prefer to continue to build towers using curtain wall construction and it is unlikely that this approach can mitigate noise levels to 40 dBC;
- The developers are willing to work with the City to see what level of dBC mitigation can be economically achieved; and
- Areas adjacent to nightclubs are currently impacted by event noise and are not required to address dBC.

On September 16<sup>th</sup>, 2010 staff hosted an Open House at the Creekside Recreation Centre with information boards attending by approximately 50 people. Staff and the City's acoustics consultant BKL Consultants Ltd. gave two presentations to those attending the Open House. Staff also conducted a walking tour of NEFC and noise readings were taken in a variety of locations to assist those attending to understand the difference in noise levels.

Eighteen residents submitted comment forms. There was strong support for the proposals with the exception of the extension of day time noise limits to 11 pm. The most common concern for those opposed to the proposed extension was the sound of dispersing patrons and that traffic would extend beyond 11 pm. A detailed summary of the comment forms is included as Appendix G.

The proposed by-laws and policies have been adjusted to address the concerns identified through the public consultation and discussion with the developers as follows:

1. the methodology for the Acoustic and Thermal Comfort Studies has been amended to identify a performance target for the mitigation of dBC to a range of 40 to 50 dBC (rather than the previously discussed target of 40 dBC);
2. staff recognize that that the mitigation measures need to be effective and feasible, and further that the testing and design exploration will inform whether a revised standard should be considered not only in NEFC but also in areas adjacent to nightclubs and elsewhere in the city, subject to further consultation with stakeholders;
3. the operators have advised that events very seldom go past 10:30 pm so most instances encouraging venue operators to conclude events by 10:30 pm should not be a problem. Occasional exceptions to this should be anticipated. In addition, the City's Special Event staff advise that at major outdoor events there are also other approaches for encouraging events to conclude by 11 pm such as turning the music down and having a 'last call' for drinks at 10:30 pm.

**FINANCIAL IMPLICATIONS** There are no financial implications for the City.

**PERSONNEL IMPLICATIONS**

There are no personnel implications.

**ENVIRONMENTAL IMPLICATIONS**

One of the most significant benefits of locating event venues in Northeast False Creek is that patrons have access to many transportation choices other than private automobile including: (1) significant transit capacity that brings riders close to the area (including the Expo line, the Millennium line, the Canada line, the Seabus and buses); (2) bike routes; and (3) opportunities to walk to the site for almost 200,000 adjacent residents, employees and visitors.

One of the recommended methods of mitigating event noise is to reduce the area of glazing on residential towers. This is also a demonstrated way to improve energy conservation.

**SOCIAL IMPLICATIONS**

The proposed actions meet a number of objectives including fostering culture, festivals, and sport and music events in the city while seeking to provide liveable housing in close proximity to event venues.

**IMPLEMENTATION PLAN**

Implementation will be pursued through:

- (1) the enforcement of the provisions of the Noise Control By-law, including the new provisions recommended for adoption by Council;
- (2) the preparation and review of rezoning and development permit applications; and
- (3) the pursuit of Protocols for Noise Monitoring and Management for each event venue.

In addition, in the case of the Civic Plaza, as an outdoor event venue, staff would review the Special Event applications which will require Council approval and /or Park Board approval depending on the operating model adopted for the Plaza.

**COMMUNICATIONS PLAN**

Staff propose the following elements for a communications plan:

- (1) the City web site will provide information on the Noise Control By-law and enforcement procedures and contacts for complaints
- (2) the venue operators will be required to contribute to the creation and maintenance of an on-line calendar of events and road closures for the NEFC area.
- (3) Developers will be required to advise future purchasers of housing in NEFC in purchase disclosure documents that the area is an event district and event-related noise can be anticipated.

**CONCLUSION**

Northeast False Creek will be a unique area in North American where, in addition to existing residents more than 7,000 new residents will live in close proximity to three event venues with a combined total capacity for more than 80,000 patrons. The initiatives recommended in

the report seek to provide a balance between fostering a vibrant event area and ensuring liveability for the area residents.

\* \* \* \* \*

## Noise Control By-law Amendments

The following amendments:

- establish NEFC as an event district
- extend day time noise limits for BC Place Stadium, Rogers Arena and the Civic Plaza to 11 pm
- exempt crowd cheering at BC Place Stadium from the Noise Control By-law

BY-LAW NO. \_\_\_\_\_

### A By-law to amend Noise Control By-law No. 6555 regarding the North East False Creek event zone

THE COUNCIL OF THE CITY OF VANCOUVER, in public meeting, enacts as follows:

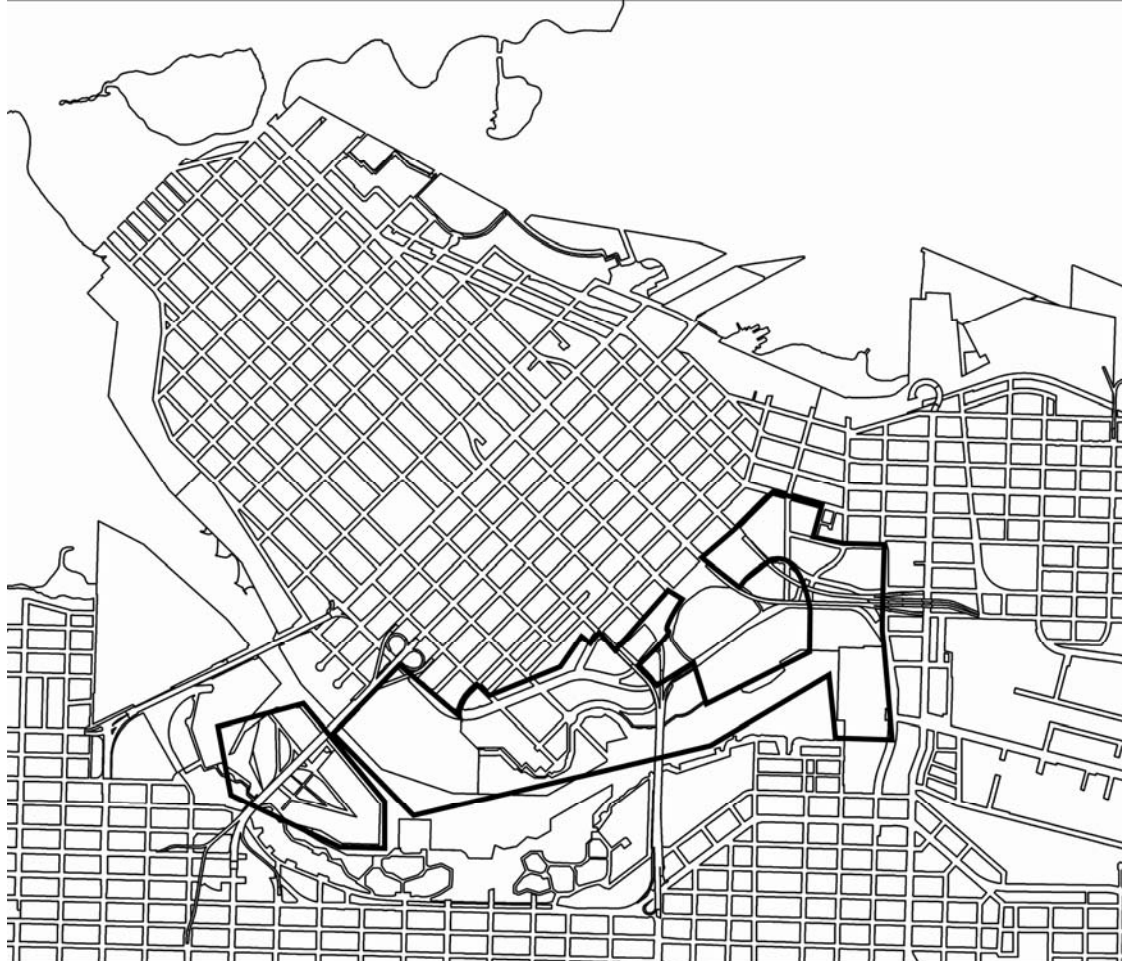
1. This By-law amends the indicated provisions of the Noise Control By-law.
2. In section 2:
  - (a) Council repeals the definition of "daytime" and substitutes:

"daytime" means:

    - (i) unless otherwise provided in this by-law, from 7 o'clock in the morning (0700 hours) to 10 o'clock in the evening (2300 hours) on any weekday or Saturday, and from 10 o'clock in the morning (1000 hours) to 10 o'clock in the evening on any Sunday or holiday; and
    - (ii) in the case of B.C. Place Stadium, Rogers Arena and a civic plaza in the event zone, from 7 o'clock in the morning (0700 hours) to 11 o'clock in the evening (2300 hours) on any weekday or Saturday, and from 10 o'clock in the morning (1000 hours) to 11 o'clock in the evening on any Sunday or holiday
  - (b) after the definition of "downtown area", Council adds:

"event zone" means that area described in Schedule "B.2"; and
  - (c) to the definition of "quiet zone", after the words "activity zone", Council strikes out "or an intermediate zone" and substitutes ", intermediate zone or event zone".
3. In section 5(a) and in section 5(b), after the words: "activity zone", Council adds the words: ", event zone".
4. In section 6, Council strikes out the words: "No person shall in an activity zone" and substitutes: "No person shall in an activity zone or an event zone".

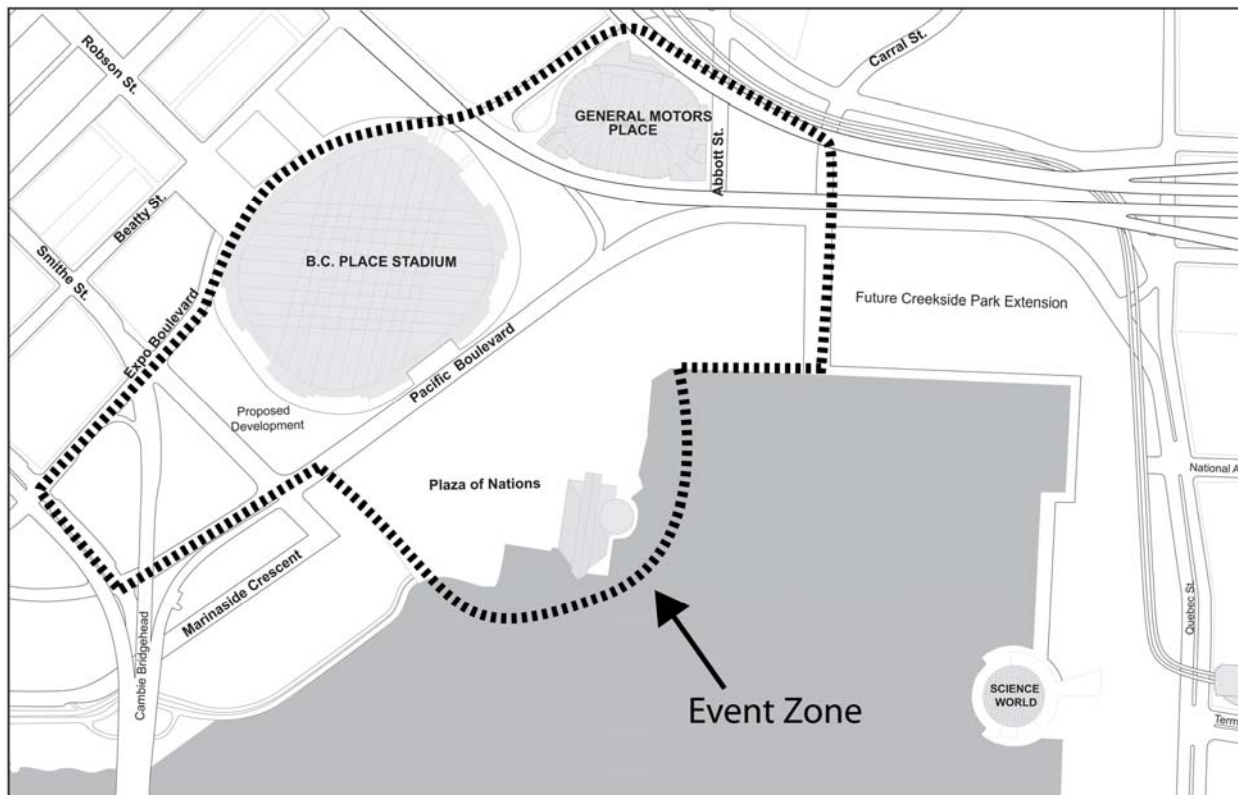
5. In section 6A (a) i) and in section 6A (b) i), after the words "ACTIVITY ZONE", Council adds: "or an EVENT ZONE".
6. In section 7, after the words "intermediate zone", Council adds ", event zone".
7. In section 14A, Council:
  - (a) at the end of subsection 14A(a) strikes out "or";
  - (b) at the end of subsection 14A(b) strikes out "." and substitutes ", or"; and
  - (c) after subsection 14A(b), adds:
    - "(c) emanates from B.C. Place Stadium and is caused by the cheering of crowds at a sporting event."
8. In section 22, after "B.1," Council adds "B.2,".
9. Council strikes out Schedule B.1 and substitutes:



Schedule B.1



10. After Schedule B.1, Council adds:



Schedule B.2 - Event Zone

11. A decision by a court that any part of this By-law is illegal, void, or unenforceable severs that part from this By-law, and is not to affect the balance of this By-law.

12. This By-law is to come into force and take effect on the date of its enactment.

ENACTED by Council this \_\_\_\_\_ day of \_\_\_\_\_, 2010

\_\_\_\_\_  
Mayor

\_\_\_\_\_  
City Clerk

Policies for the Mitigation of Event-related Noise for Residential Buildings  
- Northeast False Creek and adjacent impacted areas

Section 1 - Application and Intent

These policies are to be used in conjunction with the official development plans and CD-1's in cases where a rezoning or development application is proposing residential development in locations where the dwellings could be impacted by event noise from BC Place, Rogers Arena and the Civic Plaza.

Section 2 - Establishing Performance Targets - Acoustic and Thermal Comfort Studies

When applicants are preparing rezoning applications which incorporate housing in locations that could be impacted by event noise, they will be required to prepare Acoustic and Thermal Comfort Studies to establish performance targets and provide assurances that dwellings will be liveable and that there is compatibility between the nearby event venue(s) and the proposed housing.

The following methodology for the Acoustic and Thermal Comfort Studies shall be undertaken by professionals with expertise in acoustics and mechanical engineering:

1. Identify the sources of event noise that the building design needs to respond to;
2. Document one or more recent or past nearby outdoor event noise measurements, with microphone located above the roof of the event venue in question, that will be used to determine the event noise exposure of the new development;
3. Describe methodology used to adjust noise measurement level to façade exposure levels and to perform analysis;
4. Describe the assumptions made;
5. Evaluate whether it is possible to achieve an interior equivalent event noise level (Leq) of 40 dBC to 50 dBC during the loudest 15 minutes of a typical event involving music;
6. Provide recommendations for building orientation, construction materials and other noise isolation design strategies necessary to meet the performance targets; and
7. Show that comfortable interior temperature levels can be maintained without opening windows. Describe calculation methodology and assumptions.

This information is incorporated into the rezoning application. The study may lead to an adjustment of the maximum noise level permitted in the interior of dwelling units as identified above. In these cases, Council shall consider whether the level of noise projected for the interior of apartments will be liveable.

As part of the preparation of development permit applications, an Acoustic and Thermal Comfort Study will be prepared if one was not prepared as part of a rezoning.

### Section 3 - Development Permit Applications

Further design development shall rely on the conclusions and performance targets of the Acoustic and Thermal Comfort Study. In some cases it may be necessary to undertake further studies to ensure the proposed building design can achieve the performance targets.

## Approach for Drafting Protocols for the Monitoring and Management of Event-related Noise

### Section 1 - Application and Intent

These policies provide guidance for the operators of event venues for monitoring and managing noise to reduce impacts on adjacent housing.

### Section 2 - Protocols for the Monitoring and Management of Event Noise

Noise Monitoring and Management Protocol pursued and implemented for each of the three event venues to moderate noise impacts. These Protocols will provide for:

- Venues testing noise levels at the mixing board within the event venue and noise levels at points of reception at adjacent residential buildings;
- In the case of BC Place Stadium, undertaking these noise level tests with the roof open and the roof closed;
- Venues identifying appropriate noise levels at the mixing board within the event venue that result in noise levels at points of reception at adjacent residential buildings that are within those permitted by the applicable Noise Control By-law standard;
- Should noise makers (e.g. horns or vuvuzelas) emerge as a significant sound source, then venue operators shall act to ban their use in the venue
- Venues identifying strategies for minimizing the impact of the unloading and loading of materials related to mounting events;
- Venue events should conclude by 10:30 pm so that crowds and traffic can largely be dispersed by 11 pm, noting that periodically events will extend to 11 pm for such reasons as sport games going into overtime;
- Continuing current notification practices for special events, including the organization of 'notification trees,' that include notices to Strata Councils, Individuals and Property Managers; and
- Venues should work with City Staff and the operators of other NEFC event venue on developing and maintaining an on-line events calendar for events and road closures related to events in Northeast False Creek.

The Protocols on Noise Management and Monitoring Protocol will be the subject of Management Plans between the City and the Venue operator, or in the case of Civic Plaza, Council shall approve a Protocol to be drafted by staff.

The following unique circumstances will be considered for the different venues.

#### (i) BC Place Stadium

The noise management and monitoring will focus on public announcements, rather than cheering or music from the concerts unless the operators of BC Place Stadium chooses to host more than 10 concerts per year thus exceeding the maximum identified in the By-law.

(ii) Rogers Arena

It is recommended that the Protocol be secured when there is a proposal for a rezoning proposing residential development on the Rogers Arena site.

(iii) Civic Plaza

This Protocol for the Civic Plaza should be pursued at the time of the first rezoning on the Plaza of Nations site proposing residential development. Residential buildings on the site should be designed to mitigate noise from the Civic Plaza. Amplification technology and set ups should be pursued to minimize the sound 'footprint' from the Civic Plaza. Given this is an outdoor venue, it is anticipated that those mounting festivals and events in the Civic Plaza will need Special Event permits.

Event	Time of Day and number of events per year	Noise Control By-law Implications and Noise Readings where available
Ambient Traffic Noise (primarily the Viaducts, Pacific/Expo Blvd and the Skytrain)	-all day and night with peaks around 7 am to 6 pm on weekdays	-ambient traffic noise is not regulated by the Noise Control By-law -63 - 73 dBA -65 - 75 dBC -noisiest locations are adjacent to the viaducts, the Skytrain and the corner of Smithe and Expo -locations close to the water are quieter
Noise of Patrons leaving Rogers Arena	-9 - 11 pm -70 - 90 times per year	-patron noise is not regulated by the Noise Control By-law Noise levels at Viaducts after concert: 67 dBA and 72 dBC
Rogers Arena - Concerts (Hockey Games do not create significant noise exceeding traffic noise, except for the goal horn and patrons arriving and leaving game)	-7 - 10:30 pm -25 - 30 concerts per year	-Spectrum apartments impacted by noise levels not permitted after 10 pm -apartments on the Rogers Arena site facing the roof will be impacted by noise levels exceeding the Noise Control By-law 2006 BKL Acoustics Study: -80 - 86 dBC at the rooftop of the Arena -63 - 68 dBC for apartments facing Rogers Arena at the Spectrum development adjacent to Expo Blvd
BC Place Stadium - sport games -crowd cheering (announcements and music during games, have much lower sound levels)	-7 - 10:30 pm -12 football games -30 soccer games -approximately 40 or more times per year	-Crowd Cheering exceeds sound levels permitted by the Noise Control By-law -projected noise 'footprint' for noise levels exceeding By-law limits, decreases from approximately 300 m to 200 m or less when the roof is closed or due to smaller crowds
BC Place Stadium -concerts	-7 - 11 pm -none - four to ten times a year	-concerts and motor vehicle events are given up to 10 exemptions from the Noise Control By-law per year
Civic Plaza - Plaza of Nations site (Background Music e.g. Runs and other Special Events)	-8 am - 10:30 pm -20 - 40 times per year depending on the programming of the space	-background music within by-law limits for dBA, not for dBC
Civic Plaza - Plaza of Nations (Live Amplified Music)	-noon - 10:30 pm -20 - 40 days per year -depends on the design and function of the Plaza and whether noise impacts can be adequately mitigated	-live amplified music may not be within by-law limits, depending on design of the facility



False Creek North Official Development Plan Provisions respecting the Mitigation of Event Noise for residential development on the BC Place Stadium site  
(approved by Council November 2008)

-the provisions relevant to the mitigation of noise are in **bold**

#### 3.4.4 Residential

There is no limit on the number of dwelling units, and there are no requirements regarding units suitable for families or affordable housing.

Residential floor space must not exceed 65,000 square metres but no residential floor space is permissible except in compliance with the following requirements:

**Proposals for a sub-area zoning must consider the special acoustic conditions of the area.**

**Residential buildings must meet the Canada Mortgage and Housing Corporation standards used in the Zoning and Development By-law which sets maximum decibel levels for interior rooms based on the 24-hour equivalent (Leq) A-weighted (dBA) sound level.**

**Building orientation and construction must mitigate as much as possible events in major facilities and outdoor spaces which will produce high levels of noise, particularly bass noise (dBC), on a regular basis, and for significant periods of time.**

**The developer must take measures, including covenants on title, notices in rental agreements, inclusion in marketing and disclosure documents, and signage on buildings, to advise initial and future purchasers and residents of anticipated noise levels.**

**The preceding requirements must be satisfactory to Council when it considers the sub-area zoning proposal.**

Alternative Façade Treatments that Would Address Noise Attenuation

Figure 1. Fairmont Vancouver Airport Hotel



Figure 2. "Green residential building" in Miami



Figure 3. Macallan Condos, green building; Boston



Figure 4. Steidl & Partners, Munich



Open House Survey Results September 16, 2010

- 15 (83%) strongly supported or supported the proposed approach;
- 18 (100%) supported the Noise Monitoring and Management Protocols;
- 8 (44%) supported the extension of daytime noise limits from 10 pm to 11pm (7 opposed or strongly opposed); and
- 14 (78%) strongly supported or supported requiring building design to mitigate event noise.

Of those attending, they indicated they were impacted by event noise:

- 2 (11%) never or rarely;
- 7 (39%) sometimes;
- 3 (17%) often;
- 2 (11%) very often.