AQUILINI
DEVELOPMENT AND
CONSTRUCTION INC.

STANDARD BUILDING
#200-510 WEST HASTINGS ST.
VANCOUVER, BC V6B 1L8
P: 604.687.8813 F: 604.684.1125

June 20, 2012

Central Area Planning
City Of Vancouver

Attention: Mayor and Council

Re: Rogers Arena rezoning, acoustic requirements.

With reference to the clarification requested in Council on 12 June 2012 regarding the 82 dBC noise level exemption for the proposed rezoning at Rogers Arena, please find the following information.

In the Development and Building Policy Report, dated 5 June 2012, it states:

"*An additional change to the Noise Control By-law is recommended in Appendix C. Similar to the process used for noise generated from BC Place, an exemption for noise is being provided for Rogers Arena. While most of the noise in the event zone is restricted to 70 dBC (up to 11 p.m.), a special exemption is being given for the Rezoning Site to provide for 82 dBC at the point of reception from the roof (where the noise from the arena hits the residential buildings). A level of 82 dBC more accurately reflects the noise level for the loudest 15 minutes on a concert (as measured by the applicant during concerts by Bryan Adams, Rihanna, Bruno Mars, and Supertramp), and is also the threshold that the applicant used as a benchmark for noise mitigation for the tower design. This also provides clarity to the users of Rogers Arena and any new residents about the guidelines for noise from the arena.*"

The area of concern is that potentially excessive event based noise levels may be experienced in the surrounding public area and inside the proposed new residential units. This is specifically applicable to units that are above the roofline of the Arena and directly facing the Arena roof.

The 82 dBC noise limit is measured at the roof membrane, which provides the least amount of acoustic mitigation within the Arena structure. Due to the heavy masonry structure of the Arena walls, the noise limit of 82 dBC for event based noise will never be reached in public exterior spaces at grade. A level of 82 dBC would only be experienced by individuals at the point of reception on the roof membrane of the Arena, a situation permitted for only qualified personnel with the necessary safety equipment.

The parameter of 82 dBC used in the report is a realistic reflection of current "MAXIMUM" noise levels that can be expected on the roof membrane surface of the Arena during events. Appendix A contains a list of actual measurements taken during recent events. The average noise levels at the publically inaccessible roof membrane, as opposed to maximum, are in fact "SIGNIFICANTLY" lower than the design levels of 82 dBC.

The residential units facing the arena were, therefore, designed to mitigate the allowable maximum level of deep bass noise of 82 dBC, as experienced over a fifteen minute period. The proposed residential towers have mitigated the exterior noise to less than 50dBC when measured inside the new residential units.

The design utilizes enclosed balconies between bedrooms and the exterior of the building, constructed with reduced areas of glass. The windows at the bedroom and exterior face of the enclosed balconies are double glazed. The combination of the two design features brings the event based noise level inside the bedrooms during the 15 minutes of peak noise to 46 dBC. This level of noise is well within the current requirements for the City of Vancouver.

The design further utilizes "stacking double glazed sliding shutters" at open balconies in front of living spaces, which reduces the noise level heard inside the living spaces during the 15 minutes of peak noise to 50 dBC. Once again the level of noise is within the current requirements of the City of Vancouver.

Appendix B contains an acoustic report to that effect prepared by Brown Strachan indicating the design levels as set out above. This report was reviewed by the City of Vancouver's staff and was accepted.

Appendix C contains concept suite plans prepared by Walter Francl Architecture Inc., which indicates the design principles employed to achieve the values set out above.

Consequently, residents in the new proposed development will experience deep base noise levels of no more than 50 dBC during the most extreme 15 minutes of any event, based on noise measured at the acoustically weakest point in the Arena.

Aquilini Development and Construction reviewed the acoustic requirements thoroughly, as we feel that it is extremely important that we achieved dBC levels that are within the current requirements of the City of Vancouver. Our consultants created a unique design that has addressed the concerns forwarded to us by the City of Vancouver's Planning Department and we are confident that these requirements have been met.

Yours sincerely,

Riaan de Beer
Development Manager

Cc: David Negrin, President

APPENDIX A:

ROGERS ARENA ACOUSITC MEASUREMENTS

Rogers Arena

Rooftop Acoustic Measurements

June 2, 2011 - Supertramp

June 3, 2011 - Bruno Mars

East Roof (Best Buy Club)				
Date/Time		**db Avg**	**db Min**	**db Max**
June 2nd 19:00		57.7	54.7	66.1
June 2nd 21:00		60.0	55.7	66.0
June 2nd 21:58		60.6	55.3	69.7
June 3rd 18:35		60.4	57.6	71.9
June 3rd 19:30		61.2	57.9	67.9
June 3rd 20:44		63.0	58.6	70.6

West Roof (Loading Bay)				
Date/Time		**db Avg**	**db Min**	**db Max**
June 2nd 19:30		59.5	56.3	66.8
June 2nd 19:58		57.2	52.1	64.7
June 2nd 21:58		61.2	57.6	65.3
June 3rd 19:03		57.8	55.6	82.1
June 3rd 20:20		62.7	56.4	69.5
June 3rd 21:40		65.9	57.0	74.7

Notes:

Baseline readings were taken to determine ambient noise in the area when there was no sound activity in the Arena. Sample durations are 20 min.

Sample rate 1 per second A weight at 15' from the roof surface.

Test Meter: Reed 322

Meter Accuracy +- 1.5dB Unit conforms to IEC651 Type 2 , Ansi S1.4 Type 2 Sound Level Meter.

Rogers Arena
Rooftop Acoustic Measurements
June 24, 2011 - Rihanna

East Roof (Best Buy Club)				
Time		db Avg	db Min	db Max
18:40		57.4	54.9	68.7
19:30		60.5	54.5	69.6
20:16		65.1	55.6	74.2
21:20		57.4	55.1	66.3

West Roof (Loading Bay)				
Time		db Avg	db Min	db Max
19:05		59.2	57.6	70.9
19:53		60.5	57.7	68.3
20:39		65.0	57.1	73.1
21:40		66.2	57.5	74.5

Notes:

Baseline readings were taken to determine ambient noise in the area when there was no sound activity in the Arena. Sample durations are 20 min.
Sample rate 1 per second A weight at 15' from the roof surface.

Test Meter: Reed 322

Meter Accuracy +- 1.5dB Unit conforms to IEC651 Type 2 , Ansi S1.4 Type 2 Sound Level Meter.

Rogers Arena

Rooftop Acoustic Measurements

July 9, 2011 - New Kids on the Block

East Roof (Best Buy Club)				
Time		db Avg	db Min	db Max
18:44		59.6	57.4	67.3
19:55		64.9	58.4	70.5
21:15		62.8	58.1	73.1
22:12		62.8	58.1	71.1

West Roof (Loading Bay)				
Time		db Avg	db Min	db Max
18:20		57.1	54.1	70.8
19:18		62.4	53.8	72.8
20:46		65.7	57.4	86.9
21:43		64.6	56.4	70.1
22:40		61.9	55.7	70.4

Notes:

Baseline readings were taken to determine ambient noise in the area when there was no sound activity in the Arena. Sample durations are 20 min.

Sample rate 1 per second A weight at 15' from the roof surface.

Test Meter: Reed 322

Meter Accuracy +- 1.5dB Unit conforms to IEC651 Type 2 , Ansi S1.4 Type 2 Sound Level Meter.

APPENDIX B:

BROWN STRACHAN ACOUSTIC REPORT

Brown Strachan Associates
Consulting Engineers in Acoustics

PROJECT: C37.101

June 15, 2012

Aquilini Investment Group
200 - 510 West Hastings Street
Vancouver, BC V6B 1L8

Attention: Mr. Mark Mazzone

Dear Mr. Mazzone:

Re: Rogers Arena Towers

Further to your telephone request of 14 June 2012, the following confirms our analysis of Rogers Arena noise at your proposed residential towers (BSA report of 13 December 2011, appended).

With enclosed balconies, bedrooms and living rooms at the nearest facades facing the Rogers Arena roof meet the City's 50 dBC interior noise design criterion. The method of evaluation has been agreed with BKL (the City's acoustical consultant), including the 82 dBC exterior design level, sound isolation provided by enclosed balconies, etc.

For reference, in recently constructed residential buildings downtown, background noise levels measured within suites exceed 50 dBC (typical traffic, etc.). For event/concert noise, we understand the intent of the 50 dBC criterion is to minimize the potential for annoyance associated with the intermittent nature of music.

Please call if you have any questions.

Yours very truly,

BROWN STRACHAN ASSOCIATES

Aaron Peterson, B.A.Sc., EIT

AP/cm/12Junc/Aquilini.let

Yaletown Square #2-1290 Homer St. Vancouver Canada V6B 2Y5 Tel: 604 689 0514 Fax: 604 689 2703 bsa@brownstrachan.com

Brown Strachan Associates
Consulting Engineers in Acoustics

PROJECT: C37.101

December 13, 2011

Walter Francl Architecture Inc.
1684 West 2nd Avenue
Vancouver, BC V6J 1H4

Attention: Mr. Walter Francl

Dear Mr. Francl:

Re: Rogers Arena Towers

Further to your email of 8 September 2011, and our telephone discussions, appended is our evaluation of a typical suite proposed for the Rogers Arena sites to estimate inside noise levels with respect to the Design Target of 40-50 dBC.

Our evaluation indicates the following:

Bedrooms and living rooms behind enclosed balconies with regular thermal glazing meet the 50 dBC indoor criterion. Our evaluation is based on an exterior design noise level of 82 dBC, which we understand represents the design 15 min Leq recommended by BKL for suites with a view to Rogers Arena. The effect of enclosed balconies is based on the method agreed with BKL (standard S/A calculation). The noise spectra remain the same as our previous calculations (Graph: Src, appended).

There is no significant improvement from reducing your proposed punched window area, e.g. from 57% to 33% of the facade area (-2 dB), or using concrete vs. a typical facade (+2 dBC).

The BKL method of calculation (INSUL) using a standard room, which has been used in the evaluation of all sites in NEFC, gives results in close agreement with your typical suite design (+/-2 dBC), i.e. detailed evaluation of individual buildings is unnecessary.

Please call if you have any questions.

Yours very truly,

BROWN STRACHAN ASSOCIATES

Aaron Peterson, B.A.Sc., EIT

AP/lr/11Dec/Francl2.let

Yaletown Square #2-1290 Homer St. Vancouver Canada V6B 2Y5 Tel: 604 689 0514 Fax: 604 689 2703 bsa@brownstrachan.com

ROGERS ARENA SITES

December 13, 2011

CALC. BEDROOM NOISE LEVELS WITH VARIOUS FACADES (L/R where indicated), dBC

Facade	BKL Ref. Room (Curtain Wall)	Arch. Design (Punched Window)
6-13-6 (B/R)	63 (82-17TL-2S/A)	62
L/R		62
6Lam-13-6Lam	63	66
6-25-6 + 200+13 (BKL)	60	59
Glazed Balcony		
6-13-6 + 1200+6 (1)	53	49 (4.2m^2 balc. gl.)
L/R w/balc. glazing to 6' height only (full height 8'6", see note 2)		57
6-13-6 + 1200 + 6-13-6 (1)	50	46 (4.2m^2 balc. gl.)
L/R w/openable balc. glazing (3)		50 (full balc. gl.)
6-13-6 + 1200 + 6-13-6 (1) (glazed area reduced 50%)	47 (5.4m^2 window)	43 (2.25m^2 window)
Concrete Structure (with punched windows)		
8" conc. + 33% 6-13-6 (2)	58 (3.6m^2 window)	60 (2.6m^2 window)
8" conc. + 0.3m^2 6-13-6 (2)	48 (0.3m^2 window)	50 (0.3m^2 window)
Full 8" conc. no windows.	41 (10.8m^2 facade)	42 (7.9m^2 facade)

Notes:

Design outside noise 82 dBC (BKL Rogers Arena spectrum, loudest 15 min Leq).
Other 82 dBC noise spectra may change inside levels (appended).

BKL ref. room: A=16m^2 (full floor area), S=10.8m^2 (full facade area). S/A= -2.
Arch. design, bedroom: A=9.3m^2 (full floor area), S=4.5m^2, full facade=7.9m^2. S/A= -3.
Arch. L/R: A=10.7m^2, S=5.6m^2, full facade=10.7m^2. S/A= -3.

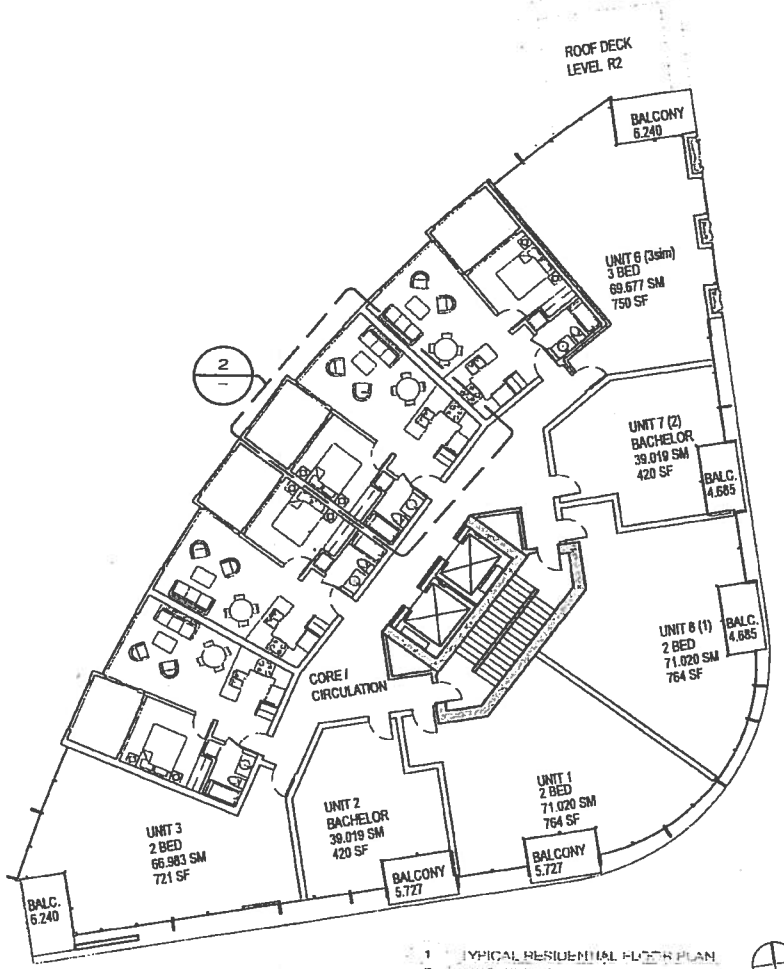
(1) Depends on absorption within enclosed balcony.
Balc. atten. = -TL_1 (gl.) + 4 dB (balc. reverb. effect) - TL_2 (gl.), full balc./facade glazing.
Reduced balc./facade glazed area corrected for S.

(2) Estimate based on 10 Log open area or glazed area ratio.

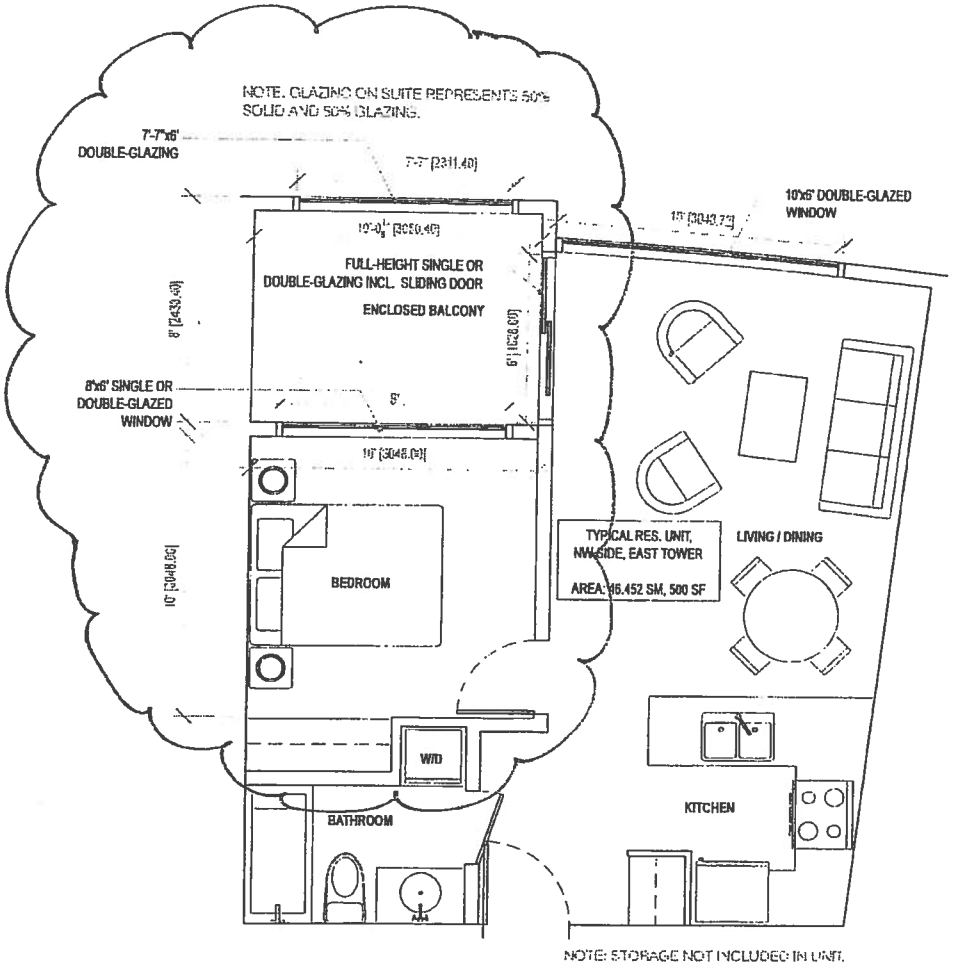
(3) Includes +1 dB contribution through sliding glass door to bedroom balcony.

Brown Strachan Associates
Consulting Engineers in Acoustics

Ceiling height = 8'-6"



1 TYPICAL RESIDENTIAL FLOOR PLAN
SCALE: 1/16" = 1'-0"



2 TYP. RES. UNIT, NW SIDE
SCALE: 1/4" = 1'-0"

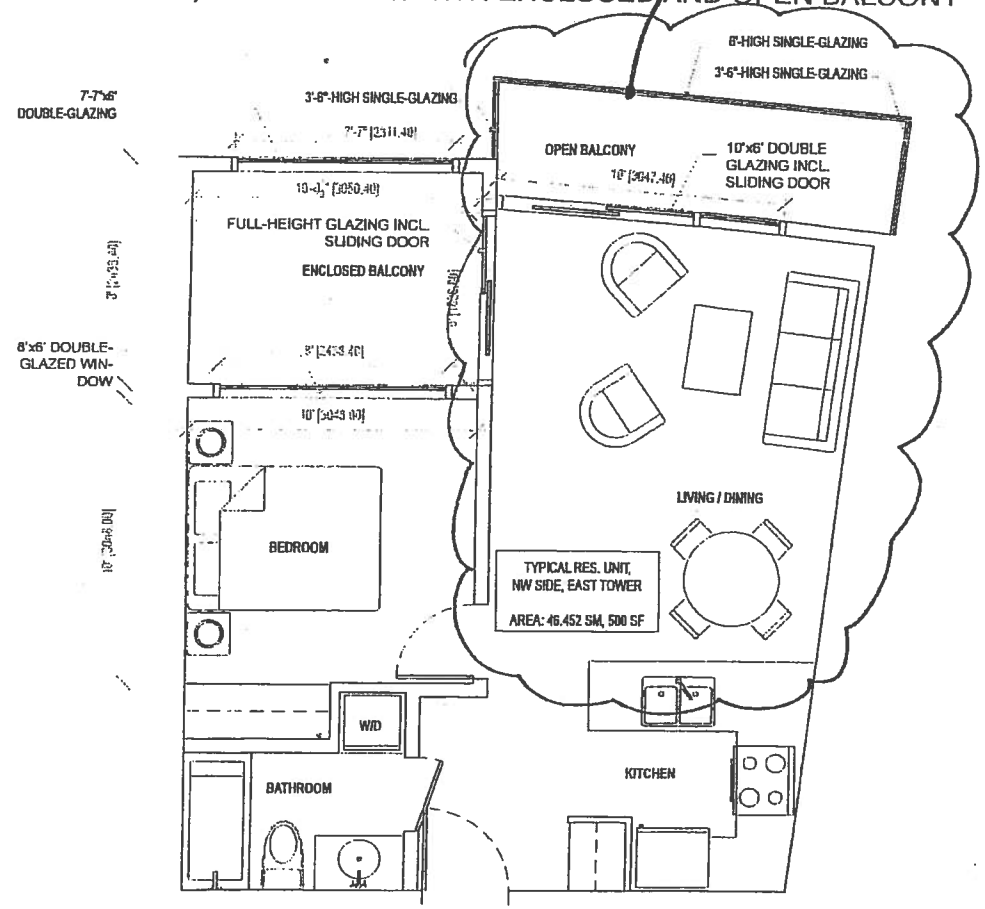
PWL Partnership Landscape Architects Inc
Consultants

ROGERS ARENA TOWERS
AQUILINI DEVELOPMENT
Project 2820

Title East Tower
TYPICAL RESIDENTIAL FLOOR PLAN
Scale Varies Date 2011 09 08
Sheet No

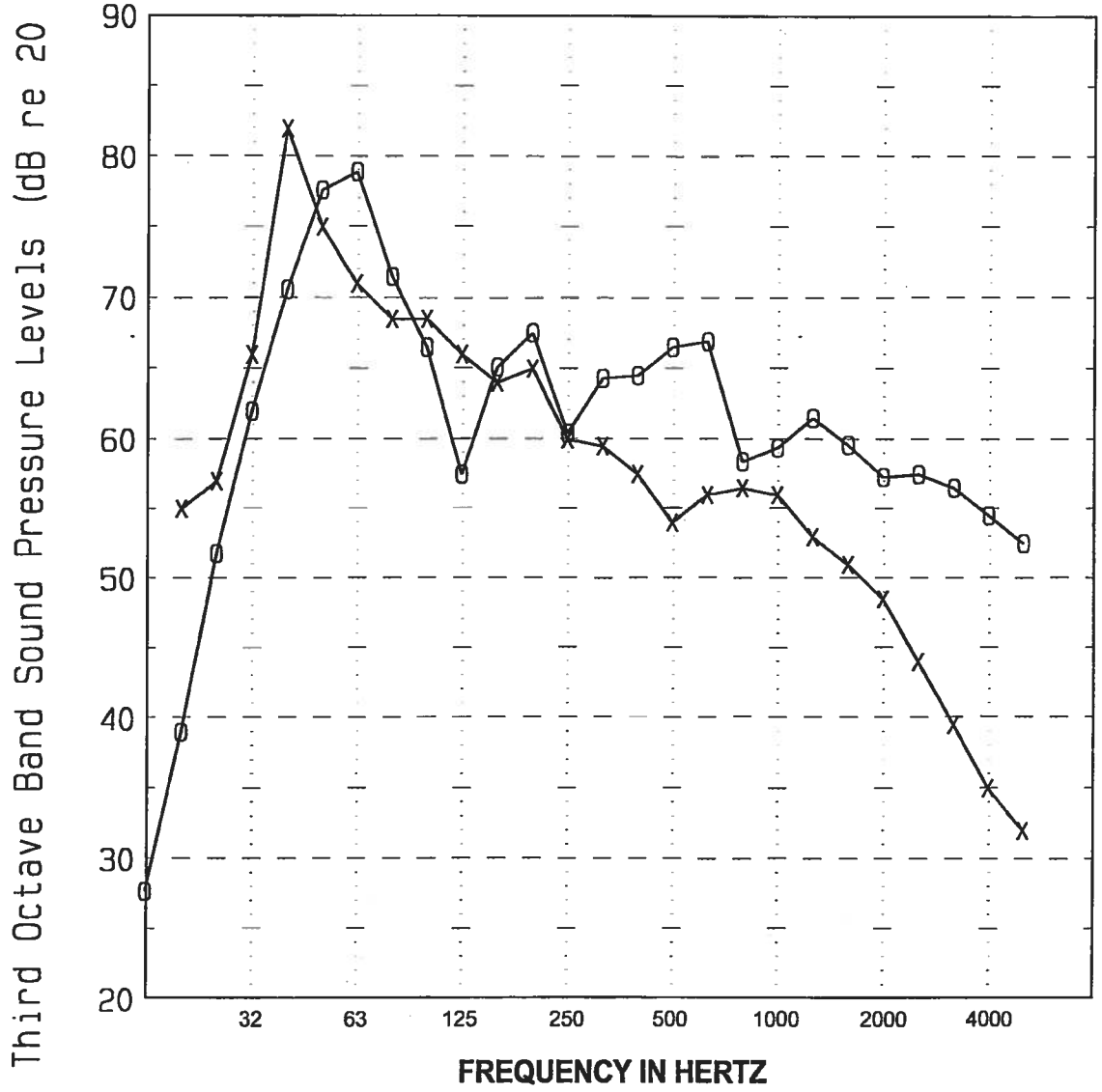
Option:
Encl. Balcony with
openable glazing.

EAST TOWER, TYPICAL UNIT: WITH ENCLOSED AND OPEN BALCONY



CALCULATED INSIDE NOISE LEVELS WITH VARIOUS FACADES (dBC)

	PWL Partnership Landscape Architects Inc Consultants	ROGERS ARENA TOWERS AQUILINI DEVELOPMENT Project 2020	Title East Tower TYPICAL RESIDENTIAL UNIT ACOUSTIC STUDY Scale – Date 10/19/11	10of 9 Sheet No



LEGEND

X——X Outdoor noise level meas. on roof of Rogers Arena during concert (loudest 15 min Leq, BKL data).
65 dBA, 82 dBC.

O——O BKL meas. music level at Deer Lake Park concert, normalized to 82 dBC.
72 dBA, 82 dBC.

PROJECT	ROGERS ARENA TOWERS
GRAPH TITLE	Evaluation of event noise at Rogers Arena.
GRAPH NUMBER FILE: BKL-82	Src
PROJECT NUMBER	C37.101
DATE	12-DEC-11

Sound Insulation Prediction (v6.3)

MARSHALL DAY Acoustics

Margin of error is generally within +/- 3STC

Job Name:Rogers Arena Towers

Job No.:C37.101 Page No.:

Date: 10 Mar 11 Initials:AMP

File Name:Insul

Notes:

6-13-6 glazing, 54 sq.ft. pane size.

STC	35
OITC	28

System description

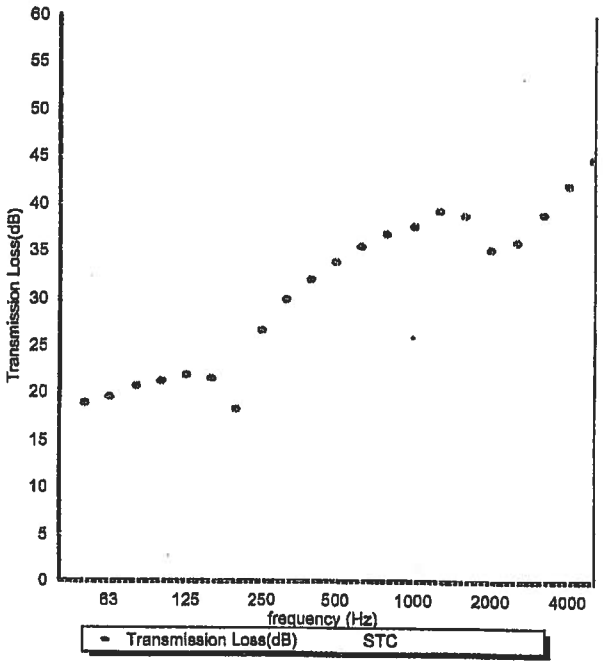
First pane: 1 x 6.0 mm Glass (m=15.0 kg/m2, fc=2200 Hz, damping=0.02)

Second pane: 1 x 6.0 mm Glass (m=15.0 kg/m2, fc=2200 Hz, damping=0.02)

Panel Size 2.7x2 m

Data est. @ 40 Hz.

frequency (Hz)	TL(dB)	TL(dB)
40	17	
50	19	
63	20	20
80	21	
100	21	
125	22	21
160	21	
200	18	
250	27	22
315	30	
400	32	
500	34	34
630	35	
800	37	
1000	38	38
1250	39	
1600	39	
2000	35	36
2500	36	
3150	39	
4000	42	41
5000	45	



Sound Insulation Prediction (v6.3)

MARSHALL DAY Acoustics

Margin of error is generally within +/- 3STC

Job Name:Rogers Arena Towers

Notes:

Job No.:C37.101

Page No.:

Date: 13 Dec 11

Initials:AMP

File Name:insul

STC	32
OITC	27

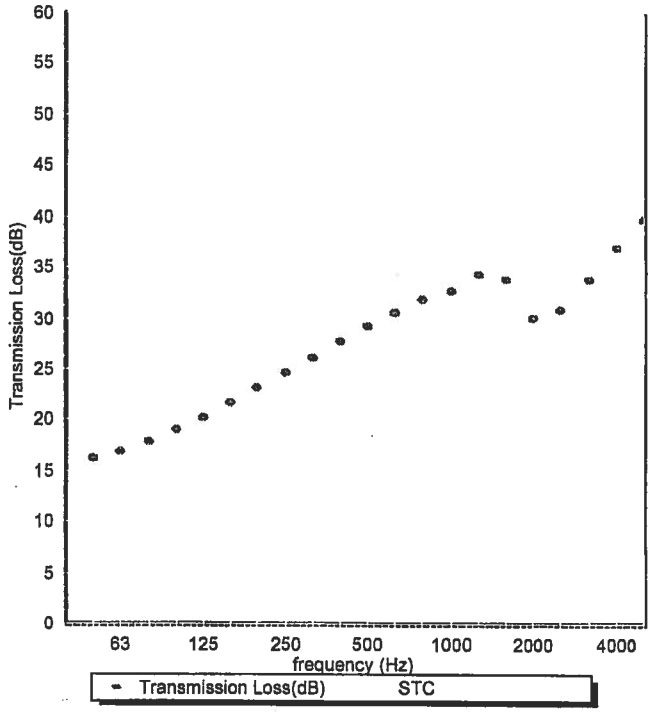
System description

Panel 1 Outer layer: 1 x 6.0 mm Glass (m=15.0 kg/m2, fc=2200 Hz, damping=0.02)

Panel Size 2.7x2 m

Data est. @ 40 Hz.

frequency (Hz)	TL (dB)	TL (dB)
40	14	
50	16	
63	17	17
80	18	
100	19	
125	20	20
160	22	
200	23	
250	25	25
315	26	
400	28	
500	29	29
630	31	
800	32	
1000	33	33
1250	34	
1600	34	
2000	30	31
2500	31	
3150	34	
4000	37	36
5000	40	



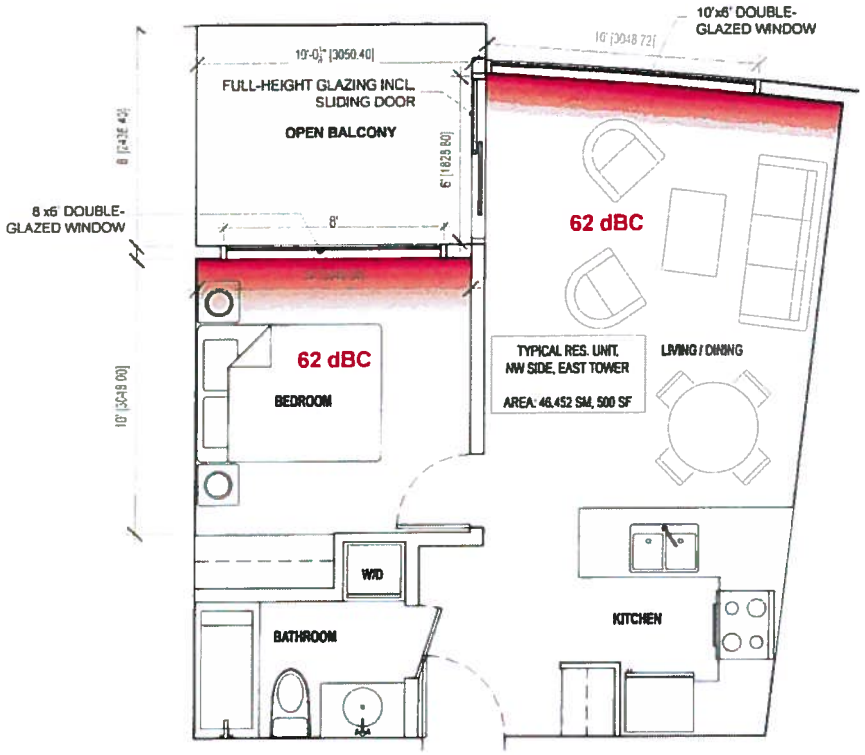
APPENDIX C:

CONCEPT SUITE PLANS

WALTER FRANCL ARCHITECTS

EAST TOWER, TYPICAL UNIT: OPEN BALCONY

Bedroom and Living/Dining room: 6-13-6 double glazing



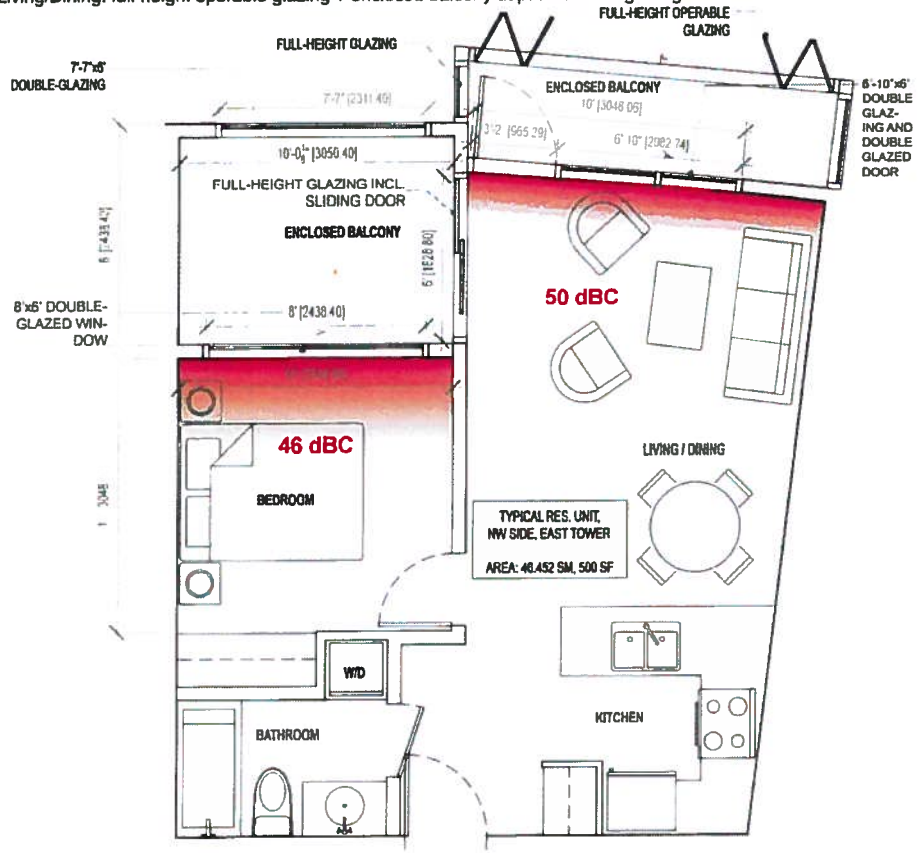
FACADE OPTION	NOISE LEVEL INSIDE SUITE (dBC) Bedroom	Living/Dining Room
Double-glazing (6-13-6 glass)	62	62

refer to Brown Strachan Associates report dated Dec. 13 / 2011 for further information

Sent to city Dec 15/11

EAST TOWER, TYPICAL UNIT: WITH ENCLOSED BALCONIES

Bedroom: 6-13-6 double glazing + enclosed balcony depth + 6-13-6 double glazing
Living/Dining: full-height operable glazing + enclosed balcony depth + double-glazing

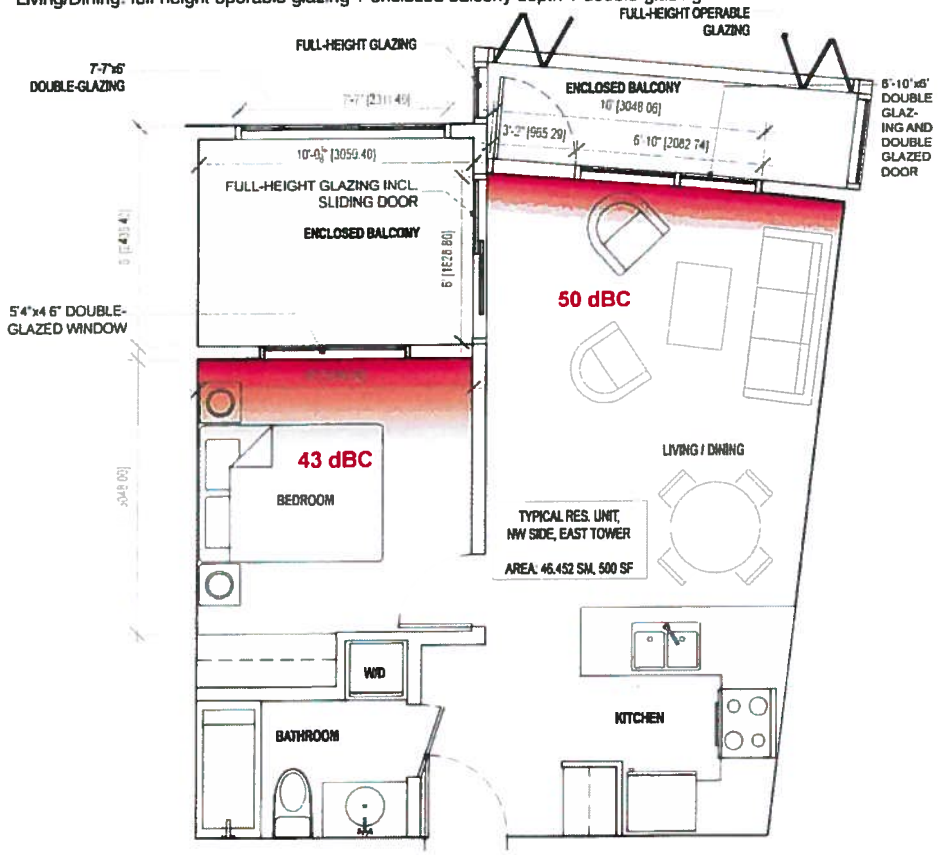


FACADE OPTION	NOISE LEVEL INSIDE SUITE (dBC) Bedroom	Living/Dining Room
Double glazing at enclosed balcony (6-13-6 glass) & double-glazing at Bedroom (6-13-6 glass)	46	--
Full-height operable glazing at enclosed balcony & double-glazing at Living/Dining room	--	50

refer to Brown Strachan Associates report dated Dec 13 / 2011 for further information

EAST TOWER, TYPICAL UNIT: WITH ENCLOSED BALCONIES

Bedroom: 6-13-6 double glazing + enclosed balcony depth + 6-13-6 double glazing
Living/Dining: full-height operable glazing + enclosed balcony depth + double-glazing

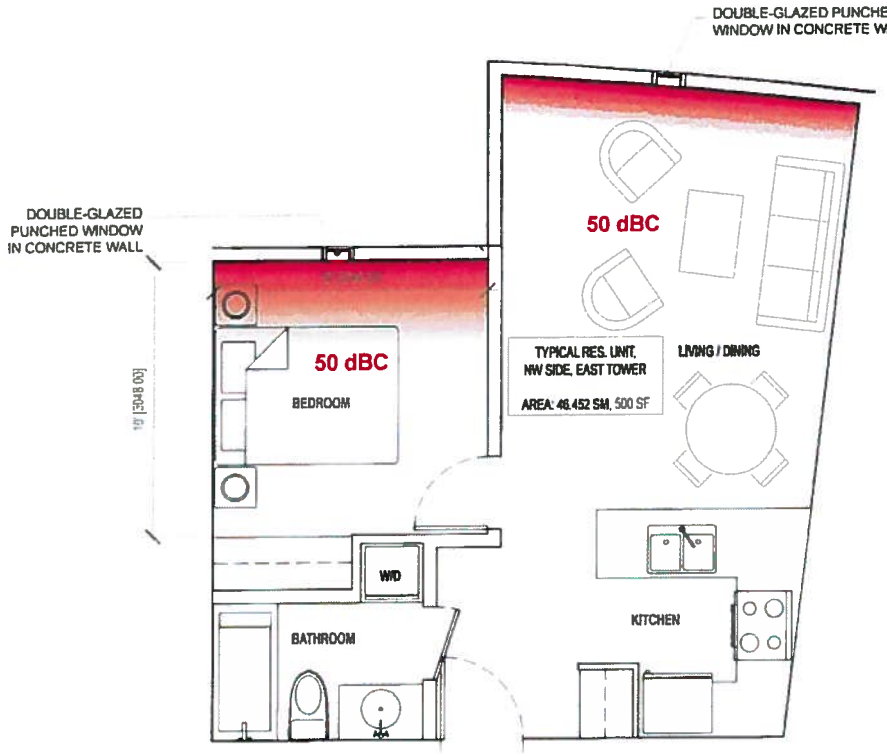


FACADE OPTION	NOISE LEVEL INSIDE SUITE (dBC) Bedroom	Living/Dining Room
Double glazing at enclosed balcony (6-13-6 glass) & double-glazing at Bedroom (6-13-6 glass) (glazing area reduced by 50%)	43	–
Full-height operable glazing at enclosed balcony & double-glazing at Living/Dining room	–	50

refer to Brown Strachan Associates report dated Dec 13 / 2011 for further information

EAST TOWER, TYPICAL UNIT: 8" CONCRETE WALL, 0.15 s.m. GLAZING

Bedroom and Living/Dining room: 6-13-6 double glazing
(0.15 s.m. area)



FACADE OPTION	NOISE LEVEL INSIDE SUITE (dBC) Bedroom	Living/Dining Room
8" concrete walls with 0.15m² double glazed window (6-13-6 glass) in Bedroom and Living/Dining room	50	50

refer to Brown Strachan Associates report dated Dec. 13 / 2011 for further information

PWL Partnership Landscape Architects Inc

Consultants

ROGERS ARENA TOWERS
AQUILINI DEVELOPMENT

Project 2820

East Tower
TYPICAL RESIDENTIAL UNIT
ACOUSTIC STUDY

Scale –

Date 12/15/11

SALIENT

The Salient Group #225 - 209 Carrall Street, Vancouver, BC V6B 2J2
T: 604.669.5536 F: 604.669.5574 E: info@thesalientgroup.com

Via Email

July 9, 2012

Mayor and Council
City of Vancouver
453 west 12th Ave
Vancouver, BC

Dear Mr. Mayor and Council Members

Re: 800 Griffiths Way,
Rogers Arena rezoning

We are writing with respect to the rezoning of 800 Griffiths and the Community Amenity Contribution proposed thereunder. Specifically we are very concerned with the overall amenity package proposed, not only by this rezoning, but by the entire North East False Creek (NEFC) rezoning.

We refer to the October 22, 2009 "**Northeast False Creek: Directions for the Future**" report and its proposal to "Deliver a minimum of 10% of the new residential floor space in NEFC through the transfer of heritage density from the Heritage Density Bank". This would suggest that a minimum of 42,000 of Rogers Arena's proposed 420,000 additional residential floor space be absorbed from the Heritage Density Bank.

The Heritage Density Bank is the City's tracking of density that has been earned by developers in completing the rehabilitation of heritage buildings that City Council had recognized as civic amenities and economic generators. This density was granted as an incentive to offset the proforma deficit that resulted from the extreme cost of heritage rehabilitation and the economically derelict areas that the buildings were in.

We note that the economic rejuvenation currently seen in Gastown and a portion of Chinatown has happened ostensibly through the completion of Heritage Revitalization projects that financially rely heavily on the ability to sell incentive density. We strongly believe that the high land values currently being used in the proforma calculations of the CAC for NEFC have been strengthened by the positive economic impact of the Gastown and Chinatown heritage redevelopments.

According to the City's "Transferable Heritage Density Inventory", as of May 10, 2012 there was 757,752 square feet of incentive density in the bank. These projects have been funded, financed, and completed to the City's satisfaction. The City currently values these density incentives at $65/square foot when transferring to new rezonings. This suggests that there is currently $49,253,880 worth of incentive that was granted to rehabilitate buildings, for economic and heritage revitalization that has been completed, and that is required to be transferred in

S A L I E N T

The Salient Group #225 - 200 Carrall Street, Vancouver, BC V6B 2J2
T: 604.669.5536 F: 604.669.5574 E: info@thesalientgroup.com

order to satisfy the intent of the individual Heritage Revitalization Agreements, and the Transfer of Density program. I note that, per the City's October 2009 report, "Reducing the amount of density currently in the density bank has been identified as a corporate priority".

We recognize the need for cost effective housing solutions and respect the proposal that the Aquilini Group has proposed. However, it had been anticipated that this site would be one that would incorporate a significant amount of the anticipated heritage density that was going to be absorbed in North East False Creek (NEFC). We ask not only that a minimum 10% of the increase in residential density portion of the CAC for the Rogers area rezoning be taken in the form of heritage density bank, but are also that this objective of the **Northeast False Creek: Directions for the Future**" report as it relates to the absorption of density from the Heritage Density Bank for the entire NEFC redevelopment be achieved. It is our understanding that the development capacity for Northeast False Creek may have been conservatively light, and that there should be the opportunity to absorb more density in compensation for the many heritage projects already completed by developers.

Again we are generally supportive of the rezoning work that is being undertaken at NEFC and the proposal of the Aquilini Group, but request that a portion of the CAC of the Rogers area rezoning be through the purchase of transferable heritage density from the heritage density bank. We also request that the targets for heritage density absorption in NEFC proposed in the **Northeast False Creek: Directions for the Future**" report be achieved, and request clarification on the allocation of this density to the remaining parcels.

Please do not hesitate to contact the undersigned for clarification or information.

Yours truly
SALIENT DEVELOPMENTS LTD

Robert Fung
President

cc: Kevin McNaney – Senior Planner NEFC
Marco D'Agostini – Senior Planner – Heritage Group