

April 18, 2016

Kagan Shastri LLP
188 Avenue Road
Toronto, ON
M5R 2J1

Attn: Mr. Ira Kagan

**Re: Rise Developments Canada Inc. - 17 Ewen Road Development
Review of Current Plans for Compliance with Minutes of Settlement
Novus File No. 15-0007**

1.0 Introduction

Novus Environmental Inc. (Novus) was retained by Rise Developments Canada Inc. (Rise) to conduct a noise impact assessment for their 10-storey student residence to be located at 17 Ewen Road, in Hamilton, Ontario. Our noise assessment in support of the re-zoning for the development was documented in the Novus report entitled “Environmental Noise Assessment, Proposed 10 Storey Student Residence, 17 Ewen Road, Hamilton, Ontario”, dated August 7, 2014. The report included a number of recommendations for noise mitigation measures.

These and other recommended air quality mitigation measures were also documented in detailed multi-party settlement agreements, including:

- A multi-party agreement between Rise (in the form of Rise Real Estate, 17 Ewen (Hamilton) Corp, and TCI Realty Holdings), Mondelez Canada Inc., and the City of Hamilton (hereafter the “Tri-party agreement”); and
- A second multi-party agreement between Rise (as before) and Mondelez (hereafter the “Rise-Mondelez agreement”).

The purpose of this letter is to document our review of the current plans (April 18, 2016) with respect to conformance with the requirements of the settlement agreements.

2.0 Description of the Current Site Plan

Excerpts from the current site plan and elevation views are shown in **Figures 1 and 2**, attached. **Figure 3** provides images from the Novus / GHD noise model showing the original settlement design and the current design, for comparison. The development remains a 10-storey student residence, set back 3.0 m from the southern property line. The terracing of the development has changed.

A mechanical penthouse is located on the roof at the eastern end of the building. Per the minutes of settlement requirements, there are no air intakes on this penthouse. Instead, two air intakes will be used:

- 1) One located at grade on the north side of the building, for the underground parking lot; and
- 2) One located on the north side 1st floor, for the building.

Intake locations are discussed further in **Section 5** of this letter.

3.0 Built Form Requirements

Attachment A at the end of this letter is a table outlining the specific built-form, air quality and noise requirements from the minutes of settlement, and outlining how the current development design addresses these requirements.

For built form, the Minutes of Settlement requirements are as follows:

- A maximum height of ten storeys.
- No Outdoor Living Area or common outdoor amenity areas, including balconies or rooftop outdoor amenity areas.
- A minimum setback of (three) 3 metres from the southern property line of the Rise Lands.

See **Figures 1 and 2**, and the SPA drawings. The current design meets these requirements.

4.0 Noise Requirements

For noise, the Minutes of Settlement requirements are as follows:

- Buffer Windows to protect each Noise Sensitive Space on the entire south facade, the entire east facade and portions of the north facade of the Rise Development.

Figure 2 of this letter and the Elevations views of the development in the Site Plan Application (SPA) documents confirm that Noise Buffer Windows will be installed in the appropriate locations.

Given the change in building massing, updated noise modelling has been conducted based on the new design to confirm that all appropriate locations are captured, especially on the northern facade. Noise modelling results are shown in **Figure 4**. Per the prior settlement discussions with GHD, the need for Noise Buffer Windows have been identified where predicted sound levels on the northern facade exceed 55 dBA for impulsive noise. The updated model will be provided to Mondelez/ GHD.

- The exterior panes of Noise Buffer Windows on the 6th through 10th floor of the east façade must provide a minimum sound transmission performance of STC 36 and meet minimum construction and octave band transmission loss performance requirements. All other exterior windows must meet STC 31 and be thicker than 1/4 inch. There shall not be less than 4 inches of space between any Buffer Window Exterior Pane and any Buffer Window Interior Pane, measured laterally.

The location of Noise Buffer Windows requiring the STC 36 exterior panes are shown in **Figure 2c** and in the SPA elevation views. The buffer windows will be designed to meet the design requirements of the Minutes of Settlement, which are summarized in **Attachment B**. Documentation on consultation with the MOECC on the noise buffer window design is also provided.

- The space between a Buffer Window Exterior Pane and a Buffer Window Interior Pane shall be maintained on all sides by a steel cage (minimum 20 gauge) without gaps.

The window design will meet this condition.

- Each Buffer Window Exterior Pane and each Buffer Window Interior Pane shall be sealed, with the exception of windows identified for acoustic audit purposes.

The Noise Buffer Window locations currently selected for acoustic testing are shown in **Figure 2**. The interior panes of these windows will be operable. All other interior panes will be sealed.

- All vents, air intakes, exhausts and like building elements shall be designed and constructed to maintain the sound isolation of interior spaces from the exterior environment.

The parking lot air intake will be located at grade and the building air intake will be located on the first floor, with both on the north side of the building. See **Figures 1 and 2b**. Excesses of the noise guidelines do not occur at these locations. See **Figure 4**. Building exhausts will be located in the mechanical penthouse. Noise from the mechanical equipment itself at this location will be greater than infiltration of noise from Mondelez. Therefore, the current design meets these requirements.

5.0 Air Quality

The only air quality Point of Impingement for the development will be the two air intakes, which will be located as follows:

- Underground parking: at grade on the north side of the building, between building design grids 5 and 6.
- Building: first floor, north side of building, between building grids 8 and 9.

See **Figures 1 and 2b** for intake locations. All exterior windows on the development will be sealed / non-openable.

The Mondelez/ GHD AERMOD dispersion model was used to predict air quality contaminant concentrations at the proposed ventilation locations, and at locations within 10 m of the intakes.. Predicted concentrations meet the requirements of the Rise-Mondelez Settlement Agreement Conditions 8 (a), (b), and (c). Results are tabulated in **Attachment C**. The dispersion modelling will be provided to Mondelez/ GHD.

6.0 Closing

Based on our review, the built form, noise and air quality conditions outlined in the Minutes of Settlement are met. Should you have any questions or comments, please feel free to contact us.

Sincerely,

Novus Environmental Inc.



R. L. Scott Penton, P.Eng.
Principal.

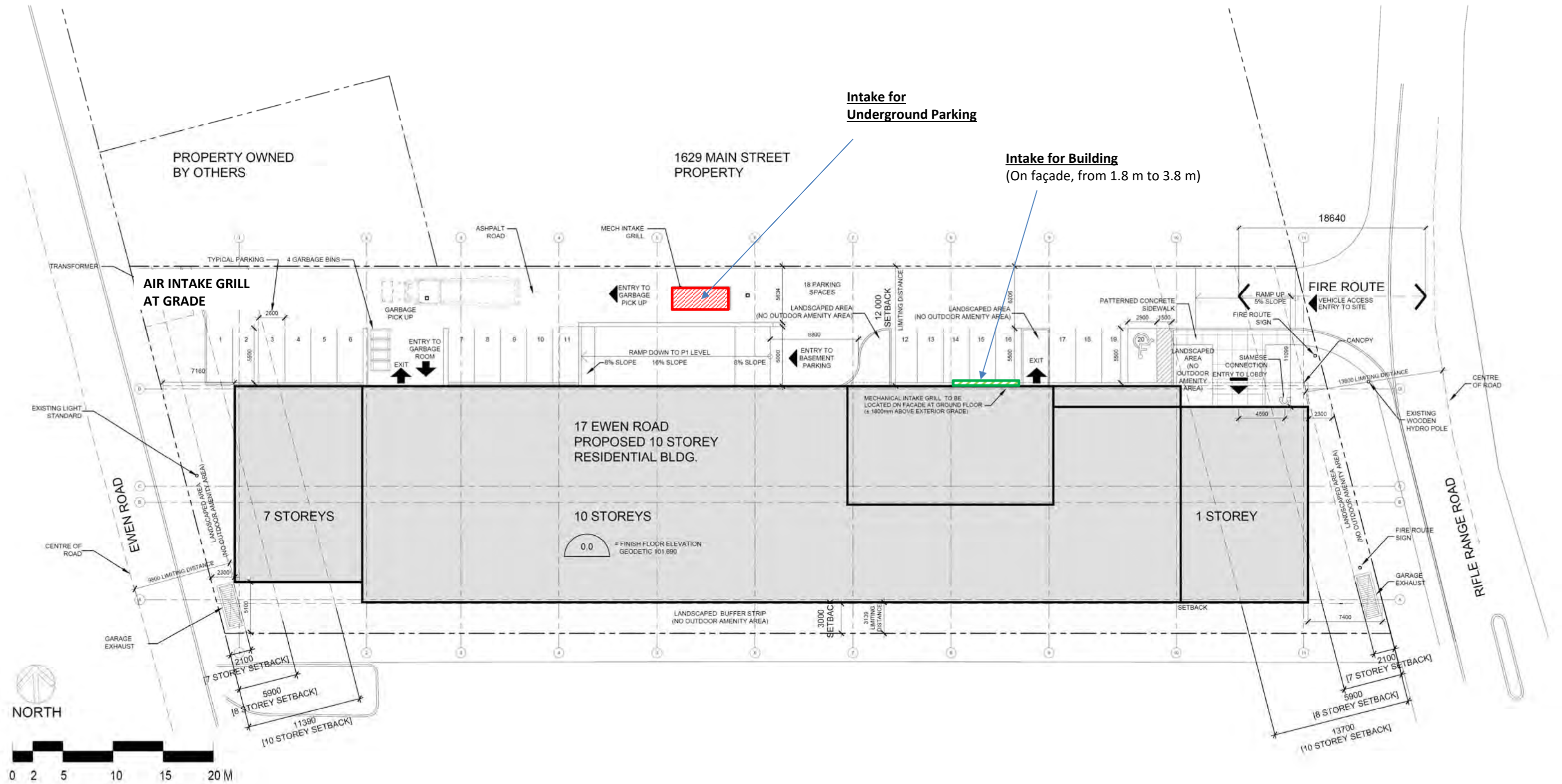


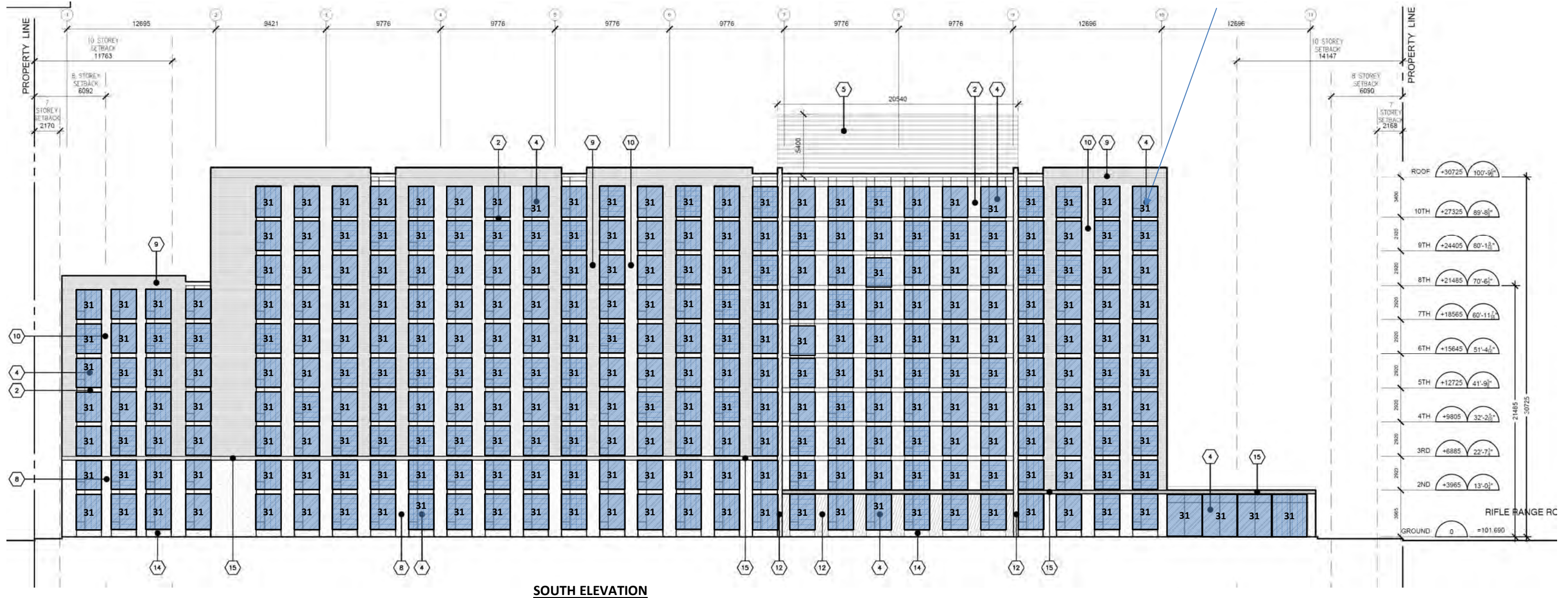
Figure No. 1
Excerpts From Site Plan

Scale: See inset
 Date: 16/02/21
 File No.: 15-0007
 Drawn By: SLP



Notes:

- Selected Buffer Window for Acoustic Audit
- Interior Window Only will be operable



Notes:

- All windows on the Southern Façade must be Noise Buffer Windows with minimum STC 31 exterior panes per Minutes of Settlement.

MATERIAL LEGEND

- | | |
|---|------------------------------------|
| ② GLASS SPANDREL PANEL | ⑩ PRECAST BRICK PANEL (LIGHT GREY) |
| ④ NON-OPERABLE NOISE BUFFER WINDOW STC 31 | ⑫ WOOD EFFECT" PANELS |
| ⑤ MECHANICAL PENTHOUSE ARCHITECTURAL LOUVRES | ⑭ ARCHITECTURAL EXPOSED CONCRETE |
| ⑧ GRANITE | ⑮ STANLESS STEEL FASCIA |
| ⑨ PRECAST BRICK PANEL (CHARCOAL) | |

Figure No. **2a**

Building Elevations Showing Locations of Buffer Windows – South Elevation

Rise Developments - 17 Ewen Road

Scale: Approx 1: 300

Date: 16/02/21

File No.: 15-0007

Drawn By: SLP



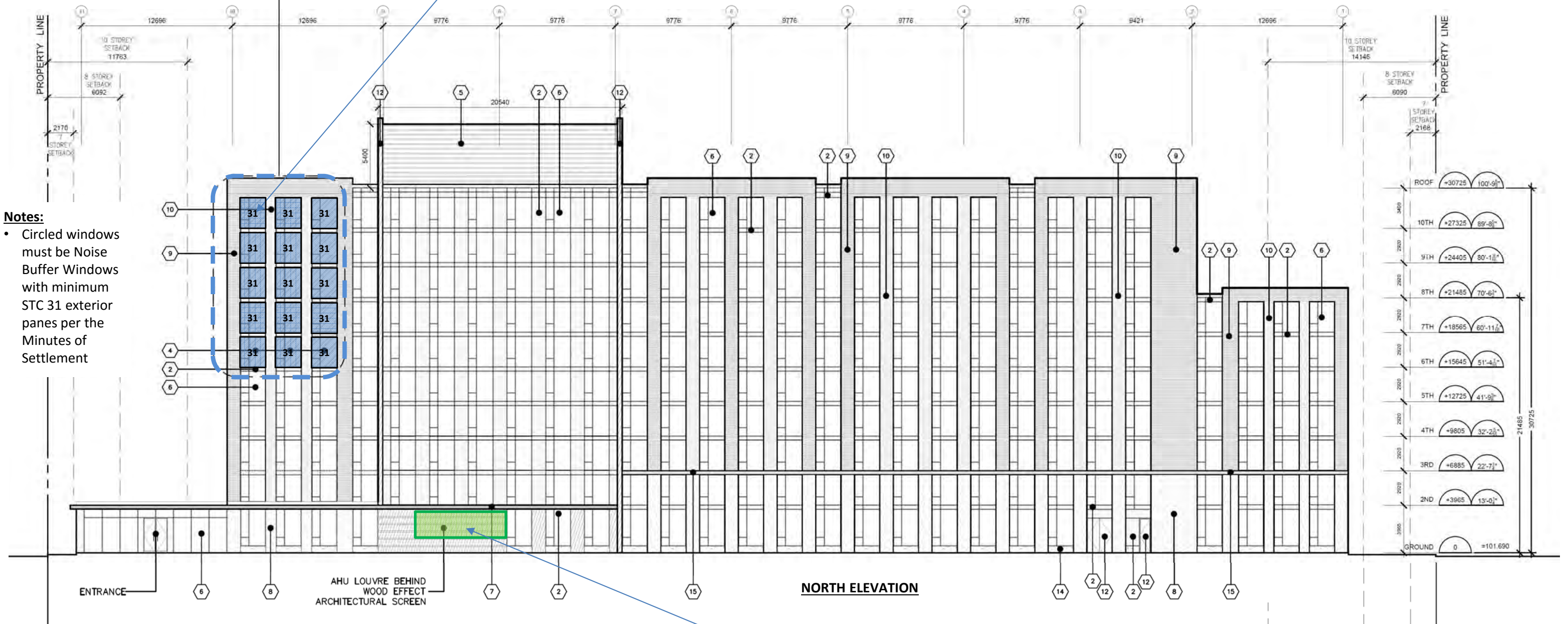
NOTE:
WINDOWS ARE NOISE BUFFER
WINDOWS WITH MINIMUM STC 31
EXTERIOR PANES

Notes:

- Selected Buffer Window for Acoustic Audit
- Interior Window Only will be operable

Notes:

- Circled windows must be Noise Buffer Windows with minimum STC 31 exterior panes per the Minutes of Settlement



Notes:

- Location of Building Air Intake
- From 1.8 m to 3.8 m high

MATERIAL LEGEND

- | | | | |
|---|--|----|----------------------------------|
| 2 | GLASS SPANDREL PANEL | 9 | PRECAST BRICK PANEL (CHARCOAL) |
| 4 | NON-OPERABLE NOISE BUFFER WINDOW STC 31 | 10 | PRECAST BRICK PANEL (LIGHT GREY) |
| 5 | MECHANICAL PENTHOUSE ARCHITECTURAL LOUVRES | 12 | WOOD EFFECT" PANELS |
| 6 | NON-OPERABLE WINDOW | 14 | ARCHITECTURAL EXPOSED CONCRETE |
| 7 | CANTILEVERED METAL CLAD CANOPY | 15 | STANLESS STEEL FASCIA |
| 8 | GRANITE | | |

Figure No. **2b**

Building Elevations Showing Locations of Buffer Windows – North Elevation

Rise Developments - 17 Ewen Road

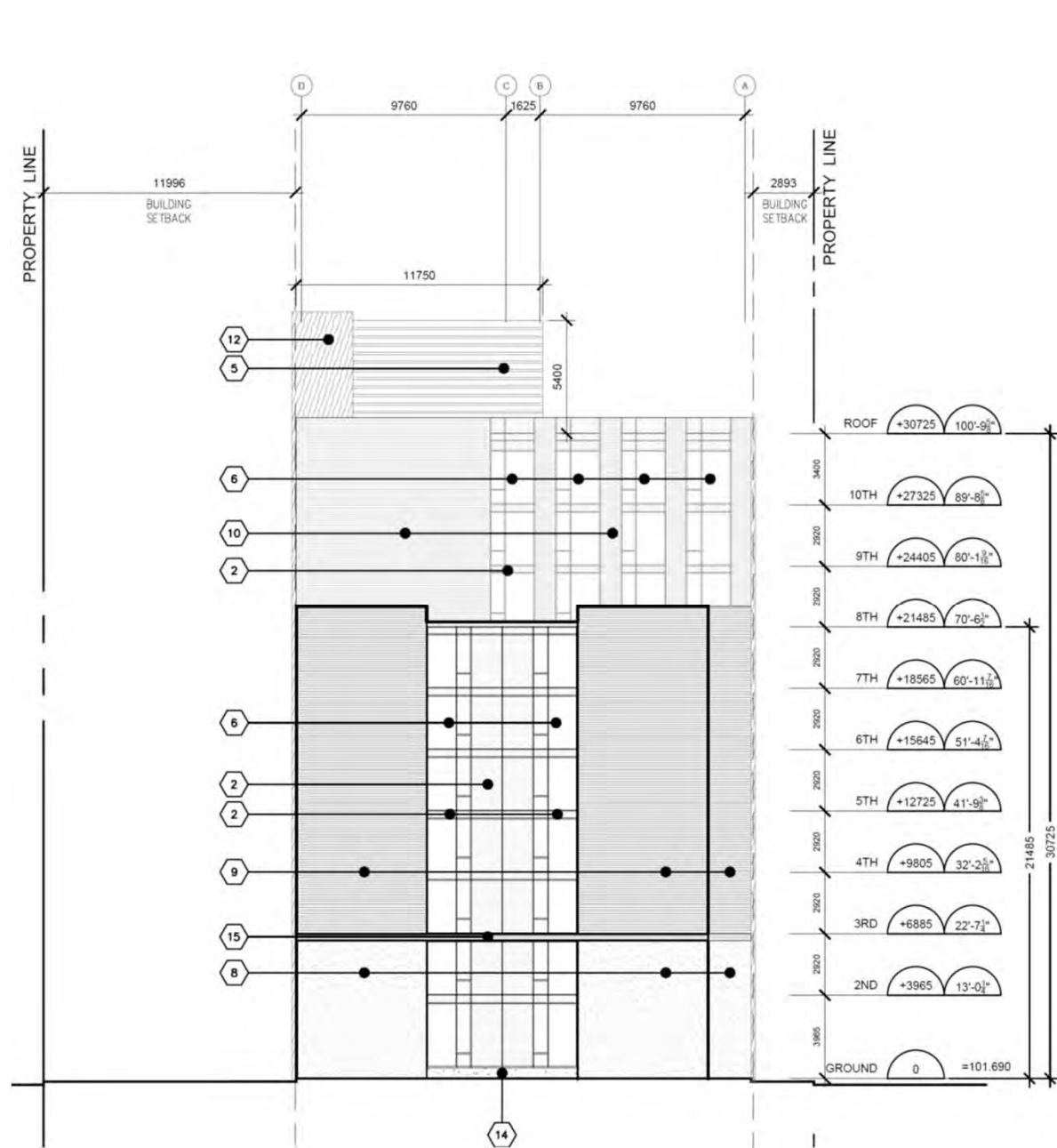
Scale: Approx 1: 300

Date: 16/02/21

File No.: 15-0007

Drawn By: SLP

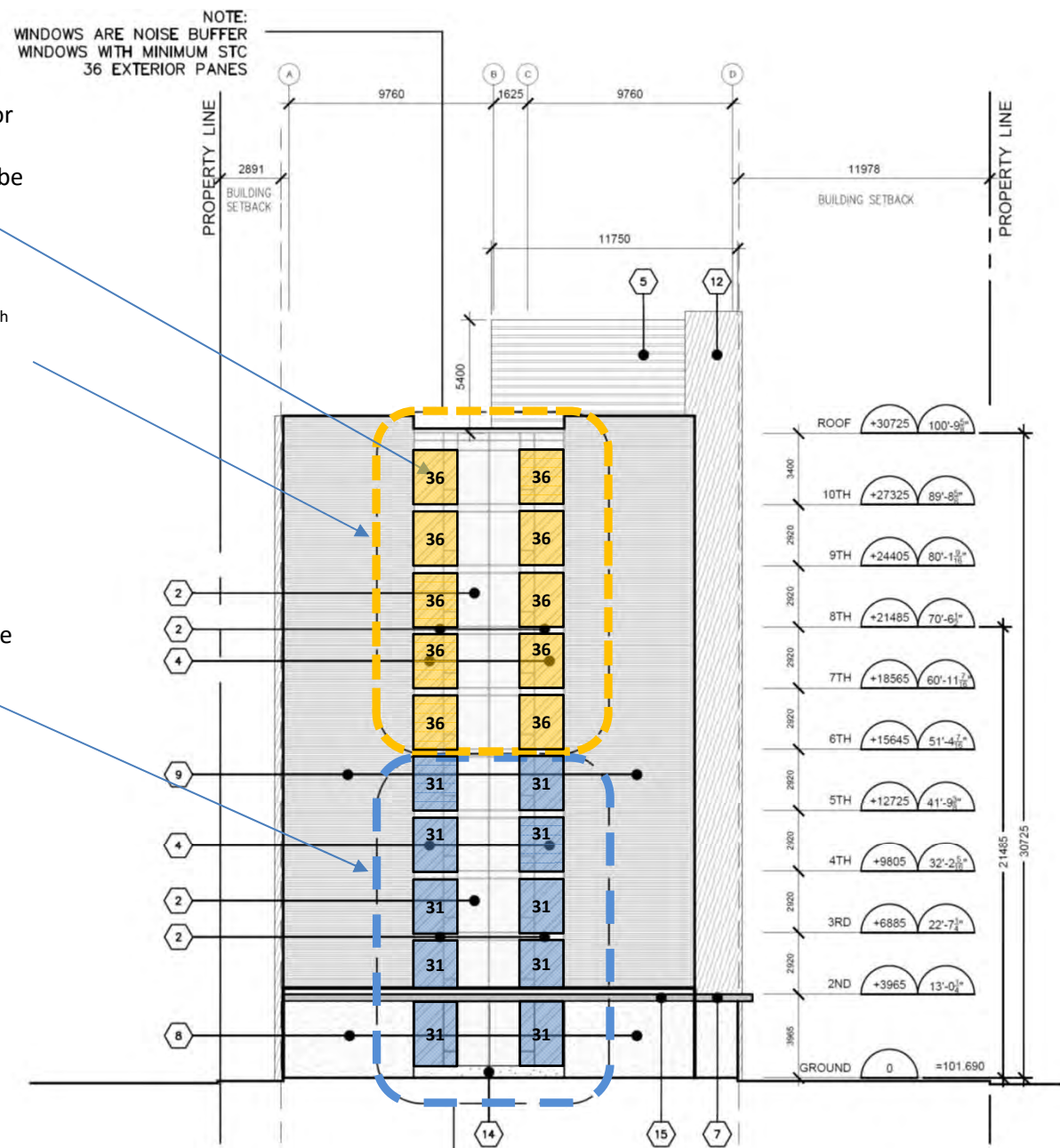




- Notes:**
- Selected Buffer Window for Acoustic Audit
 - Interior Window Only will be operable

- Notes:**
- Circled windows here on 6th through 10th floors must be Noise Buffer Windows with minimum STC 36 exterior panes per the Minutes of Settlement

- Circled windows here on 1st through to 5th floors must be Noise Buffer Windows with minimum STC 31 exterior panes per the Minutes of Settlement



WEST ELEVATION

EAST ELEVATION

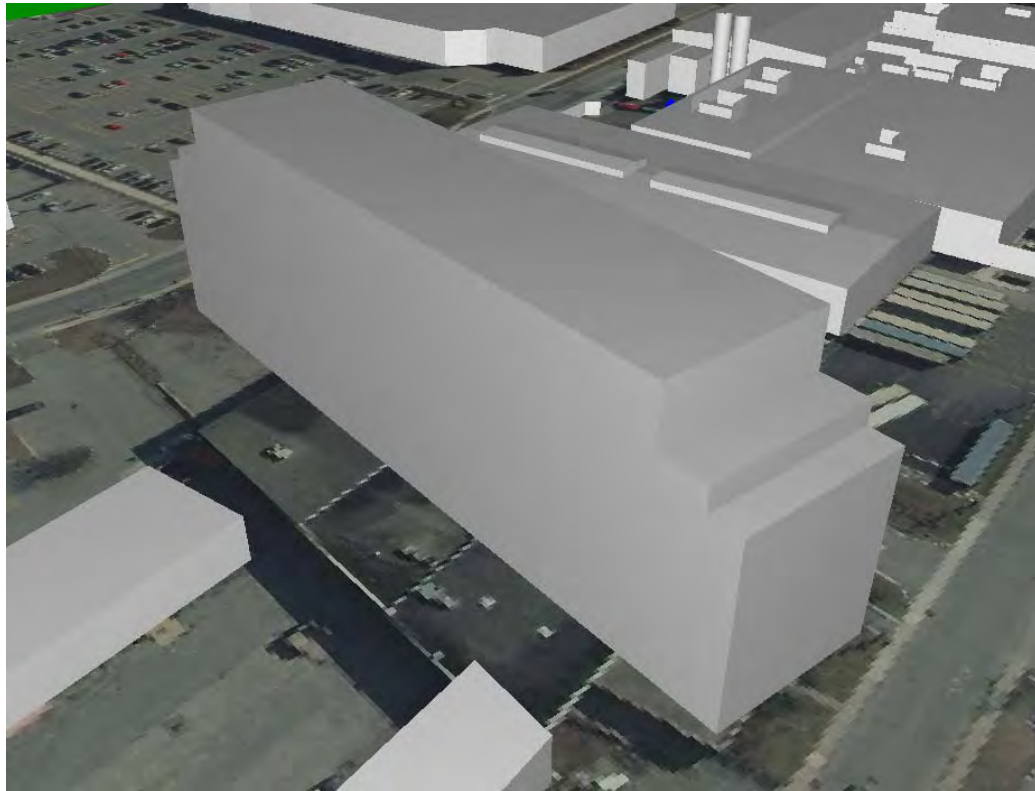
MATERIAL LEGEND

- | | | | |
|---|--|----|----------------------------------|
| 2 | GLASS SPANDREL PANEL | 9 | PRECAST BRICK PANEL (CHARCOAL) |
| 4 | NON-OPERABLE NOISE BUFFER WINDOW STC 31 STC 36 | 10 | PRECAST BRICK PANEL (LIGHT GREY) |
| 5 | MECHANICAL PENTHOUSE ARCHITECTURAL LOUVRES | 12 | WOOD EFFECT" PANELS |
| 6 | NON-OPERABLE WINDOW | 14 | ARCHITECTURAL EXPOSED CONCRETE |
| 7 | CANTILEVERED METAL CLAD CANOPY | 15 | STANLESS STEEL FASCIA |
| 8 | GRANITE | | |

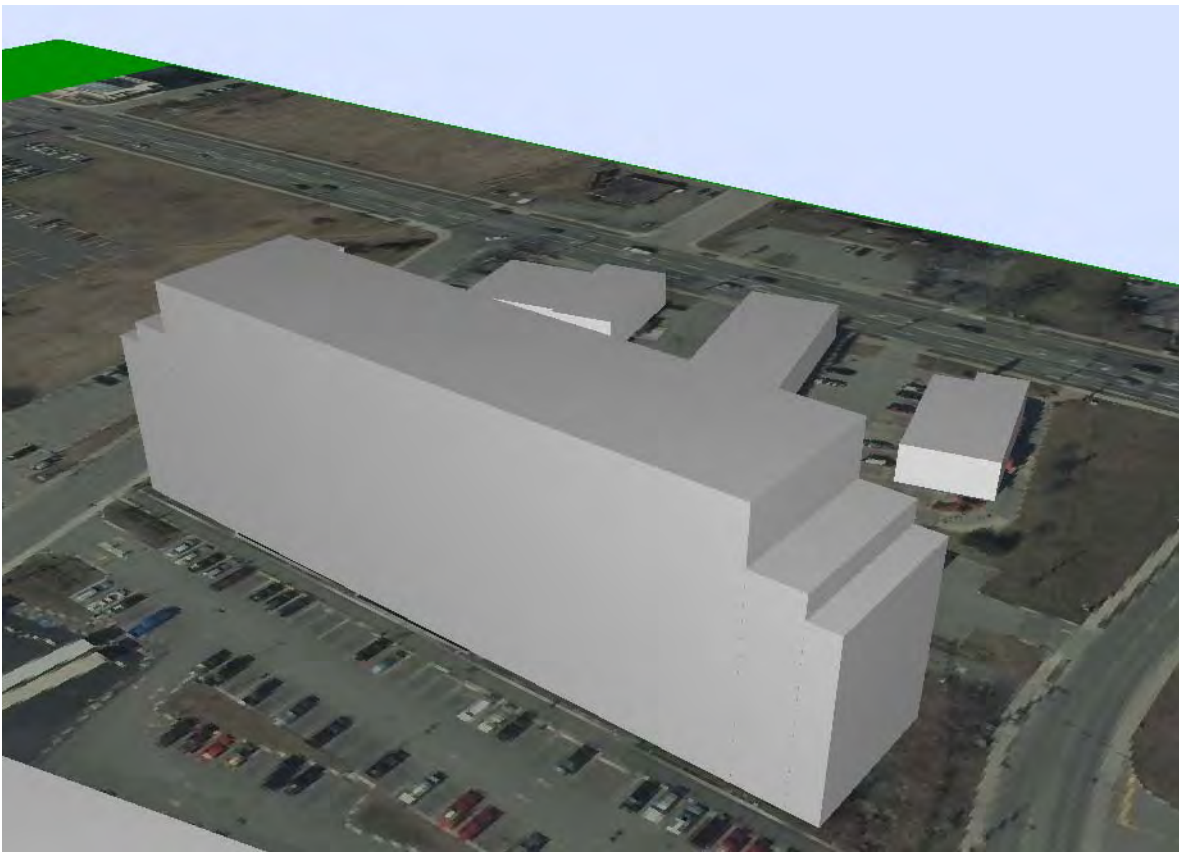
Figure No. **2c**

Building Elevations Showing Locations of Buffer Windows – West and East Elevations

SETTLEMENT DESIGN

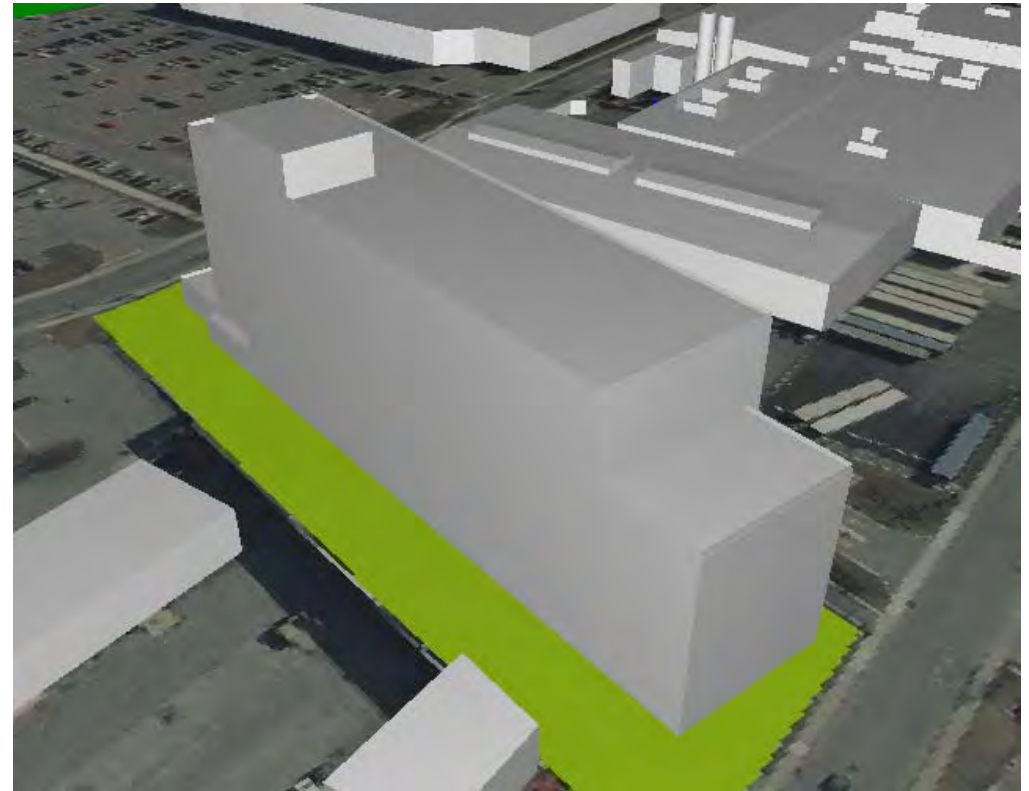


View From Northwest

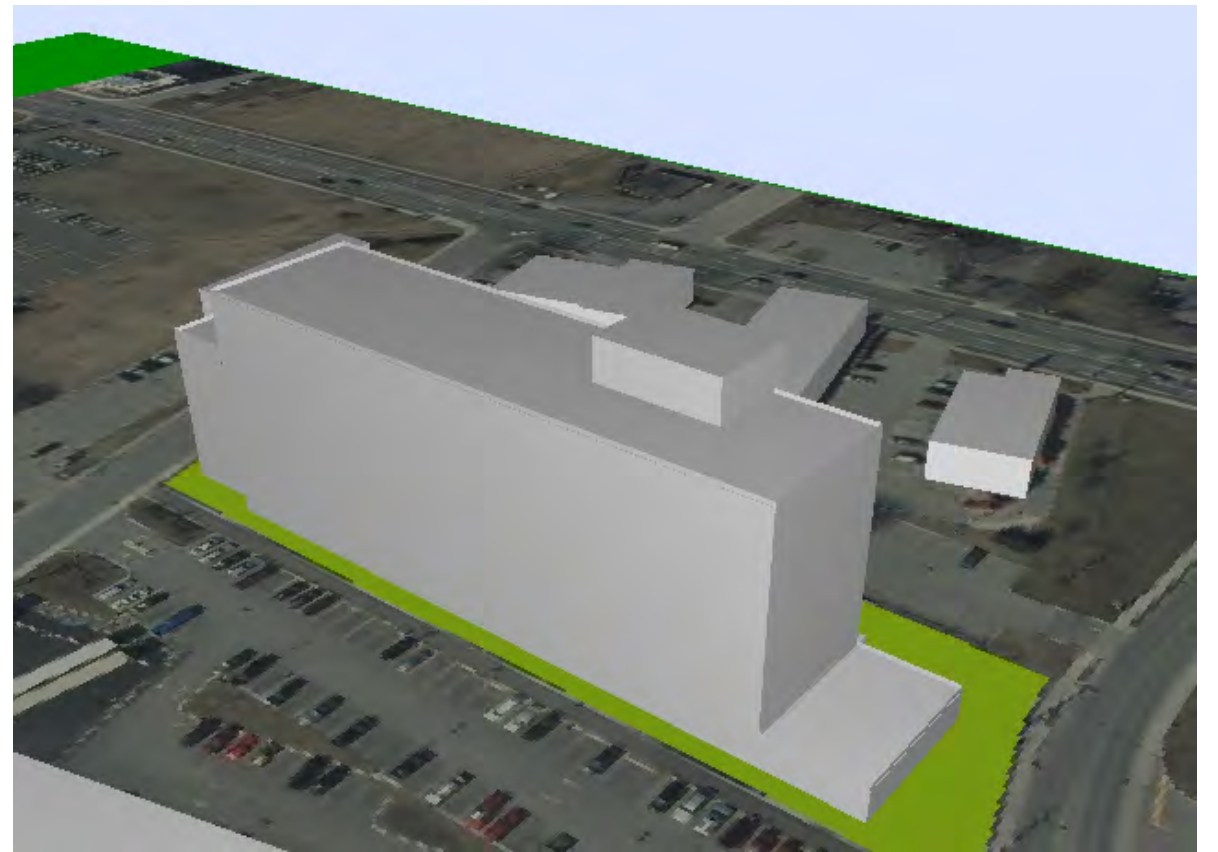


View From Southeast

CURRENT DESIGN



View From Northwest



View From Southeast

Figure No. 3

Visual Comparison Between Settlement Design and Current Design

Rise Developments - 17 Ewen Road

Scale: n/a

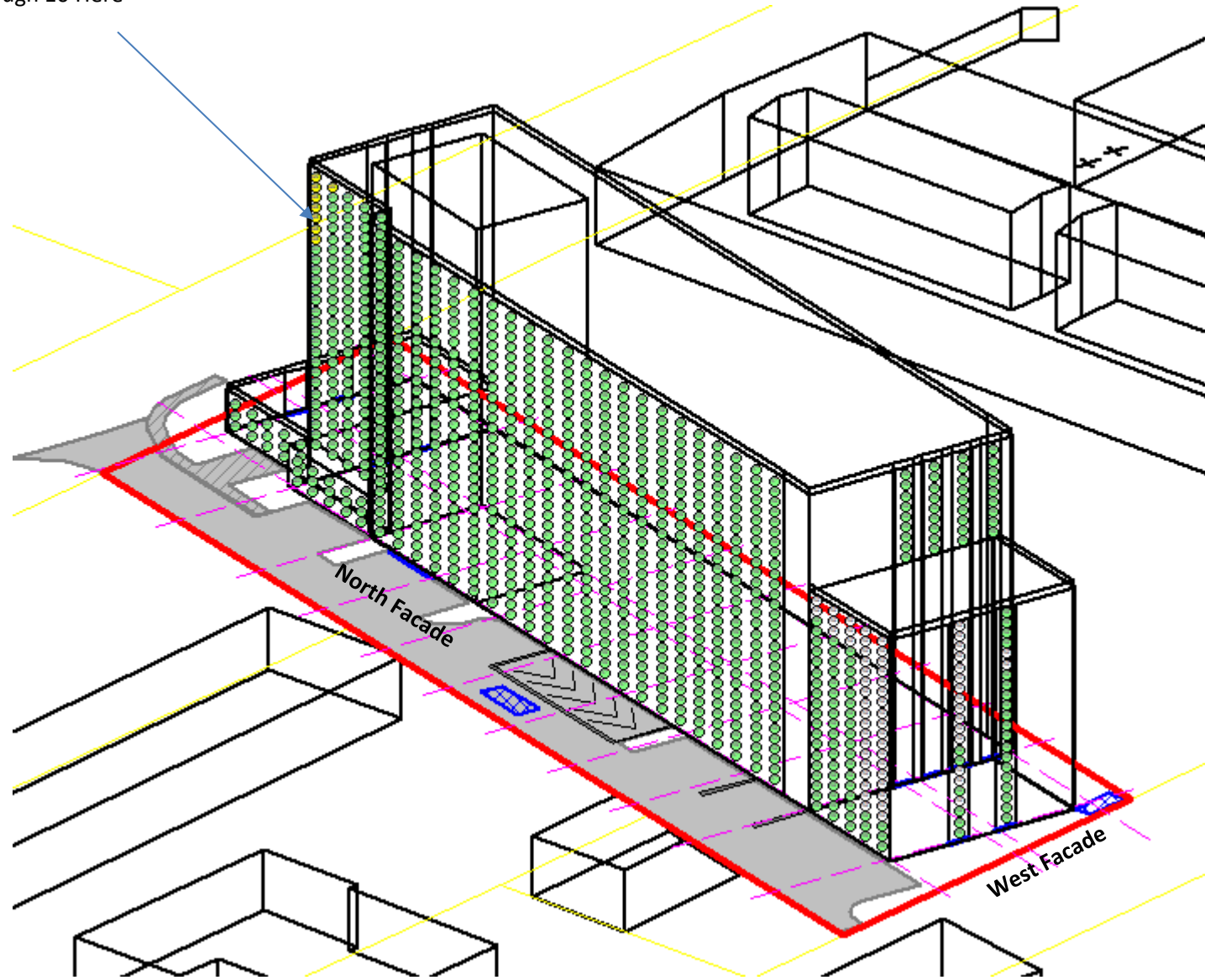
Date: 16/14/18

File No.: 15-0007

Drawn By: SLP



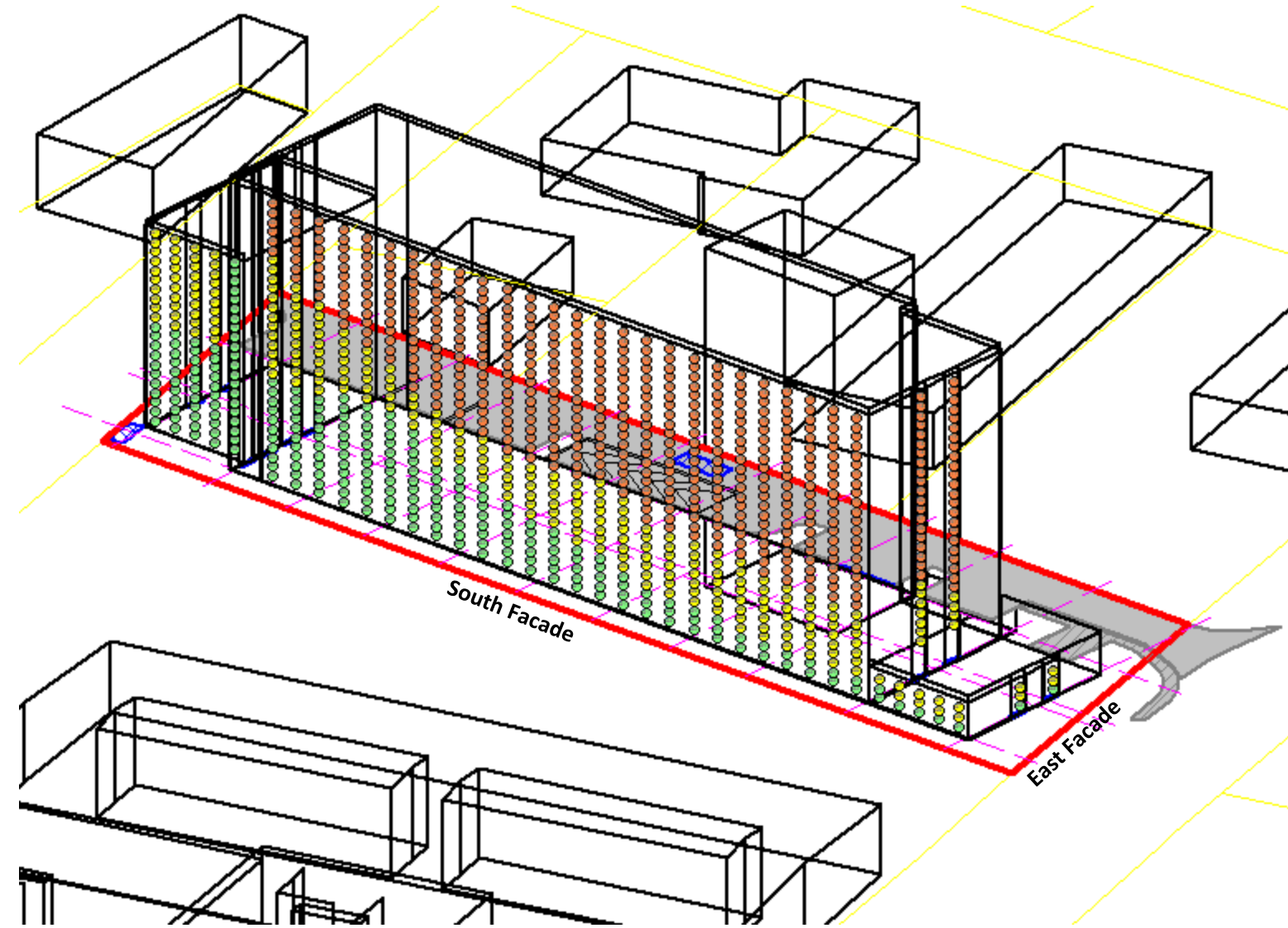
Noise Buffer Windows
Required For Floors 6
through 10 Here



View From Northwest

LEGEND

- ≥ 45
- ≥ 55
- ≥ 60



View From Southeast

Noise Buffer Windows Required For
All Windows On The Southern
And Eastern Facades Per Minutes of
Settlement

Non-Impulsive Noise

Figure No. **4a**

Updated Noise Modelling Results – Impulsive Noise

Rise Developments - 17 Ewen Road

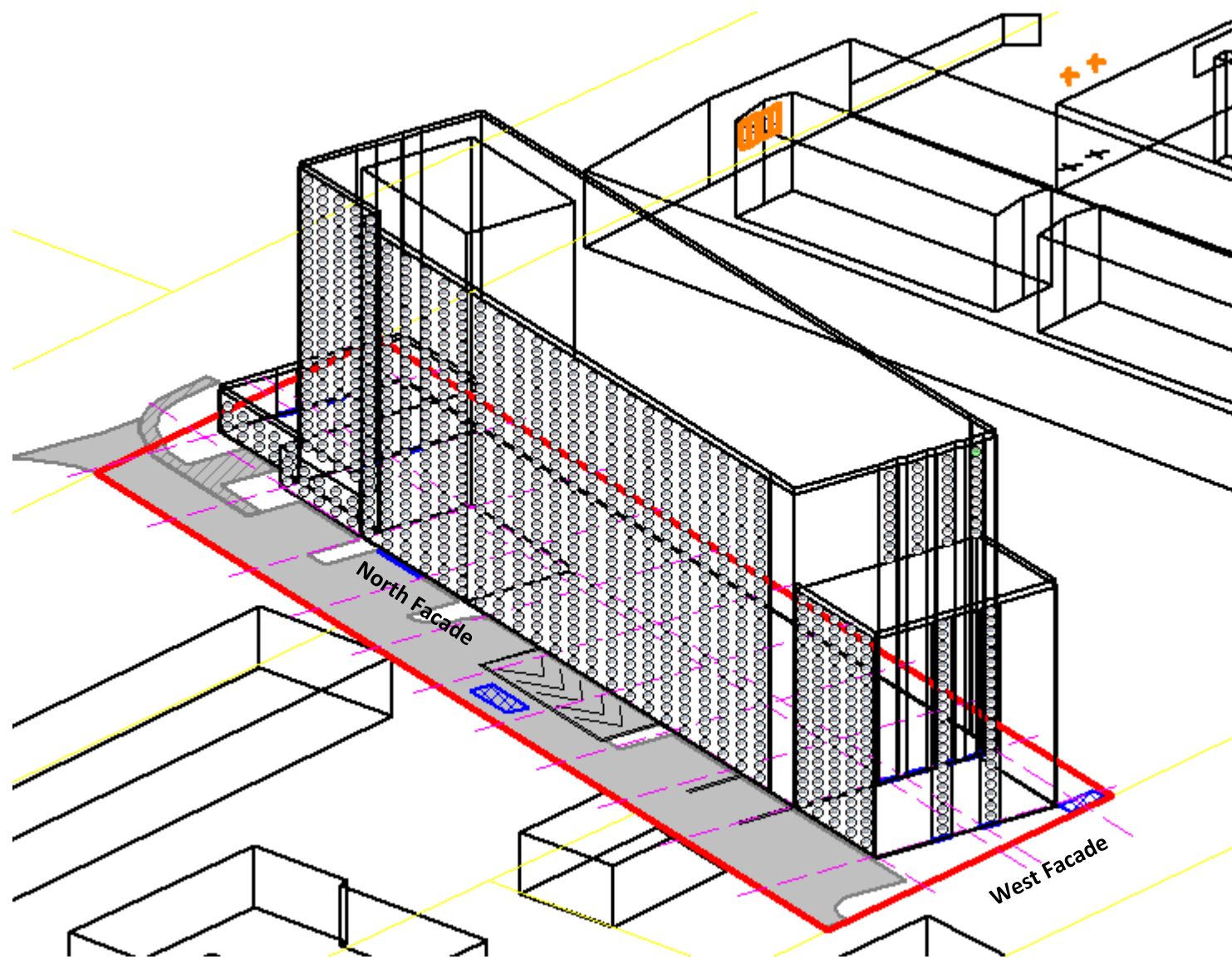
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Date: 16/04/18

File No.: 15-0007

Drawn By: SLP

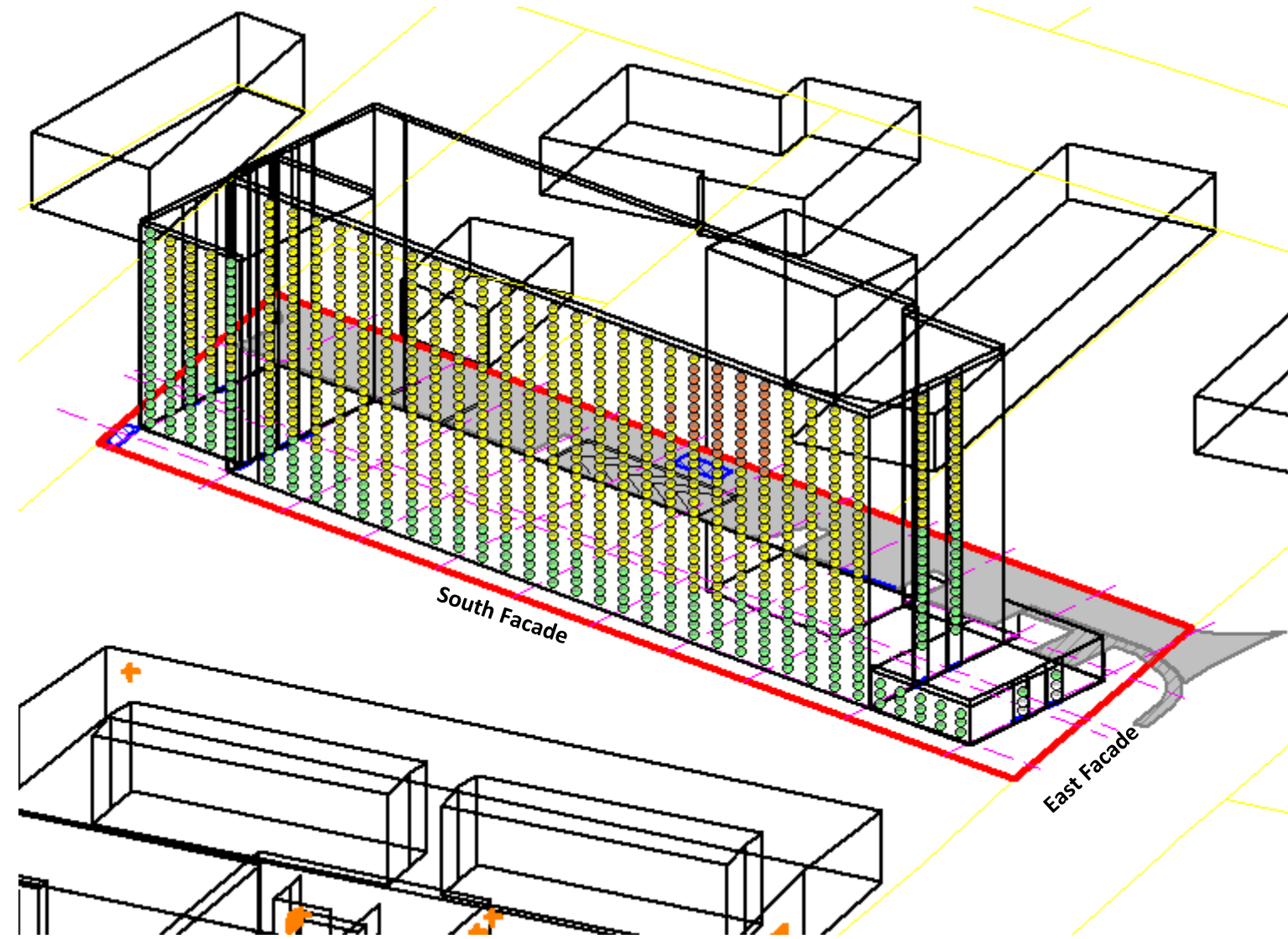




View From Northwest

LEGEND

- >= 45
- >= 55
- >= 60



View From Southeast

Noise Buffer Windows Required For All Windows On The Southern And Eastern Facades Per Minutes of Settlement

Figure No. **4b**
Updated Noise Modelling Results – Non-Impulsive Noise

Scale: n/a
 Date: 16/04/18
 File No.: 15-0007
 Drawn By: SLP



Attachment A

Attachment A: Minutes of Settlement Noise, Air Quality and Built-Form Requirements, and Compliance of Current Design

Tri-Party Agreement Requirements	Rise-Mondelez Settlement Agreement	How the Current Design Addresses Requirement
15 Rise agrees that the Rise Development shall include certain design elements intended to mitigate noise impacts from the Hamilton Manufacturing Facility. These design elements are set out in this section and are collectively referred to in this Agreement as the "Required Design Elements". The Required Design Elements include:	16 Rise agrees that the Rise Development shall include certain design elements intended to mitigate impacts from the Hamilton Manufacturing Facility. These design elements are set out in this section and are collectively referred to in this Mondelez Canada/Rise Agreement as the "Required Design Elements". The Required Design Elements include:	--
(a) a Buffer Window to protect each Noise Sensitive Space on the entire south facade, the entire east facade and portions of the north facade of the Rise Development, illustrated in Schedule "C" attached to this Mondelez Canada/Rise Agreement:	(a) a Buffer Window to protect each Noise Sensitive Space on the entire south facade, the entire east facade and portions of the north facade of the Rise Development, illustrated in Schedule "C" attached to this Mondelez Canada/Rise Agreement:	Figure 2 of this letter and the Elevations views of the development in the Site Plan Application (SPA) documents confirm that Noise Buffer Windows will be installed in the appropriate locations. Updated noise modelling has been conducted based on the new design to confirm that all appropriate locations are captured, especially on the eastern and northern facades. Results are shown in Figure 4. Per the prior settlement discussions with GHD, the need for Noise Buffer Windows have been identified where predicted sound levels on the northern facade exceed 55 dBA. The updated model will be provided to Mondelez/ GHD.
(i) each Buffer Window shall consist of a Buffer Window Exterior Pane and a Buffer Window Interior Pane;	(i) each Buffer Window shall consist of a Buffer Window Exterior Pane and a Buffer Window Interior Pane;	Appropriate buffer windows meeting the design requirements of the Minutes of Settlement will be installed.
(ii) each Buffer Window Exterior Pane on floors 6, 7, 8, 9 and 10, on the east façade only, shall provide a minimum sound transmission performance of STC 36 and shall consist of a minimum of either A. 1/2" thick (13 mm) glass, B. laminated glass, 3/16" glass / 0.030" laminate / 3/16" glass C. laminated glass, 1/4" glass / 0.030" laminate / 1/8" glass.	(ii) each Buffer Window Exterior Pane on floors 6, 7, 8, 9 and 10, on the east façade only, shall provide a minimum sound transmission performance of STC 36 and shall consist of a minimum of either A. 1/2" thick (13 mm) glass, B. laminated glass, 3/16" glass / 0.030" laminate / 3/16" glass C. laminated glass, 1/4" glass / 0.030" laminate / 1/8" glass.	The location of Noise Buffer Windows requiring the the minimum STC 36 exterior panes are shown in Figure 2c and in the SPA elevation views. Appropriate buffer windows meeting the design requirements of the Minutes of Settlement will be installed.
(iii) all other Buffer Window Exterior Panes shall provide a minimum sound transmission performance of STC 31 and shall be not less than ¼ inch (6 mm) thick;	(iii) all other Buffer Window Exterior Panes shall provide a minimum sound transmission performance of STC 31 and shall be not less than ¼ inch (6 mm) thick;	Appropriate buffer windows meeting the design requirements of the Minutes of Settlement will be installed.
(iv) each Buffer Window shall provide a minimum transmission loss by octave band as is set out in Schedule C for that type of Buffer Window;	(iv) each Buffer Window shall provide a minimum transmission loss by octave band as is set out in Schedule C for that type of Buffer Window;	Appropriate buffer windows meeting the design requirements of the Minutes of Settlement will be installed. Buffer window design requirements shown in Attachment B .
(v) each Buffer Window Interior Pane shall be an exterior grade window meeting minimum Ontario Building Code Requirements;	(v) each Buffer Window Interior Pane shall be an exterior grade window meeting minimum Ontario Building Code Requirements;	Appropriate buffer windows meeting the design requirements of the Minutes of Settlement will be installed.
(vi) there shall be not less than four (4) inches of space between any Buffer Window Exterior Pane and any Buffer Window Interior Pane, measured laterally;	(vi) there shall be not less than four (4) inches of space between any Buffer Window Exterior Pane and any Buffer Window Interior Pane, measured laterally;	Appropriate buffer windows meeting the design requirements of the Minutes of Settlement will be installed.
(vii) the space between a Buffer Window Exterior Pane and a Buffer Window Interior Pane shall be maintained on all sides by a steel cage (minimum 20 gauge) without gaps;	(vii) the space between a Buffer Window Exterior Pane and a Buffer Window Interior Pane shall be maintained on all sides by a steel cage (minimum 20 gauge) without gaps;	Appropriate buffer windows meeting the design requirements of the Minutes of Settlement will be installed.
(viii) each Buffer Window Exterior Pane and each Buffer Window Interior Pane shall be sealed except as noted in Subsection (g) below	(viii) each Buffer Window Exterior Pane and each Buffer Window Interior Pane shall be sealed except as noted in Subsection (g) below	Appropriate buffer windows meeting the design requirements of the Minutes of Settlement will be installed.

Tri-Party Agreement Requirements	Rise-Mondelez Settlement Agreement	How the Current Design Addresses Requirement
(b) a maximum height of ten storeys;	(b) a maximum height of ten storeys;	See Figure 1 and 2 , and the SPA drawings. The current design meets these requirements.
(c) Sealed Windows shall be installed on all other windows on the Rise Development that do not require a Buffer Window;	(c) Sealed Windows shall be installed on all other windows on the Rise Development that do not require a Buffer Window;	The current design meets this requirement.
(d) all vents, air intakes, exhausts and like building elements shall be designed and constructed to maintain the sound isolation of interior spaces from the exterior environment;	(d) all vents, air intakes, exhausts and like building elements shall be designed and constructed to maintain the sound isolation of interior spaces from the exterior environment;	The parking garage air intake will be located at grade, and the building air intake will be located on the first floor, both on the north side of the building. See Figures 1 and 2b . Excesses of the noise guidelines do not occur at grade. Building exhausts will be located in the mechanical penthouse. Noise from the mechanical equipment itself at this location will be greater than infiltration of noise from Mondelez. Therefore, the current design meets this requirement.
(e) no Outdoor Living Area or common outdoor amenity areas, including balconies or rooftop outdoor amenity areas;	(e) no Outdoor Living Area or common outdoor amenity areas, including balconies or rooftop outdoor amenity areas;	See Figure 1 and 2 , and the SPA drawings. The current design meets these requirements.
(f) a minimum setback of (three) 3 metres from the southern property line of the Rise Lands; and	(f) a minimum setback of (three) 3 metres from the southern property line of the Rise Lands; and	See Figure 1 and 2 , and the SPA drawings. The current design meets these requirements.
(g) openable Buffer Windows for audits on the south, east and north facades will be constructed with an openable inside pane of glass to allow Acoustic Audit measurements to assess compliance with NPC-300 noise criteria and the performance of the Buffer Windows (the "Selected Buffer Windows"). The number and location of Selected Buffer Windows shall be reviewed and agreed to by Mondelez Canada Inc. and Rise; and	(g) openable Buffer Windows for audits on the south, east and north facades will be constructed with an openable inside pane of glass to allow Acoustic Audit measurements to assess compliance with NPC-300 noise criteria and the performance of the Buffer Windows (the "Selected Buffer Windows"). The number and location of Selected Buffer Windows shall be reviewed and agreed to by Mondelez Canada Inc. and Rise; and	Selected buffer windows will be confirmed with Mondelez. Currently planned locations include: - South Façade, 10th floor, far east corner (Figure 2a); - North Façade, 10th floor, far east corner (Figure 2b); and - East Façade, 10th Floor, southern most window (Figure 2c)
(h) there shall be no location at the Rise Development that is above the first storey that would be considered a Point of Impingement, with the exception of the ventilation system air intakes, including those associated with the heating, ventilation and air conditioning (HVAC) equipment, and all air intakes at the Rise Development shall be located on the west side of the north façade of the Rise Development, at least 6 metres below the roofline, so as to minimize the exposure of the air intakes to the emissions from the Hamilton Manufacturing Plant such that the emissions from the Hamilton Manufacturing Plant will comply with the applicable air standards as set out in Regulation 419/05 and the Environmental Protection Act using an approved air dispersion model as set out in Regulation 419/05. Notwithstanding the forgoing, any other ventilation solution or location which, when modeled using an air dispersion model selected by Mondelez Canada Inc. in accordance with Regulation 419/05, would provide at least an equivalent level of protection or shielding from the emissions from the Hamilton Manufacturing Facility at a Point of Impingement as the location listed above and which is agreed upon by Rise and Mondelez Canada Inc. is also permitted and will not require an amendment to this agreement.	(h) there shall be no location at the Rise Development that is above the first storey that would be considered a Point of Impingement, with the exception of the ventilation system air intakes, including those associated with the heating, ventilation and air conditioning (HVAC) equipment, and all air intakes at the Rise Development shall be located on the west side of the north façade of the Rise Development, at least 6 metres below the roofline, so as to minimize the exposure of the air intakes to the emissions from the Hamilton Manufacturing Plant such that the emissions from the Hamilton Manufacturing Plant will comply with the applicable air standards as set out in Regulation 419/05 and the Environmental Protection Act using an approved air dispersion model as set out in Regulation 419/05.	The only air quality Points of Impingement for the development will be the air intakes, which are located as follows: - Parking garage - North side of building, between building grids 5 and 6 - Building - First floor north side of building, between grids 8 and 9 Please see Figures 1 and 2b for air intake locations. The Mondelez/ GHD AERMOD dispersion model was used to predict air quality contaminant concentrations at the four proposed ventilation locations. Predicted concentrations at the air intakes, and at all locations within 10 m of the air intakes, meet the requirements of the Rise-Mondelez Settlement Agreement Conditions 8 (a), (b), and (c). Results are tabulated in Attachment C. The dispersion modelling will be provided to Mondelez / GHD. This condition is therefore met.

Tri-Party Agreement Requirements	Rise-Mondelez Settlement Agreement	How the Current Design Addresses Requirement
	<p>8 Rise agrees that the only Points of Impingement permitted above ground level at the Rise Development are the ventilation system air intakes described in Subsection 16(h) and that if the MOE determines that any other feature of the Rise Development is a Point of Impingement, such as a building exhaust, window or other opening, Rise will develop a solution that is acceptable to the MOE that results in that feature no longer being a Point of Impingement failing which, Section 29 shall apply. As at the time of preparing this agreement, the parties agree that preliminary analysis has determined that the preferred location for the air intakes for the Rise Development is at a location no more than three meters above ground level on the west end of the north facade of the Rise Development. The parties agree that the air intakes for the Rise Development will be located at this preferred location or in any other alternate location agreed to by the Parties, in each case in a manner which ensures compliance with the Required Design Element in Subsection 16(h) and that ensures that all emissions from the Hamilton Manufacturing Facility at any permitted Point of Impingement at the Rise Development will meet each of the following criteria when modeled using an air dispersion model selected by Mondelez Canada Inc. in accordance with Regulation 419/05:</p>	<p>See the response to 16 (h) above. This condition is met.</p>
	<p>(a) no emission shall be more than 50% of the applicable respective air standards for each contaminant as set out in Regulation 419/05 and the Environmental Protection Act, based on the operation of three boilers at the Hamilton Manufacturing Facility;</p>	<p>See the response to 16 (h) above, and Attachment C. This condition is met.</p>
	<p>(b) no emission shall be greater than 80% of the applicable respective air standards for each contaminant as set out in Regulation 419/05 and the Environmental Protection Act based on the operation of four boilers at the Hamilton Manufacturing Facility; and</p>	<p>See the response to 16 (h) above, and Attachment C. This condition is met.</p>
	<p>(c) there is no emission, as modeled using the air dispersion model described herein, that will exceed a Point of Impingement standard at any location on the facade of the Rise Development within 10 meters surrounding the location of the air intakes under this Mondelez Canada/Rise Agreement;</p>	<p>See the response to 16 (h) above, and Attachment C. This condition is met.</p>

Attachment B

Attachment B: Noise Buffer Window Design

Settlement Agreements Schedule C - Table 1
Minimum Sound Transmission Loss for Buffer Windows

STC	Buffer Window Exterior Pane Specifications	Safelx Glass Test ID	1/1-Octave Band Transmissiom Loss (dB)							
			63	125	250	500	1000	2000	4000	8000
31	Minimum 1 pane 1/4"	RAL-TL85-169	17	24	26	31	34	29	35	39
	Option 1: 1 pane 1/2"	RAL-TL85-198	22	27	32	35	33	39	48	45
36	Option 2: Lam. 1 pane (G-L-G) 3/16" - 0.030" - 3/16"	RAL-TL85-200	22	27	31	34	36	36	48	53
	Option 3: Lam. 1 pane (G-L-G) 1/4" - 0.030" - 1/8"	RAL-TL85-229	22	27	31	33	36	37	47	52

SCHEDULE "C"

BUFFER WINDOW DESCRIPTION

Figure 1: Buffer Window Design

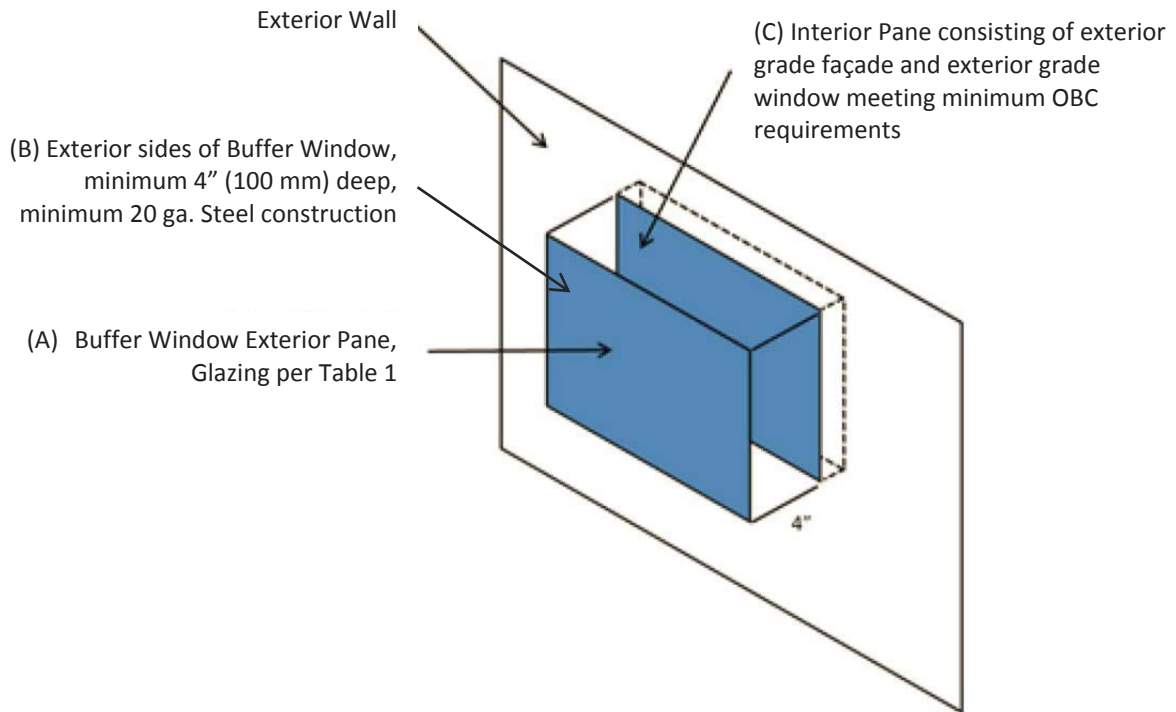
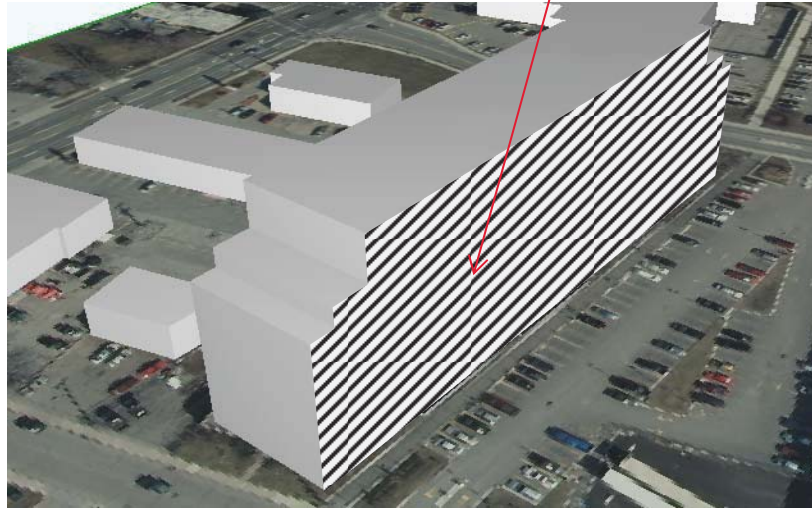


Figure 2: Buffer Window Locations

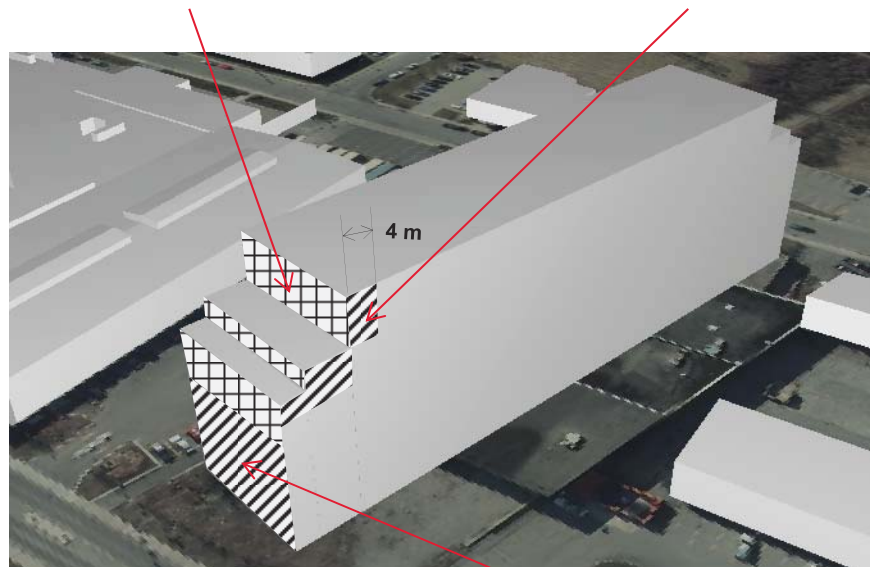
Buffer Window Exterior Pane on South Side
STC 31 - All Noise Sensitive Windows



West and South Facades

Buffer Window Exterior Pane East Facade
6, 7, 8, 9 and 10th Storeys
STC 36 - All Noise Sensitive Windows

Buffer Window Exterior Pane North Facade
Limited Locations, 6, 7, 8, 9 and 10th Storeys
STC 31 - All Noise Sensitive Windows



East and North Facades

Buffer Window Exterior Pane East Facade
Floors 1 through 5
STC 31 - All Noise Sensitive Windows

LEGEND



STC 31 Exterior Window Per Table 1



STC 36 Exterior Window Per Table 1

MOECC Correspondence

From: "Greason, Ian (ENE)" <Ian.Greason@ontario.ca>
Date: April 4, 2014 at 1:36:27 PM EDT
To: "brianm@riserealestate.ca" <brianm@riserealestate.ca>
Cc: "Merza, Header (ENE)" <Header.Merza@ontario.ca>, "Verbaas, Alice (ENE)" <Alice.Verbaas@ontario.ca>, "Parrott, Ian (ENE)" <ian.parrott@ontario.ca>, "IssuesManager_EAASIB_EAB (ENE)" <IssuesManager_EAASIB_EAB@ontario.ca>
Subject: **Re: Request for MOE clarification (March 18, 2014).pdf**

Mr. McMullan:

Thank you for returning my call this morning. As you requested, I am providing a brief summary of our discussion.

The proposed use of an additional layer of fixed glass spaced at 10 centimetres from the exterior windows, as described in your March 18, 2014 Request for Clarification (attached), would be acceptable for consideration in the context of a receptor based "on building" noise control measure in a Class 4 Area, as defined by NPC-300. Receptor based "on building" noise control measures are defined in NPC-300 as "noise control measures implemented on the property of the receptor, directly on the building, for example, inoperable windows, enclosed noise buffers, parapets, acoustic barriers, etc. attached to the receptor building." Receptor based "on building" noise control measures may be considered for new noise sensitive land uses proposed in a Class 4 area.

Please note that the Ministry's Environmental Approvals Branch has not conducted a detailed review of the Mondelez facility noise emissions to confirm that Mondelez would be able to operate in compliance with NPC-300 sound level limits following the construction of the proposed residential building. Your next steps would be to continue discussions with Mondelez and the municipality to confirm that the site could be assessed as a Class 4 Area and that the proposed receptor based "on building" noise control measures would allow the Mondelez facility to continue to operate in compliance with NPC-300 sound level limits.

Regards,
Ian

Ian D. Greason, P.Eng.
Supervisor, Approval Services (Team 4)
Environmental Approvals Branch
Ministry of the Environment

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Request for Clarification
17 Ewen Road, Hamilton, Ontario
March 18, 2014

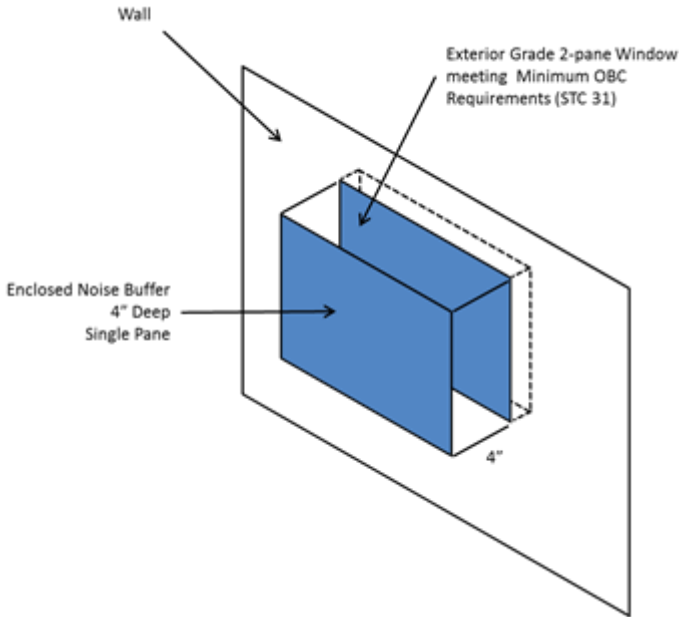
Following a meeting between representatives of the owner of 17 Ewen Road (“Rise”) and staff from the Ministry of the Environment, Rise carefully considered the discussions and requests clarification on one item. This clarification will assist in focusing the discussions between itself, Mondelez Canada Inc. and the City of Hamilton.

By way of brief background Rise proposes to build a privately owned student residence at 17 Ewen Road to serve students at McMaster University. The site is north of and adjacent to the Mondelez Canada Inc. candy factory at 45 Ewen Road in Hamilton. Mondelez Canada Inc. has expressed concerns with the impact of the student residence on their current and future operations vis-à-vis compliance with NPC-205 (now NPC-300). Rise and Mondelez Canada Inc. are engaged in without prejudice settlement discussions to explore how NPC-300 could be utilized (together with noise mitigation already being implemented by Mondelez on its own site pursuant to an ECA) to permit the proposed student residence without adversely affecting Mondelez’s current and future operations. The City of Hamilton is also involved in these discussions. NPC-300 requires a legally binding agreement between Rise, Mondelez and the City of Hamilton.

Rise previously requested that MOE advise if the proposed privately owned student residence could properly be considered as a commercial or institutional use under NPC-300 so that sealed windows (instead of enclosed balconies) could be used on the south facing façade (the one facing Mondelez) to properly address noise. This would not require the Rise property to be identified by the City of Hamilton as a Class 4 site. Moreover, the sealed windows would not be considered sensitive receptors (under NPC-300) and thus there would be no impact on Mondelez’s current or future operations. A noise study was prepared by Novus Environmental which studied the predicted noise levels within the privately owned student residence and found them to be below the maximum noise guidelines and thus acceptable.

Ministry staff advised that they could not support treating the privately owned student residence as a commercial or institutional use. They advised that the privately owned student residence was properly considered a residential use. MOE staff further advised that NPC-300 provided a process by which this residential use could be permitted. It required the identification of the site by the City as a Class 4 property, a legally binding agreement between Rise, Mondelez and the City of Hamilton, and a form of noise mitigation on the privately owned student residence which is recognized in NPC-300. Rise has carefully considered this position and requests clarification on the specifics of the noise mitigation for the residential building. Rise would like to find a way to implement the position of MOE staff.

Following the recent meeting Rise understands that an acceptable form of noise mitigation for the privately owned student residence (treated as a residential building) would be to have a second glass window ten (10) centimetres out from each window. An illustration of this is shown below.



Novus Environmental has studied the worst-case (highest) sound levels from the Mondelez operations (which are due to impulsive noise from tanker truck unloading) and determined that the highest predicted facade sound levels on the eastern corner of the southern façade are 78.3 dBAI.

Under NPC-300 noise guidelines this noise mitigation must ensure that the applicable guideline limits are met outside of the enclosed façade window (i.e., at the exterior grade 2-pane window shown in the figure). As unloading activity is restricted to daytime hours, the applicable guideline limit is 60 dBA assuming a Class 4 designation.

There are two scenarios which can then be examined.

1. Scenario 1: The enclosed buffer glazing would be operable (openable) to the extent allowed under the Building Code. That is to say, it could open up to 4" wide.
2. Scenario 2: The enclosed buffer glazing would be inoperable (closed).

Based on composite transmission loss calculation Scenario 2 would be required in order to ensure that the sound level at the enclosed buffer facade meets the applicable 60 dBA guideline limit. The required configuration would be:

- A sealed 1/4" in thick single pane glazing element
- Steel sides 4" deep

The sound level at the enclosed buffer is predicted to be 58.2 dBA, and would therefore meet the 60 dBA applicable guideline limit. The calculations by Novus Environmental are attached.

Rise seeks confirmation this proposed mitigation is acceptable to MOE. Rise understands that all other relevant requirements of NPC-300 will also have to be met.

Enclosed Noise Buffer - 4" deep Sealed

Receiving Room

10 ft x 10 ft bedroom

Width	1.0	m wide	Length	Length	Vertical Height	Wall Area	Floor Area	Ceiling Area	Room Volume
Height	1.0	m high	()	()	()	(^2)	(^2)	(^2)	(^3)
Depth	0.1	m deep	1.0	0.1	1.0	2.2	0.1	0.1	0.1

	Description Comment	Material Selection	Area (^2)	NRC	Sound Absorption								
					63 Hz (sabins)	125 Hz (sabins)	250 Hz (sabins)	500 Hz (sabins)	1000 Hz (sabins)	2000 Hz (sabins)	4000 Hz (sabins)	8000 Hz (sabins)	
Walls:	W1 Interior Window	Remaining 1	151. REF. Glass, 3/32" ordinary window	1.0	0.16	0.25	0.35	0.25	0.18	0.12	0.07	0.04	0.03
	W2 Sides	1	156. REF. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01
	W3												
	W4												
	W5												
	W6												
Floors:	F1 Floor	Remaining 0	209. Steel	0.1	0.48	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01
	F2												
Ceilings:	C1 Ceiling	Remaining 0	323. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00
	C2												
	C3												
				a	0.26	0.37	0.28	0.21	0.15	0.09	0.05	0.05	0.05
				R2	0.29	0.43	0.32	0.23	0.16	0.09	0.05	0.05	0.05

Façade Source Data

Mondelez Operations

Size of Exposed Façade

Width	1.0	m wide	Area (^2)
Height	1.0	m high	1.0

FREE FIELD SOUND LEVEL

Scenario	Name	5 63 Hz	6 125 Hz	7 250 Hz	8 500 Hz	9 1000 Hz	10 2000 Hz	11 4000 Hz	12 8000 Hz	dB	dBA
1	W-C Continuous Noise - Day	69.3	64.9	63	62.7	59.4	54.3	47.2	33.3	72.2	64.1
2	W-C Continuous Noise - Night	68.2	64.2	60.3	59.7	54.5	50	43	31.5	70.7	60.5
3	Impulsive Noise - east corner	66.3	67.9	74.8	79.6	70.1	67.5	59.9	50.3	81.7	78.3
4	Impulsive Noise - west corner	59.3	58.8	64.5	67.1	55.1	49.8	38.6	23.2	70.0	65.2
5										9.0	7.0
6										9.0	7.0
7										9.0	7.0
8										9.0	7.0

Calculation

Composite?

N

Use Outdoor Sound Level Scenario:

3

Impulsive Noise - east corner

TL	Material	Select	Area	STC
Material 1	609	GLASS Saflex 1a: 1 pane 1/4" (RAL-TL85-169)	Remaining 1.0	31
Material 2	Disabled		0	
Material 3	Disabled			
Material 4	Disabled			

Transmission Loss (dB)

Material	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Material 1	17	24	26	31	34	29	35	39
Disabled								
Disabled								
Disabled								
Disabled								

Sound Pressure Level (dB)

Summary	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dBA
	66.3	67.9	74.8	79.6	70.1	67.5	59.9	50.3	81.7	78.3
Lp1	3	3	3	3	3	3	3	3	84.7	81.3
TL	17.0	24.0	26.0	31.0	34.0	29.0	35.0	39.0		
Lp2	58.0	51.0	57.1	58.2	47.2	51.8	41.2	27.0	63.3	58.2

Free Field Sound Level at window
Façade Correction (per BPN-56)
Resulting sound level at façade

1
2
3
4

Resulting sound level at Enclosed Window

Buffer Window Calculations for Current Design

Enclosed Noise Buffer - 4" deep Sealed

Receiving Room

10 ft x 10 ft bedroom

Width	1.0	m wide	Length (l)	1.0	Vertical Height (l)	2.2	Wall Area (m ²)	Floor Area (m ²)	Ceiling Area (m ²)	Room Volume (m ³)
Height	1.0	m high	Length (l)	0.1	Vertical Height (l)	1.0	2.2	0.1	0.1	0.1
Depth	0.1	m deep								

	Description Comment	Material Selection	Area (m ²)	NRC	Sound Absorption									
					63 Hz (sabins)	125 Hz (sabins)	250 Hz (sabins)	500 Hz (sabins)	1000 Hz (sabins)	2000 Hz (sabins)	4000 Hz (sabins)	8000 Hz (sabins)		
Walls:	W1 Interior Window	Remaining 0	151. REF. Glass, 3/32" ordinary window	2.0	0.16	0.49	0.70	0.50	0.36	0.24	0.14	0.08	0.06	
	W2 Sides	0	156. REF. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
W3														
W4														
W5														
W6														
Floors:	F1 Floor	Remaining 0	209. Steel	0.1	0.48	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
F2														
Ceilings:	C1 Ceiling	Remaining 0	323. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	
	C2	0												
C3														
					a	0.50	0.72	0.53	0.39	0.27	0.16	0.09	0.09	
					R2	0.63	1.02	0.68	0.47	0.30	0.17	0.09	0.09	

Façade Source Data

Mondelez Operations

Size of Exposed Façade

Width	1.0	m wide	Area (m ²)
Height	2.0	m high	2.0

FREE FIELD SOUND LEVEL

Scenario	Name	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)		Incidence Angle		
1	W-C Impulsive South Façade	62.9	63.4	70.4	75.1	65.5	63.0	55.4	45.9	77.3	73.7		0-90	0	609
2	W-C Impulsive East Façade	62.0	63.7	70.6	75.3	65.8	63.2	55.1	44.2	77.4	74.0		60-90	3	610
3	W-C Impulsive North Façade	55.3	54.2	58.5	60.0	47.4	42.6	32.7	20.0	63.8	58.2		60-90	3	609
4										9.0	7.0				
5	W-C Cont South Façade	66.6	61.8	59.4	58.4	55.6	50.6	43.5	31.5	69.1	60.2		0-90	0	609
6	W-C Cont East Façade	64.6	59.2	58.1	57.7	54.7	49.5	41.8	24.9	67.3	59.2		60-90	3	610
7	W-C Cont North Façade	57.8	50.2	45.8	42.5	36.4	29.3	20.0	2.4	58.9	43.7		60-90	3	609
8										9.0	7.0				

Calculation

Composite?

N

Use Outdoor Sound Level Scenario: 1

W-C Impulsive South Façade

TL	Material 1	Material 2	Material 3	Material 4	Area	STC
609	Select: GLASS Saflex 1a: 1 pane 1/4" (RAL-TL85-169)				2.0	31
	Disabled				0	
	Disabled					
	Disabled					

	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Material 1	17	24	26	31	34	29	35	39
Disabled								
Disabled								
Disabled								

Summary	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)
	62.9	63.4	70.4	75.1	65.5	63	55.4	45.9	77.3	73.7
	3	3	3	3	3	3	3	3		
	0	0	0	0	0	0	0	0		
Lp1 TL	65.9	66.4	73.4	78.1	68.5	66.0	58.4	48.9	80.3	76.7
	17.0	24.0	26.0	31.0	34.0	29.0	35.0	39.0		
Lp2	54.2	45.9	52.4	53.7	42.8	47.7	37.0	23.5	59.0	53.8

Free Field Sound Level at window
 Façade Correction (per BPN-56)
 Angle of incidence correction per BPN-56
 Resulting sound level at façade
 Resulting sound level at Enclosed Window

1
2
3
4

Enclosed Noise Buffer - 4" deep Sealed

Receiving Room

10 ft x 10 ft bedroom

Width	1.0	m wide	Length (l)	1.0	Vertical Height (l)	2.2	Wall Area (m ²)	Floor Area (m ²)	Ceiling Area (m ²)	Room Volume (m ³)
Height	1.0	m high	Length (l)	0.1	Vertical Height (l)	1.0	2.2	0.1	0.1	0.1
Depth	0.1	m deep								

	Description Comment	Material Selection	Area (m ²)	NRC	Sound Absorption									
					63 Hz (sabins)	125 Hz (sabins)	250 Hz (sabins)	500 Hz (sabins)	1000 Hz (sabins)	2000 Hz (sabins)	4000 Hz (sabins)	8000 Hz (sabins)		
Walls:	W1 Interior Window	Remaining 0	151. REF. Glass, 3/32" ordinary window	2.0	0.16	0.49	0.70	0.50	0.36	0.24	0.14	0.08	0.06	
	W2 Sides	0	156. REF. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
W3														
W4														
W5														
W6														
Floors:	F1 Floor	Remaining 0	209. Steel	0.1	0.48	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
F2														
Ceilings:	C1 Ceiling	Remaining 0	323. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	
	C2	0												
C3														
					a	0.50	0.72	0.53	0.39	0.27	0.16	0.09	0.09	
					R2	0.63	1.02	0.68	0.47	0.30	0.17	0.09	0.09	

Façade Source Data

Mondelez Operations

Size of Exposed Façade

Width	1.0	m wide	Area (m ²)
Height	2.0	m high	2.0

FREE FIELD SOUND LEVEL

Scenario	Name	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)		Incidence Angle		
1	W-C Impulsive South Façade	62.9	63.4	70.4	75.1	65.5	63.0	55.4	45.9	77.3	73.7		0-90	0	609
2	W-C Impulsive East Façade	62.0	63.7	70.6	75.3	65.8	63.2	55.1	44.2	77.4	74.0		60-90	3	610
3	W-C Impulsive North Façade	55.3	54.2	58.5	60.0	47.4	42.6	32.7	20.0	63.8	58.2		60-90	3	609
4										9.0	7.0				
5	W-C Cont South Façade	66.6	61.8	59.4	58.4	55.6	50.6	43.5	31.5	69.1	60.2		0-90	0	609
6	W-C Cont East Façade	64.6	59.2	58.1	57.7	54.7	49.5	41.8	24.9	67.3	59.2		60-90	3	610
7	W-C Cont North Façade	57.8	50.2	45.8	42.5	36.4	29.3	20.0	2.4	58.9	43.7		60-90	3	609
8										9.0	7.0				

Calculation

Composite?

N

Use Outdoor Sound Level Scenario: 2

W-C Impulsive East Façade

TL	610	Select:	GLASS Saflex 1b: 1 pane 1/2" (RAL-TL85-198)	Remaining	Area	STC
Material 1	610	Select:	GLASS Saflex 1b: 1 pane 1/2" (RAL-TL85-198)	2.0	36	
Material 2		Disabled		0		
Material 3		Disabled				
Material 4		Disabled				

	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Material 1	22	27	32	35	33	39	48	45
Disabled								
Disabled								
Disabled								

Summary	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)
	62	63.7	70.6	75.3	65.8	63.2	55.1	44.2	77.4	74.0
	3	3	3	3	3	3	3	3		
	3	3	3	3	3	3	3	3		
Lp1 TL	68.0	69.7	76.6	81.3	71.8	69.2	61.1	50.2	83.4	80.0
	22.0	27.0	32.0	35.0	33.0	39.0	48.0	45.0		
Lp2	51.3	46.2	49.6	52.9	47.1	40.9	26.7	18.8	57.2	52.4

Free Field Sound Level at window
 Façade Correction (per BPN-56)
 Angle of incidence correction per BPN-56
 Resulting sound level at façade
 Resulting sound level at Enclosed Window

1
2
3
4

Enclosed Noise Buffer - 4" deep Sealed

Receiving Room

10 ft x 10 ft bedroom

Width	1.0	m wide	Length (l)	1.0	Vertical Height (l)	2.2	Wall Area (A ₂)	Floor Area (A ₁)	Ceiling Area (A ₂)	Room Volume (A ₃)
Height	1.0	m high	Length (l)	0.1	Vertical Height (l)	1.0	2.2	0.1	0.1	0.1
Depth	0.1	m deep								

	Description Comment	Material Selection	Area (A ₂)	NRC	Sound Absorption								
					63 Hz (sabins)	125 Hz (sabins)	250 Hz (sabins)	500 Hz (sabins)	1000 Hz (sabins)	2000 Hz (sabins)	4000 Hz (sabins)	8000 Hz (sabins)	
Walls:	W1 Interior Window	Remaining 0	151. REF. Glass, 3/32" ordinary window	2.0	0.16	0.49	0.70	0.50	0.36	0.24	0.14	0.08	0.06
	W2 Sides	0	156. REF. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01
W3													
W4													
W5													
W6													
Floors:	F1 Floor	Remaining 0	209. Steel	0.1	0.48	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01
F2													
Ceilings:	C1 Ceiling	Remaining 0	323. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00
	C2	0											
C3													
					a	0.50	0.72	0.53	0.39	0.27	0.16	0.09	0.09
					R2	0.63	1.02	0.68	0.47	0.30	0.17	0.09	0.09

Façade Source Data

Mondelez Operations

Size of Exposed Façade

Width	1.0	m wide	Area (A ₂)
Height	2.0	m high	2.0

FREE FIELD SOUND LEVEL

Scenario	Name	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)		Incidence Angle		
1	W-C Impulsive South Façade	62.9	63.4	70.4	75.1	65.5	63.0	55.4	45.9	77.3	73.7		0-90	0	609
2	W-C Impulsive East Façade	62.0	63.7	70.6	75.3	65.8	63.2	55.1	44.2	77.4	74.0		60-90	3	610
3	W-C Impulsive North Façade	55.3	54.2	58.5	60.0	47.4	42.6	32.7	20.0	63.8	58.2		60-90	3	609
4										9.0	7.0				
5	W-C Cont South Façade	66.6	61.8	59.4	58.4	55.6	50.6	43.5	31.5	69.1	60.2		0-90	0	609
6	W-C Cont East Façade	64.6	59.2	58.1	57.7	54.7	49.5	41.8	24.9	67.3	59.2		60-90	3	610
7	W-C Cont North Façade	57.8	50.2	45.8	42.5	36.4	29.3	20.0	2.4	58.9	43.7		60-90	3	609
8										9.0	7.0				

Calculation

Composite?

N

Use Outdoor Sound Level Scenario: 3

W-C Impulsive North Façade

TL	Material 1	Material 2	Material 3	Material 4	Area	STC
609	Select: GLASS Saflex 1a: 1 pane 1/4" (RAL-TL85-169)				2.0	31
	Disabled				0	
	Disabled					
	Disabled					

	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Material 1	17	24	26	31	34	29	35	39
Disabled								
Disabled								
Disabled								

Summary	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)
TL	55.3	54.2	58.5	60	47.4	42.6	32.7	20	63.8	58.2
Lp1	3	3	3	3	3	3	3	3		
TL	61.3	60.2	64.5	66.0	53.4	48.6	38.7	26.0	69.8	64.2
TL	17.0	24.0	26.0	31.0	34.0	29.0	35.0	39.0		
Lp2	49.6	39.7	43.5	41.6	27.7	30.3	17.3	0.6	51.4	41.0

Free Field Sound Level at window
 Façade Correction (per BPN-56)
 Angle of incidence correction per BPN-56
 Resulting sound level at façade

1
2
3
4

Resulting sound level at Enclosed Window

Enclosed Noise Buffer - 4" deep Sealed

Receiving Room

10 ft x 10 ft bedroom

Width	1.0	m wide	Length (l)	1.0	Vertical Height (l)	2.2	Wall Area (m ²)	Floor Area (m ²)	Ceiling Area (m ²)	Room Volume (m ³)
Height	1.0	m high	Length (l)	0.1	Vertical Height (l)	1.0	2.2	0.1	0.1	0.1
Depth	0.1	m deep								

Walls:	W1	W2	W3	W4	W5	W6	F1	F2	C1	C2	C3	Area (m ²)	NRC	Sound Absorption								
														63 Hz (sabins)	125 Hz (sabins)	250 Hz (sabins)	500 Hz (sabins)	1000 Hz (sabins)	2000 Hz (sabins)	4000 Hz (sabins)	8000 Hz (sabins)	
	Interior Window	Remaining 0		151. REF. Glass, 3/32" ordinary window								2.0	0.16	0.49	0.70	0.50	0.36	0.24	0.14	0.08	0.06	
	Sides	Remaining 0		156. REF. Steel								0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
Floors:	F1	Floor	Remaining 0		209. Steel								0.1	0.48	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01
Ceilings:	C1	Ceiling	Remaining 0		323. Steel								0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00
	C2	Remaining 0																				
	C3	Remaining 0																				
													a	0.50	0.72	0.53	0.39	0.27	0.16	0.09	0.09	
													R2	0.63	1.02	0.68	0.47	0.30	0.17	0.09	0.09	

Façade Source Data

Mondelez Operations

Size of Exposed Façade

Width	1.0	m wide	Area (m ²)
Height	2.0	m high	2.0

FREE FIELD SOUND LEVEL

Scenario	Name	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)		Incidence Angle		
1	W-C Impulsive South Façade	62.9	63.4	70.4	75.1	65.5	63.0	55.4	45.9	77.3	73.7		0-90	0	609
2	W-C Impulsive East Façade	62.0	63.7	70.6	75.3	65.8	63.2	55.1	44.2	77.4	74.0		60-90	3	610
3	W-C Impulsive North Façade	55.3	54.2	58.5	60.0	47.4	42.6	32.7	20.0	63.8	58.2		60-90	3	609
4										9.0	7.0				
5	W-C Cont South Façade	66.6	61.8	59.4	58.4	55.6	50.6	43.5	31.5	69.1	60.2		0-90	0	609
6	W-C Cont East Façade	64.6	59.2	58.1	57.7	54.7	49.5	41.8	24.9	67.3	59.2		60-90	3	610
7	W-C Cont North Façade	57.8	50.2	45.8	42.5	36.4	29.3	20.0	2.4	58.9	43.7		60-90	3	609
8										9.0	7.0				

Calculation

Composite?

N

Use Outdoor Sound Level Scenario: 5

W-C Cont South Façade

TL	Material 1	Material 2	Material 3	Material 4	Area	STC
609	Select: GLASS Saflex 1a: 1 pane 1/4" (RAL-TL85-169)				2.0	31
	Disabled				0	
	Disabled					
	Disabled					

Material 1	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Disabled	17	24	26	31	34	29	35	39
Disabled								
Disabled								
Disabled								

Summary	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)
	66.6	61.8	59.4	58.4	55.6	50.6	43.5	31.5	69.1	60.2
	3	3	3	3	3	3	3	3		
	0	0	0	0	0	0	0	0		
Lp1 TL	69.6	64.8	62.4	61.4	58.6	53.6	46.5	34.5	72.1	63.2
	17.0	24.0	26.0	31.0	34.0	29.0	35.0	39.0		
Lp2	57.9	44.3	41.4	37.0	32.9	35.3	25.1	9.1	58.3	41.2

Free Field Sound Level at window
 Façade Correction (per BPN-56)
 Angle of incidence correction per BPN-56
 Resulting sound level at façade
 Resulting sound level at Enclosed Window

1
2
3
4

Enclosed Noise Buffer - 4" deep Sealed

Receiving Room

10 ft x 10 ft bedroom

Width	1.0	m wide	Length (l)	1.0	Vertical Height (l)	2.2	Wall Area (m ²)	Floor Area (m ²)	Ceiling Area (m ²)	Room Volume (m ³)
Height	1.0	m high	Length (l)	0.1	Vertical Height (l)	1.0	2.2	0.1	0.1	0.1
Depth	0.1	m deep								

	Description Comment	Material Selection	Area (m ²)	NRC	Sound Absorption									
					63 Hz (sabins)	125 Hz (sabins)	250 Hz (sabins)	500 Hz (sabins)	1000 Hz (sabins)	2000 Hz (sabins)	4000 Hz (sabins)	8000 Hz (sabins)		
Walls:	W1 Interior Window	Remaining 0	151. REF. Glass, 3/32" ordinary window	2.0	0.16	0.49	0.70	0.50	0.36	0.24	0.14	0.08	0.06	
	W2 Sides	0	156. REF. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
W3														
W4														
W5														
W6														
Floors:	F1 Floor	Remaining 0	209. Steel	0.1	0.48	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
F2														
Ceilings:	C1 Ceiling	Remaining 0	323. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
	C2	0												
C3														
					a	0.50	0.72	0.53	0.39	0.27	0.16	0.09	0.09	
					R2	0.63	1.02	0.68	0.47	0.30	0.17	0.09	0.09	

Façade Source Data

Mondelez Operations

Size of Exposed Façade

Width	1.0	m wide	Area (m ²)
Height	2.0	m high	2.0

FREE FIELD SOUND LEVEL

Scenario	Name	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)		Incidence Angle		
1	W-C Impulsive South Façade	62.9	63.4	70.4	75.1	65.5	63.0	55.4	45.9	77.3	73.7		0-90	0	609
2	W-C Impulsive East Façade	62.0	63.7	70.6	75.3	65.8	63.2	55.1	44.2	77.4	74.0		60-90	3	610
3	W-C Impulsive North Façade	55.3	54.2	58.5	60.0	47.4	42.6	32.7	20.0	63.8	58.2		60-90	3	609
4										9.0	7.0				
5	W-C Cont South Façade	66.6	61.8	59.4	58.4	55.6	50.6	43.5	31.5	69.1	60.2		0-90	0	609
6	W-C Cont East Façade	64.6	59.2	58.1	57.7	54.7	49.5	41.8	24.9	67.3	59.2		60-90	3	610
7	W-C Cont North Façade	57.8	50.2	45.8	42.5	36.4	29.3	20.0	2.4	58.9	43.7		60-90	3	609
8										9.0	7.0				

Calculation

Composite?

N

Use Outdoor Sound Level Scenario: 6

W-C Cont East Façade

TL	610	Select:	GLASS Saflex 1b: 1 pane 1/2" (RAL-TL85-198)	Remaining	Area	STC
Material 1	610	Select:	GLASS Saflex 1b: 1 pane 1/2" (RAL-TL85-198)	2.0	36	
Material 2		Disabled		0		
Material 3		Disabled				
Material 4		Disabled				

	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Material 1	22	27	32	35	33	39	48	45
Disabled								
Disabled								
Disabled								

Summary	Sound Pressure Level [dB]									
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)
	64.6	59.2	58.1	57.7	54.7	49.5	41.8	24.9	67.3	59.2
	3	3	3	3	3	3	3	3		
	3	3	3	3	3	3	3	3		
Lp1 TL	70.6	65.2	64.1	63.7	60.7	55.5	47.8	30.9	73.3	65.2
	22.0	27.0	32.0	35.0	33.0	39.0	48.0	45.0		
Lp2	53.9	41.7	37.1	35.3	36.0	27.2	13.4	0.0	54.4	39.0

Free Field Sound Level at window
 Façade Correction (per BPN-56)
 Angle of incidence correction per BPN-56
 Resulting sound level at façade

1
2
3
4

Resulting sound level at Enclosed Window

Enclosed Noise Buffer - 4" deep Sealed

Receiving Room

10 ft x 10 ft bedroom

Width	1.0	m wide	Length (l)	1.0	Vertical Height (l)	2.2	Wall Area (m ²)	Floor Area (m ²)	Ceiling Area (m ²)	Room Volume (m ³)
Height	1.0	m high	Length (l)	0.1	Vertical Height (l)	1.0	2.2	0.1	0.1	0.1
Depth	0.1	m deep								

	Description Comment	Material Selection	Area (m ²)	NRC	Sound Absorption									
					63 Hz (sabins)	125 Hz (sabins)	250 Hz (sabins)	500 Hz (sabins)	1000 Hz (sabins)	2000 Hz (sabins)	4000 Hz (sabins)	8000 Hz (sabins)		
Walls:	W1 Interior Window	Remaining 0	151. REF. Glass, 3/32" ordinary window	2.0	0.16	0.49	0.70	0.50	0.36	0.24	0.14	0.08	0.06	
	W2 Sides	0	156. REF. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
W3														
W4														
W5														
W6														
Floors:	F1 Floor	Remaining 0	209. Steel	0.1	0.48	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
F2														
Ceilings:	C1 Ceiling	Remaining 0	323. Steel	0.1	0.09	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	
	C2	0												
C3														
					a	0.50	0.72	0.53	0.39	0.27	0.16	0.09	0.09	
					R2	0.63	1.02	0.68	0.47	0.30	0.17	0.09	0.09	

Façade Source Data

Mondelez Operations

Size of Exposed Façade

Width	1.0	m wide	Area (m ²)
Height	2.0	m high	2.0

FREE FIELD SOUND LEVEL

Scenario	Name	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)		Incidence Angle		
1	W-C Impulsive South Façade	62.9	63.4	70.4	75.1	65.5	63.0	55.4	45.9	77.3	73.7		0-90	0	609
2	W-C Impulsive East Façade	62.0	63.7	70.6	75.3	65.8	63.2	55.1	44.2	77.4	74.0		60-90	3	610
3	W-C Impulsive North Façade	55.3	54.2	58.5	60.0	47.4	42.6	32.7	20.0	63.8	58.2		60-90	3	609
4										9.0	7.0				
5	W-C Cont South Façade	66.6	61.8	59.4	58.4	55.6	50.6	43.5	31.5	69.1	60.2		0-90	0	609
6	W-C Cont East Façade	64.6	59.2	58.1	57.7	54.7	49.5	41.8	24.9	67.3	59.2		60-90	3	610
7	W-C Cont North Façade	57.8	50.2	45.8	42.5	36.4	29.3	20.0	2.4	58.9	43.7		60-90	3	609
8										9.0	7.0				

Calculation

Composite?

N

Use Outdoor Sound Level Scenario: 7

W-C Cont North Façade

TL	Material 1	Material 2	Material 3	Material 4	Area	STC
609	Select: GLASS Saflex 1a: 1 pane 1/4" (RAL-TL85-169)				2.0	31
	Disabled				0	
	Disabled					
	Disabled					

	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Material 1	17	24	26	31	34	29	35	39
Disabled								
Disabled								
Disabled								

Summary	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB	dB(A)
	57.8	50.2	45.8	42.5	36.4	29.3	20	2.4	58.9	43.7
	3	3	3	3	3	3	3	3		
	3	3	3	3	3	3	3	3		
Lp1 TL	63.8	56.2	51.8	48.5	42.4	35.3	26.0	8.4	64.9	49.7
	17.0	24.0	26.0	31.0	34.0	29.0	35.0	39.0		
Lp2	52.1	35.7	30.8	24.1	16.7	17.0	4.6	0.0	52.3	29.5

Free Field Sound Level at window
 Façade Correction (per BPN-56)
 Angle of incidence correction per BPN-56
 Resulting sound level at façade
 Resulting sound level at Enclosed Window

1
2
3
4

Attachment C

Attachment C: Air Quality Modelling Results

- Sources of concern are existing 3 boilers, and potential future 4th boiler.
- Oxides of Nitrogen (NOx) is the modelled contaminant, as it is limiting.
 - has the combination of highest emission rate and lowest guideline limit.
 - If the requirements are met for this contaminant, they will be met for all others.
 - Approach is consistent with MOECC requirements / practices for combustion sources.
- See **Figure 1** for air intake location. Air intake location is at grade level.

AERMOD Dispersion Modelling Results

Scenario	Averaging Period	Factor	Results
3 Boilers	1-Hour	Predicted Concentration ($\mu\text{g}/\text{m}^3$)	236
		O.Reg 419/05 Standard ($\mu\text{g}/\text{m}^3$)	400
		Percentage of Standard (%)	59%
		Below 50% of Standard?	NO
	24-Hour	Predicted Concentration ($\mu\text{g}/\text{m}^3$)	88.3
		O.Reg 419/05 Standard ($\mu\text{g}/\text{m}^3$)	200
		Percentage of Standard (%)	44%
		Below 50% of Standard?	Yes
4 Boilers	1-Hour	Predicted Concentration ($\mu\text{g}/\text{m}^3$)	316
		O.Reg 419/05 Standard ($\mu\text{g}/\text{m}^3$)	400
		Percentage of Standard (%)	79%
		Below 80% of Standard?	Yes
	24-Hour	Predicted Concentration ($\mu\text{g}/\text{m}^3$)	120
		O.Reg 419/05 Standard ($\mu\text{g}/\text{m}^3$)	200
		Percentage of Standard (%)	60%
		Below 80% of Standard?	Yes