HGC ENGINEERING

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NOISE STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
2512 - 2532 ARGYLE ROAD
MISSISSAUGA, ONTARIO

Prepared for:

Plazacorp
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May 27, 2019

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1 INTRODUCTION AND SUMMARY

Howe Gastmeier Chapnik Limited (HGC Engineering) was retained by Plazacorp to perform a Noise Study for a proposed residential development located on Argyle Road in the City of Mississauga. A key plan is attached as Figure 1. This study is based on the "Issued to client for review" drawing set prepared by Architecture Unfolded, dated May 16, 2019.

The proposed development will consist of four 4-storey buildings (Blocks "A" through "D"), with one level of underground parking below. The concept plan for the development is included as Figure 2. The study is required by the City of Mississauga as part of the planning and approvals process.

Road traffic on Argyle Road and Dunbar Road are the primary noise sources. Secondary sources of noise include road traffic noise on Dundas Street West and Confederation Parkway. Ultimate road traffic data was obtained from the City of Mississauga. The data was used to predict future traffic sound levels at the locations of the proposed building façades and in the outdoor amenity areas. The predicted sound levels were evaluated with respect to the guidelines of the Ministry of the Environment, Conservation and Parks (MECP) and the City of Mississauga, and preliminary recommendations developed for appropriate controls, as summarized conceptually herein.

The results of the study, based on the information currently available, indicate that the proposed development is feasible in terms of the expected noise impacts. Details supporting this assessment are provided below. Warning clauses for noise are required, and recommended wording for those clauses is provided herein.

2 SITE DESCRIPTION

The subject property is located in the City of Mississauga, on the west side of Argyle Road, just north of Dunbar Road. The proposed development will consist of four 4-storey residential buildings, with one level of underground parking below.

A site visit was conducted by HGC Engineering in April, 2019, to make observations of the acoustical environment and identify significant noise sources within the vicinity. This area is

considered Class I (urban) in terms of its acoustical environment. There are currently single-family residences on the site. Residential uses surround the site, including high-rise buildings to the north and single family homes to the east, south, and west. There are several commercial properties far to the north on Dundas Street West, but these are far enough away that any related noises are unlikely to be audible, and they are not considered further.

Road traffic on Argyle Road and Dunbar Road are the primary noise sources. Road traffic on Dundas Street West and Confederation Parkway are considered to be secondary sources of noise and have been included in the analysis. There are no rail lines near this site, and as the site is outside the influence area of the Toronto Pearson International Airport, noise from air traffic has not been considered in this study.

3 NOISE CRITERIA

3.1 Road Traffic Noise

Guidelines for acceptable levels of road traffic noise impacting residential developments are contained in the MECP publication NPC-300, "Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning," August, 2013 (release date October 21, 2013), and are listed in Table 1 below. The values in Table 1 are energy equivalent (average) sound levels (L_{EQ}) in units of A-weighted deciBels (dBA).

Table 1: MECP Road Traffic Noise Criteria (dBA)

Area	Day (dBA) (7:00 – 23:00)	Night (dBA) (23:00 – 7:00)
Outdoor Living Area	55 dBA	--
Inside Living/Dining Rooms	45 dBA	45 dBA
Inside Bedrooms	45 dBA	40 dBA

These criteria apply to the surrounding vehicular traffic. Daytime refers to the period between 07:00 and 23:00, while nighttime refers to the period between 23:00 and 07:00. Corridors and washrooms are usually not considered to be noise-sensitive areas.

The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, a backyard, a terrace, a playground, or common areas associated with multi-unit buildings where passive outdoor recreation is expected to occur. Balconies or private terraces with a depth of less than 4 meters (measured perpendicular to the building façade) are not considered OLAs under MECP guidelines, and accordingly the noise criteria are not applicable there.

The guidelines in the MECP publication allow the sound level in an Outdoor Living Area to be exceeded by up to 5 dBA, without mitigation, if warning clauses are placed in the rental agreements to the property. Where OLA sound levels exceed 60 dBA, physical mitigation is required to reduce the OLA sound level to below 60 dBA and as close to 55 dBA as feasible. Note that not all OLA's necessarily require protection, if there are other protected outdoor areas accessible to future residents.

With respect to the building envelope, no controls are required where road traffic levels are under 50 dBA. Where the road traffic noise level (L_{EQ}) is greater than 60 dBA at night or 65 dBA during the day, windows must be designed to achieve the indoor sound level criteria listed above. Otherwise, any glazing meeting the Ontario Building Code is considered adequate under MECP guidelines. Where the predicted nighttime and/or daytime sound levels exceed these thresholds, central air conditioning is required so that windows can remain closed against the noise.

4 TRANSPORTATION NOISE

4.1 Road Traffic Data

Road traffic volume data for the surrounding roadways was obtained from the City of Mississauga in the form of Ultimate Annual Average Daily Traffic (AADT), and is provided in Appendix A. Ultimate AADT data is a conservative prediction of future traffic volumes made by the Transportation Services Department, to be used in assessments for new developments. This data includes commercial vehicle (truck) percentages of 3% for Dundas Street West and Confederation Parkway, and 2% for Dunbar Road and Argyle Road. The commercial percentages are split into 55% / 45% for medium and heavy trucks, respectively. A day/night split of 90%/10% was used in the analysis, as indicated, along with posted speed limits of 50 km/h for the surrounding roadways. The ultimate traffic volumes used in the analysis are listed in Table 2.

Table 2: Ultimate Traffic Data

Road Name		Cars	Medium Trucks	Heavy Trucks	Total
Dundas Street West	Daytime	10 651	181	148	10 980
	Night-time	1 183	20	16	1 220
	Total	11 834	201	165	12 200
Confederation Parkway	Daytime	24 182	411	337	24 930
	Night-time	2 687	46	37	2 770
	Total	26 869	457	374	27 700
Dunbar Road	Daytime	3 528	40	32	3 600
	Night-time	392	4	4	400
	Total	3 920	44	36	4 000
Argyle Road	Daytime	3 528	40	32	3600
	Night-time	392	4	4	400
	Total	3 920	44	36	4000

4.2 Prediction Results

To assess the levels of traffic noise which will impact the site in the future, predictions were made using a numerical computer modeling package (*Cadna-A version 2019 build: 167.4905*). The model is based on the methods from ISO Standard 9613-2.2, "*Acoustics - Attenuation of Sound During Propagation Outdoors*", which accounts for reduction in sound level with distance due to geometrical spreading, air absorption, ground attenuation and acoustical shielding by intervening structures.

The road noise sources have been included in the model using the basic road element included in *Cadna-A*, which follows the German guideline RLS-90 for road traffic noise predictions. Our experience suggests that road sound levels predicted by RLS-90 are reasonably accurate. The model road traffic values have been qualified to be within 1-2 dBA of those predicted in STAMSON 5.04, a computer algorithm developed by the MECP.

The model was used to predict traffic noise levels at each of the building facades. Predicted daytime and night-time sound levels at the building façades are shown in Figures 3 and 4, respectively. The maximum predicted sound levels at each façade are shown in Table 3 below.

Table 3: Predicted Future Sound Levels at the Façades, [dBA]

Building	Façade	Daytime L_{EQ} (16 hr)	Night-time L_{EQ} (8 hr)
Block A	North	52	46
	East	51	44
	South	51	45
	West	45	<40
Block B	North	58	52
	East	62	55
	South	58	52
	West	41	<40
Block C	North	49	43
	East	47	<40
	South	50	44
	West	44	<40
Block D	North	58	51
	East	62	55
	South	57	51
	West	41	<40

4.3 Recommendations

The sound levels from traffic at the façades of the proposed development were predicted to be up to 62 dBA during daytime hours, and up to 55 dBA during nighttime hours. The following sections outline preliminary recommendations for building façade constructions and ventilation requirements to achieve the noise criteria discussed in Section 3.

4.3.1 Minimum Building Façade Constructions

Since the maximum predicted sound levels at the building facades are less than 65 dBA during the day, and less than 60 dBA at night, any glazing design meeting the requirements of the Ontario Building Code (OBC) will provide sufficient sound insulation to achieve the criteria listed in Section 3. However, in an urban environment such as this, we do not typically recommend less than STC-28, which can be achieved using standard glazing assemblies.

The above recommendation assumes that exterior wall assemblies have sufficient sound insulation such that sound transmitted through them is negligible in comparison to the glazing. Any typical insulated exterior wall assembly is anticipated to be sufficient to meet this requirement.

4.3.2 Ventilation Requirements

Maximum predicted daytime sound levels at the facades of the proposed buildings are above 55 dBA but below 65 dBA and maximum predicted nighttime sound levels are above 50 dBA but below 60 dBA. Therefore, the development should be designed with the provision for the installation of central air conditioning or an alternative heating and cooling system that will allow windows to remain closed against the noise. Such a system is expected to be included in any case.

4.3.3 Outdoor Living Areas

There is a common outdoor amenity area (prediction locations R1 and R2) to the west of Blocks A and C, as well as a playground area (prediction location R3) between the two buildings. Predictions indicate that future sound levels at these outdoor amenity areas will be less than 55 dBA during the day. These areas are well shielded from traffic noise by the surrounding buildings and consequently, no acoustic mitigation measures are required. Figure 5 shows the locations of the receivers used to evaluate the predicted future noise levels in these areas.

There are also some rooftop terraces that may be greater than 4 m in depth. While these do not specifically need to be shielded given that the common amenity space has been provided for all residents, analysis indicates that sound levels on these terraces (represented by prediction locations R4-R7 on Figure 5) will also be within the 55 dBA target. The remaining balconies and terraces in the development are less than 4 m in depth, and therefore are not subject to the MECP criteria.

5 IMPACT OF THE DEVELOPMENT ON ITSELF

Section 5.9.1 of the Ontario Building Code (OBC) specifies the minimum required sound insulation characteristics for demising partitions, in terms of Sound Transmission Class (STC) values. In order to maintain adequate acoustical privacy between separate suites in a multi-tenant building, inter-suite walls must meet or exceed STC-50. Walls separating a suite from a refuse chute or elevator shaft (if any), must meet or exceed STC-55. Tables 1 and 2 in Section SB-3 of the Supplementary Guideline to the OBC provide a comprehensive list of constructions that will meet the above requirements.

Tarion's Builder Bulletin B19R requires the internal design of condominium projects to integrate suitable acoustic features to insulate the suites from noise from each other and amenities in accordance with the OBC, and limit the potential intrusions of mechanical and electrical services of the building on its residents. It is expected that an acoustical consultant will review in greater detail the mechanical and electrical drawings and details of demising constructions and mechanical/electrical equipment, during design development, to help ensure that the noise impact of the development on itself is maintained within acceptable levels.

There is a loading bay on the ground floor at the east portion of Block A, which is enclosed, and is therefore not expected to be a significant environmental noise concern.

6 IMPACT OF THE DEVELOPMENT ON THE ENVIRONMENT

Sound levels from stationary (non-traffic) sources of noise such as rooftop air-conditioners, cooling towers, exhaust fans, etc. should not exceed the minimum one-hour L_{EQ} ambient (background) sound level from road traffic, at any potentially impacted residential point of reception, to avoid complaints. Typical minimum ambient sound levels in the area are expected to be 50 dBA during the day and 45 dBA at night at nearby residential receptors. Thus, any common electro-mechanical equipment associated with this development (e.g. emergency generator testing, fresh-air handling equipment, etc.) should be designed with these targets in mind such that they do not result in noise impact beyond these ranges. Note that these requirements do not apply to privately owned A/C units, which should be selected and designed to comply with the requirements of MECP Publication NPC-216, "Residential Air Conditioning Devices" (1993).

7 WARNING CLAUSES

MECP guidelines recommend that appropriate warning clauses be used in the Development Agreements and in purchase, sale and lease agreements (typically by reference to the Development Agreements), to inform future owners and occupants about potential noise concerns from sources in the area. The actual wording of the warning clause depends on the nature of the excess. For residential uses, the recommended clauses are as follows:

(a) Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the Municipality's and the Ministry of Environment, Conservation and Parks' noise criteria.

(b) This dwelling unit has been supplied with the provision for the future installation of a heating and cooling system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Ministry of the Environment, Conservation and Parks.

These sample clauses are provided only as examples, and can be modified by the owner's legal representative, in consultation with the City, in order to suit site-specific requirements.

8 CONCLUSIONS & SUMMARY OF RECOMMENDATIONS

The following list summarizes the conclusions and recommendations made in this report. The reader is referred to the previous sections of the report where these recommendations are discussed in more detail:

1. Standard glazing constructions will be sufficient to ensure adequate indoor sound levels from traffic noise, as outlined in Section 4.3.1.

2. The provision for future installation of a heating and cooling system that will allow windows to remain closed is required, as outlined in Section 4.3.2. Such a system is expected to be provided in any event.

3. Noise warning clauses should be included in the property and tenancy agreements and offers of purchase and sale for the residential suites to inform future residents of potential noise intrusions from the roads. Recommended wording for these clauses is provided in Section 7. Such clauses are often included by reference to the Development Agreements in which they are contained.

4. Demising assemblies must be selected to meet the minimum requirements of the Ontario Building Code (OBC). Where B19R certification is needed, an acoustical consultant is required to review details of demising constructions and mechanical/electrical equipment, when available, to help ensure that the noise impact of the development on itself are maintained within acceptable levels. Outdoor sound emissions should also be checked to ensure that any potential impacts on adjacent properties are suitably minimized.

Figure 1: Key Plan

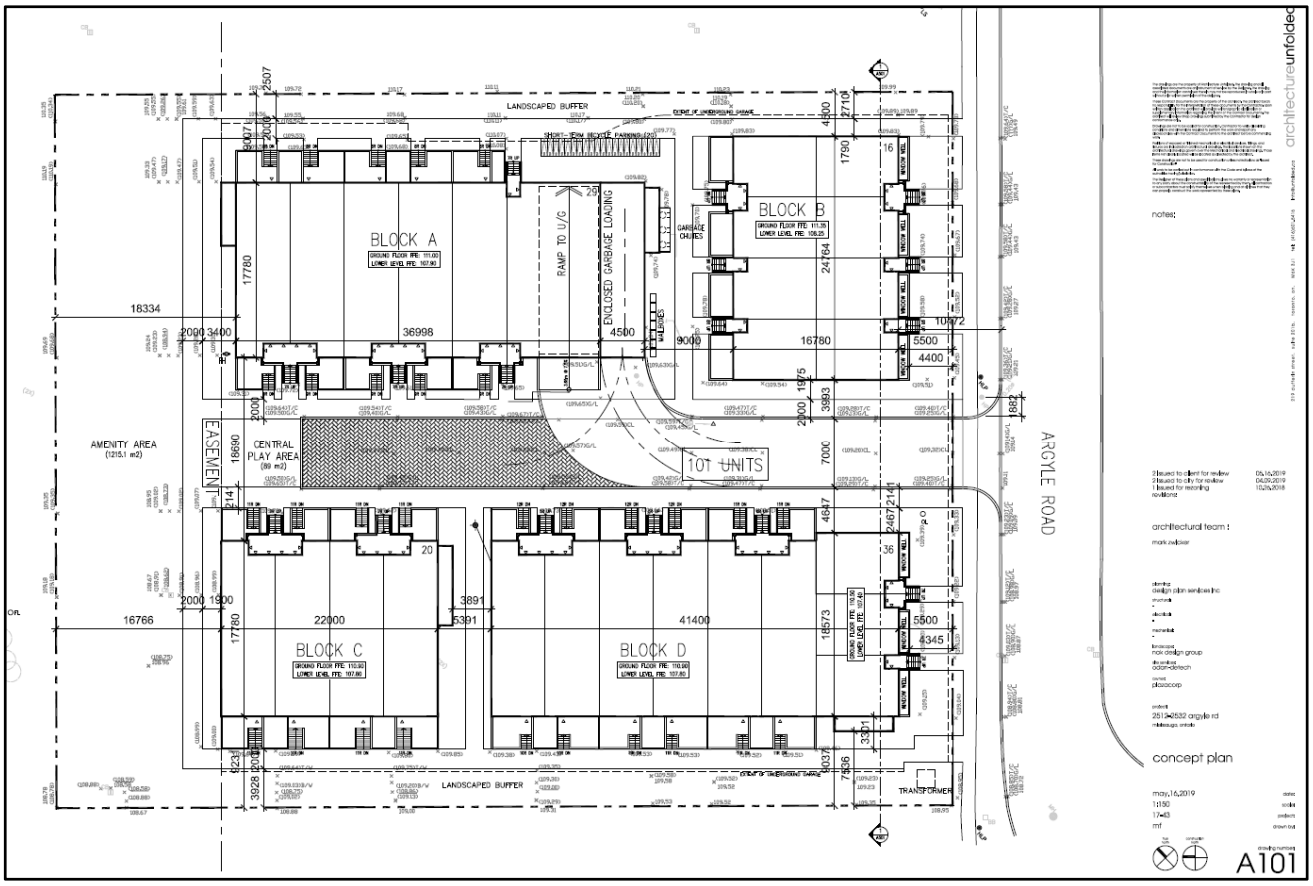

Figure 2: Concept Plan

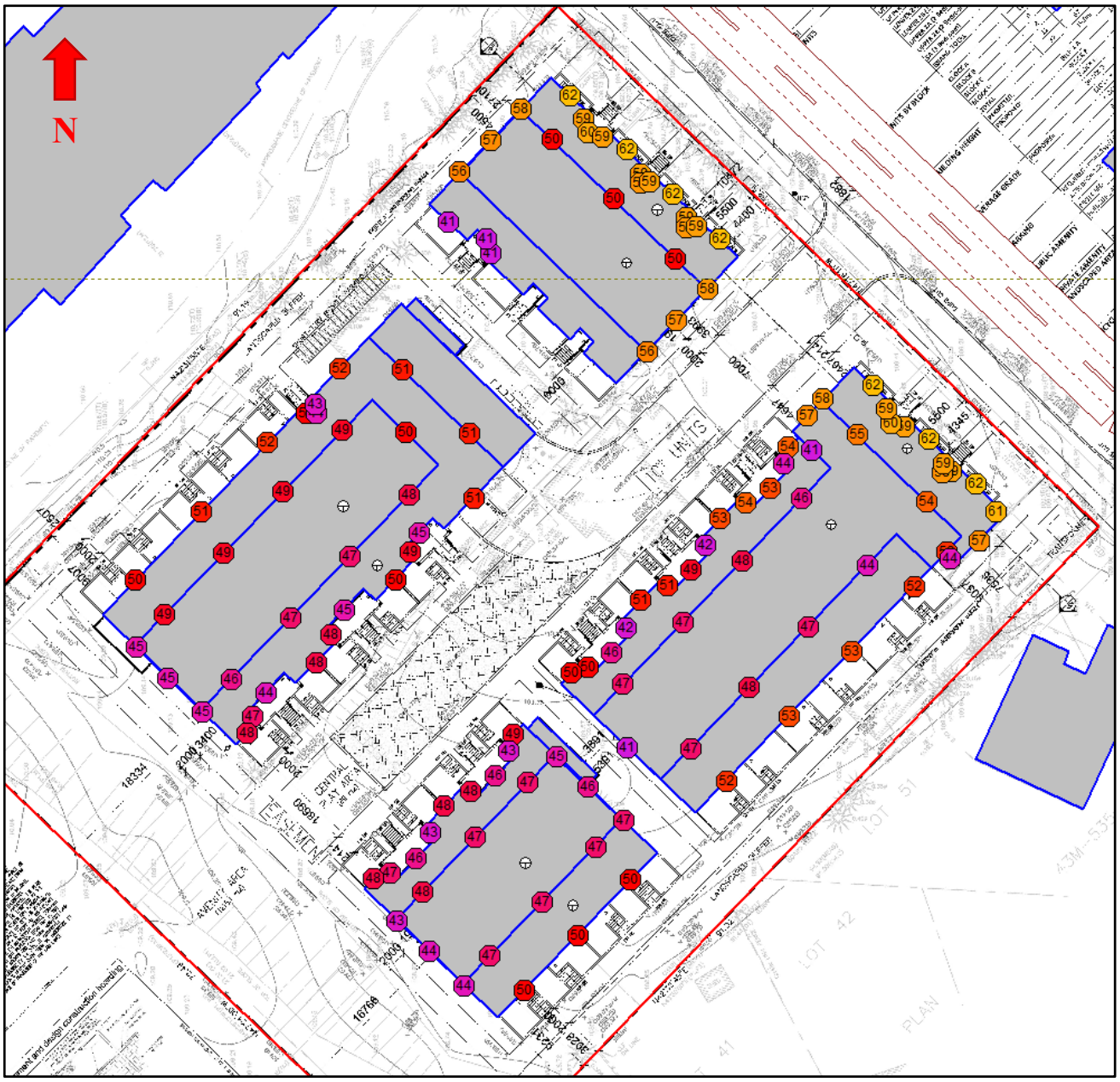

Figure 3: Daytime Sound Level Predictions at Building Façades from Road Traffic

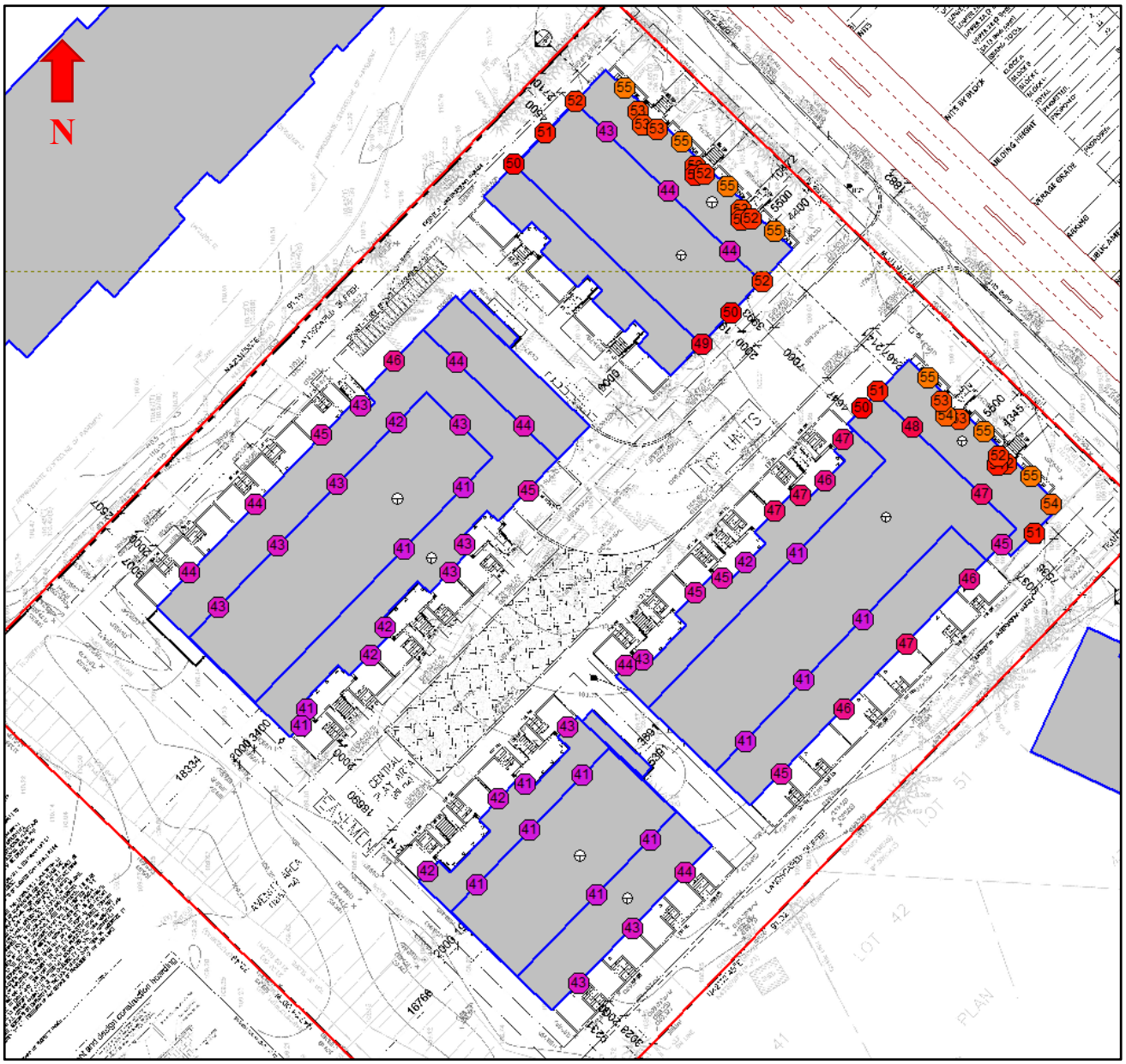

Figure 4: Nighttime Sound Level Predictions at Building Façades from Road Traffic

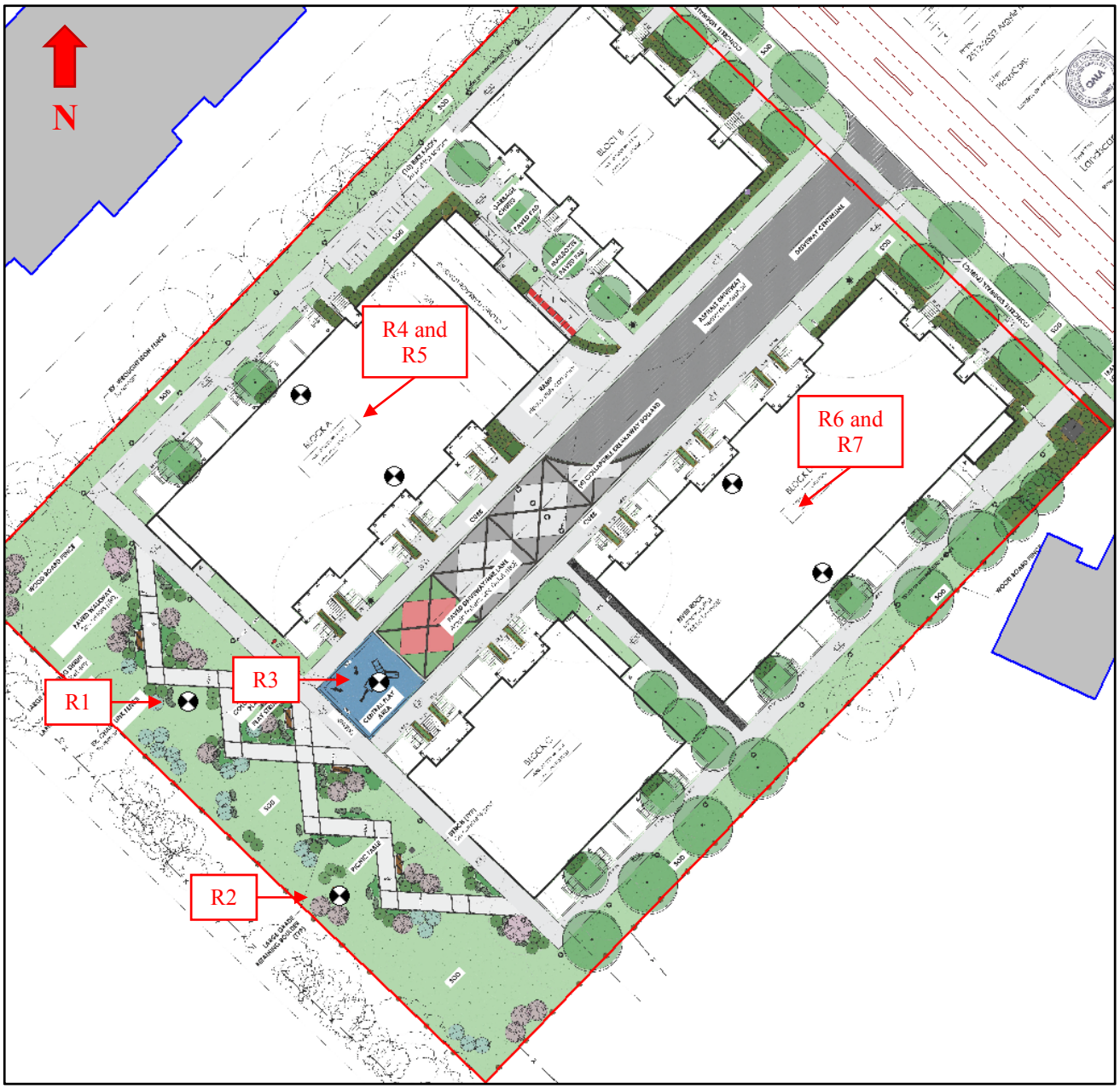

Figure 5: Receptor Locations in Outdoor Living Areas

APPENDIX A
TRAFFIC DATA

Date:	17-May-19

NOISE REPORT FOR PROPOSED DEVELOPMENT

REQUESTED BY:	
Name:	Louri Basmanov
Company	HGC Engineering

PREPARED BY:	
Name:	Bertuen Mickle
Tel#:	(905) 615-3200

Location:	Argyle Rd-Dundas Rd W to Dunbar Rd:Dunbar Rd-Confederation Pwy to Argyle Road:Dundas Street West-Dundas Street W & Argyle Road Intersection Confederation Parkway-Confederation Parkway & Dunbar Road Intersection
ID#:	418

ON SITE TRAFFIC DATA

Specific	***Street Names***				
	Dundas Street West	Confederation Parkway	Dunbar Road	Argyle Road	
AADT:	12,200	27,700	4,000	4,000	
# of Lanes:	4 Lanes	2 Lanes	2 Lanes	2 Lanes	
% Trucks:	3%	3%	2%	2%	
Medium/Heavy Trucks Ratio:	55/45	55/45	55/45	55/45	
Day/Night Traffic Split:	90/10	90/20	90/10	90/10	
Posted Speed Limit:	50km/h	50km/h	50km/h	50km/h	
Gradient of Road:	<2%	<2%	<2%	<2%	
Ultimate R O W:	35m	18.5m	20m	20m	

Comments:	Ultimate Traffic Data Only