

**NOISE IMPACT STUDY
PROPOSED MIXED-USE DEVELOPMENT
4933 VICTORIA AVENUE NORTH
VINELAND STATION, ONTARIO**

FOR

4933 VIC COURT GLOBIZEN LP

PREPARED BY



BRENDON COLACO, B.A.Sc.

CHECKED BY



SAM N. KULENDRAN, B.A.Sc., P.Eng.



**J.E. COULTER ASSOCIATES LIMITED
1210 SHEPPARD AVENUE EAST, SUITE 211
TORONTO, ONTARIO
M2K 1E3**

MARCH 8, 2024

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1.0 INTRODUCTION

At the request of 4933 Vic Court Globizen LP, J.E. COULTER ASSOCIATES LIMITED has completed a noise impact study of the proposed mixed-use development located at 4933 Victoria Avenue North in Vineland Station, Ontario. See Figure 1 in Appendix A for a Key Plan.

The proposed development will consist of residential towers, townhomes, a hotel and spa, and commercial spaces. The development is bounded to the:

- north by Lake Ontario
- south by existing low-rise residential
- east by existing low-rise residential
- west by Victoria Avenue North and a park beyond.

The purpose of the study is to prepare recommendations to permit the site to meet the applicable Ministry of the Environment, Conservation and Parks' (MECP) and Town of Lincoln guidelines.

A review of the subject area, including a site visit, indicated there are no significant sources of stationary noise nearby that would affect the future residents of this proposed development.

There are also no sources of vibration near the development. As a result, the study will focus on potential transportation noise impacts.

2.0 APPLICABLE CRITERIA

The MECP applicable criteria to a site such as this are found in its publication *NPC-300* "Environmental Guide for Noise, Stationary and Transportation Sources – Approval and Planning." As per *NPC-300*, this development would be considered a Class 1 – Urban area.

2.1 Transportation Noise Guidelines

Transportation noise sources addressed by *NPC-300* include aircraft, rail traffic, and roadway traffic (which includes cars, trucks, buses, etc.).

Where the sound levels exceed 55 dB L_{eq} in private outdoor living areas (OLA), MECP requires noise mitigation measures to be incorporated into the subdivision design (i.e., intervening structures such as acoustic barriers or buildings and/or greater setbacks from the noise source). However, MECP will permit sound levels up to 60 dB L_{eq} daytime (5 dB above the criterion level of 55 dB L_{eq}) in private outdoor living areas (OLA), if it is not technically feasible to achieve 55 dB. Where the criterion levels are marginally exceeded, a warning clause is required in the Agreement of Purchase and Sale and the subdivision agreement. With respect to condominiums, balconies and terraces are considered OLAs only if they are 4m or greater in depth.

For residential buildings, the Ministry's ventilation requirements are based on the sound level at the exterior building façade. Where the sound levels at the exterior of the building façade exceed 55 dB L_{eq} daytime at the living room window or 50 dB L_{eq} nighttime at the bedroom window, the unit must be provided with forced air heating, with a provision for future air conditioning by the owner. An excess up to 10 dB is permissible, provided a warning clause is given. Where the sound levels exceed this limit (i.e., 65 dB L_{eq} daytime or 60 dB L_{eq} nighttime),

air conditioning must be incorporated into the building design prior to occupancy. Warning clauses are applicable as well.

Air-conditioning requirements are applied so that adequate interior sound levels can be maintained with the windows closed.

The MECP also stipulates acceptable indoor sound levels limits, which vary depending on whether they are railway or roadway noise sources.

The applicable MECP criteria are summarized in Table 1, below.

Table 1: Noise Criteria Summary

Type of Space	Road	
	Daytime (dB L _{eq}) (0700–2300)	Nighttime (dB L _{eq}) (2300–0700)
Outdoor Living Area (O.L.A.)	55	N/A
Bedrooms	45	40
Living/Dining	45	45
Kitchen/Baths	45	45

Note: OLAs for condominiums are terraces/balconies greater than 4m in depth and common amenity areas such as rooftop patios.

3.0 TRANSPORTATION NOISE SOURCES

The following sections summarize the noise sources surrounding the proposed development.

3.1 Roadway Noise Sources

The QEW is located approximately 600m south of the site. The 2019 traffic volumes and the overall truck percentages for the QEW were provided by the MTO. As per *NPC-300*, the Summer Average Daily Traffic (SADT) volumes were used as they are higher than the Annual Average Daily Traffic (AADT) volumes. The SADT volumes were escalated to 2034 using a growth rate of 2.5% per annum and are summarized in Table 2, below. The medium and heavy truck percentage distribution has been determined based on data from past projects. The posted speed limit of the QEW in the area is 110 km/hr. A typical highway day/night split of 67%/33% was used for QEW. Victoria Avenue North ends at the development and as such is considered is acoustically insignificant and not considered further.

Table 2: 2034 Road Traffic Volumes

Roadway	Traffic Volumes (AADT)	Truck Percentage (%)		Speed Limit (km/h)
		Medium	Heavy	
QEW at Victoria Avenue	188,279	2.5	7.5	110

4.0 TRANSPORTATION NOISE ASSESSMENT

Based on the volumes provided in Section 3.0, the sound levels have been calculated at various façades and OLAs of the proposed development and are shown in Figure 3. The roadway sound levels were calculated in CadnaA using the TNM module implemented in CadnaA in accordance with *NPC-306*. Please see Appendix B for sample calculations.

Table 3: Transportation Noise Summary

Point of Reception	Road	
	Daytime (dBA, $L_{eq,16hr}$)	Nighttime (dBA, $L_{eq,8hr}$)
Location 1	57	57
Location 2	55	55
Location 3	57	57
Location 4	54	54
Location 5	54	54
Location 6	35	35
Location 7 – 1 st Floor Outdoor Amenity Building A (OLA)	48	NA
Location 8 – 4 th Floor Outdoor Amenity Building C (OLA)	52	NA
Location 9 – 7 ^h Floor South Balcony (OLA)	54	NA
Location 10 – 9 th Floor South Balcony (OLA)	55	NA
Location 11 – 10 th Floor South Balcony (OLA)	55	NA
Location 12 – 12 th Floor South Balcony (OLA)	55	NA
Location 13 – 13 th Floor South Balcony (OLA)	54	NA
Location 14 – 4 st Floor Outdoor Amenity Building A (OLA)	49	NA

Note: There are no nighttime sound level limits for outdoor living areas.

4.1 Façade and Ventilation Control Recommendations

The predicted sound levels slightly exceed the applicable MECP noise guidelines. Ventilation upgrades and façade upgrades should be implemented as follows.

As the sound levels exceed 55 dBA L_{eq} during the daytime and 50 dBA L_{eq} during the nighttime on the north, east, and west façade, all units should be provided with forced air heating, with a provision for future air conditioning by the owner. All affected units will need to be supplied with Warning Clause C (see Appendix C) in their Agreements of Purchase/Sale or Lease. It is expected all units will be provided with central air conditioning in any case, as is standard for such residential developments.

Suite details have not been completed at this stage of the design. As a result, only preliminary recommendations are provided regarding exterior façade STC ratings.

Due to the modest nature of the outdoor sound levels, all residential units in the development may use standard OBC windows rated to STC 27. Any standard OBC compliant exterior wall or ceiling construction may be used.

4.2 Noise Barrier Recommendations

There are common outdoor amenity areas on the 1st and 4th floors. The predicted sound levels are approximately 48 dBA $L_{eq,16hr}$ on the 1st floor outdoor amenity of Building A. The predicted sound levels are approximately 49 and 52 dBA $L_{eq,16hr}$ for the common outdoor amenity areas on the 4th floors of Buildings A and C, respectively. The sound levels are below the MECP recommended sound levels of 55 dBA $L_{eq,16hr}$ and noise control is not required for the amenity areas.

There are private balconies on the north and south façade of the residential towers that are greater than 4m in depth. The predicted sound levels on the balconies are less than or equal to 55 dBA $L_{eq,16hr}$ and meet the MECP limit of 55 dBA $L_{eq,16hr}$. Noise control is not required for these balconies.

Should additional private terraces or balconies greater than 4m in depth be added on the south façades, they would need to be reviewed for potential noise control measures.

5.0 IMPACT OF THE DEVELOPMENT ON ITSELF AND THE SURROUNDING AREA

It is typical to review the potential impact of a new development both on itself and the surrounding area. There is existing residential development around the subject site.

In terms of the impact of the development on itself, the development's own mechanical/electrical equipment needs to be considered.

The mechanical design of the development has not yet progressed to the point where the impact of the development on itself or its surroundings can be accurately quantified. As plans mature, a review of the impacts of the development on itself as well as on the surrounding area can be completed. In most cases, the most critical receptors are often the building's own future occupants and there is no noise or vibration impact to the surrounding areas. This is especially the case for this development due to the distance to surrounding residences.

Noise and vibration control measures for the development's mechanical and electrical equipment can be readily incorporated into the design. In many cases, equipment can also be selected to avoid a noise and vibration impact entirely. It is recommended a review of the noise and vibration impact of the development be completed at such a time when the mechanical and electrical design is completed, prior to the building permit application. Typically, any sources of noise and vibration can be adequately controlled and not result in an impact to either the development itself or to the surrounding area.

6.0 CONCLUSIONS

The proposed development is located in an area with a modest amount of transportation noise. Unmitigated, transportation sound levels exceed the MECP guidelines. As a result, noise control measures in the form of ventilation upgrades and façade elements have been recommended. The extent and nature of these upgrades is similar to those required for most residential buildings near major roadways.

7.0 SUMMARY OF RECOMMENDATIONS

To meet the requirements of the MECP and Town of Lincoln the following noise control measures will be required:

1. All units should be provided with forced air heating, with a provision for future air conditioning by the owner and supplied with Warning Clause C (see Appendix C) in their Agreements of Purchase/Sale or Lease.
2. Based on the modest sound levels, upgrades beyond STC 27 are not required for the glazing.
3. The sound levels at the common outdoor amenity areas located on the 1st and 4th floors meet the MECP sound level limit of 55 dBA $L_{eq,16hr}$. Noise control is not required for these spaces.
4. The predicted sound levels on the private balconies are less than or equal to 55 dBA $L_{eq,16hr}$ and meet the MECP limit of 55 dBA $L_{eq,16hr}$. Noise control is not required for these balconies.
5. Prior to the building permit application, a review of the proposed development's mechanical and electrical equipment should be completed to ensure that applicable noise guidelines are met at the surrounding areas, as well as at the future development itself.

APPENDIX A: FIGURES



Figure 1: Area Plan

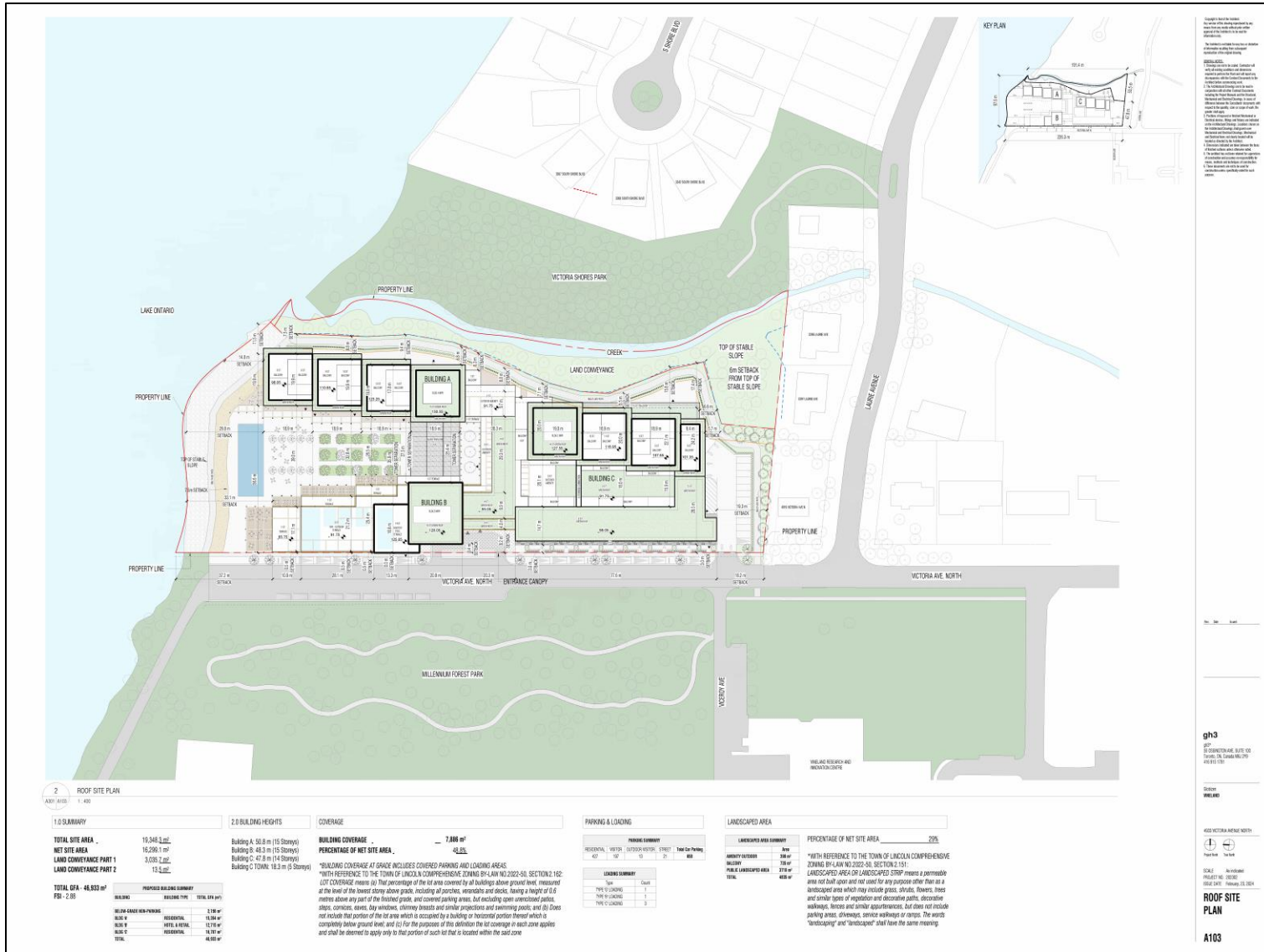


Figure 2: Site Plan

APPENDIX B: SAMPLE CALCULATIONS AND DATA

Highway	Location Description	Dist (KM)	Year	Pattern Type	AADT	SADT	SAWDT	WADT
QEW			2004	CTR	86900	109700	105100	73300
QEW			2005	CTR	83800	103800	99700	71100
QEW			2006	CTR	85400	105700	101300	72500
QEW			2007	CTR	87400	108300	107300	74100
QEW			2008	CTR	89300	110500	108400	75900
QEW			2009	CTR	91300	111400	107700	77600
QEW			2010	CTR	96700	117700	113100	82100
QEW			2011	CTR	96000	116800	112300	81500
QEW			2012	CTR	97600	118400	116900	83100
QEW			2013	CTR	99600	121200	125200	84600
QEW			2014	IC	101000	111800	111300	89600
QEW			2015	IC	102600	113600	113000	91000
QEW			2016	IC	104300	115400	114900	92500
QEW			2017	IC	106000	116100	117000	96200
QEW			2018	IC	107600	118400	119100	97400
QEW			2019	IC	109300	120100	120700	98700
QEW	VICTORIA AV IC-57	6.7	1988	CTR	51700	67200	63100	43400
QEW			1989	CTR	53800	68300	65100	46300
QEW			1990	CTR	56100	70100	66200	48800
QEW			1991	CTR	58200	73300	72800	50600
QEW			1992	CTR	58000	71300	69000	50500
QEW			1993	CTR	58600	73800	70900	49800
QEW			1994	CTR	59400	76000	72500	49900
QEW			1995	CTR	66200	85000	81400	55500
QEW			1996	CTR	68700	87900	84500	57700
QEW			1997	CTR	71200	91100	87600	59800
QEW			1998	CTR	73700	93600	89900	61900
QEW			1999	CTR	72100	90800	87200	60600
QEW			2000	CTR	73700	92900	89200	61900
QEW			2001	CTR	75200	94900	91000	63400
QEW			2002	CTR	76800	96900	92900	64800
QEW			2003	IC	76800	85600	86400	68000
QEW			2004	IC	79200	88600	89000	70000
QEW			2005	IC	81900	91100	91900	72200
QEW			2006	IC	83100	92300	93200	73600
QEW			2007	IC	90000	100000	103100	79500
QEW			2008	IC	95400	105700	102300	84100
QEW			2009	IC	91600	101700	102600	81500
QEW			2010	IC	93500	103500	104400	82900
QEW			2011	IC	95500	105000	108900	85700
QEW			2012	IC	97400	107900	104600	86400
QEW			2013	IC	99300	109900	109300	88100
QEW			2014	IC	101200	112000	111500	89700
QEW			2015	IC	103200	114200	113700	91500
QEW			2016	IC	105100	116300	115800	93200

Highway	Location Description	Dist (KM)	Year	Pattern Type	AADT	SADT	SAWDT	WADT
QEW			2017	IR	107000	125500	125500	95400
QEW			2018	IR	108900	128000	128000	97400
QEW			2019	IR	110800	130000	130000	99300
QEW	ONTARIO ST IC-64	3.8	1988	CTR	50300	65400	61400	42300
QEW			1989	CTR	52400	66500	63400	45100
QEW			1990	CTR	55500	69400	65500	48300
QEW			1991	CTR	57200	72100	71500	49800
QEW			1992	CTR	57000	70100	67800	49600
QEW			1993	CTR	57600	72600	69700	49000
QEW			1994	CTR	63900	81800	78000	53700
QEW			1995	CTR	66700	85600	82000	55900
QEW			1996	CTR	69500	88900	85500	58300
QEW			1997	CTR	72200	92400	88800	60600
QEW			1998	CTR	75000	95200	91500	63000
QEW			1999	CTR	73400	92500	88800	61700
QEW			2000	CTR	74900	94400	90600	62900
QEW			2001	CTR	76400	96400	92400	64400
QEW			2002	CTR	77900	98300	94300	65800
QEW			2003	CTR	78300	97300	93500	66400
QEW			2004	CTR	81100	102400	98100	68400
QEW			2005	CTR	83100	103000	98800	70500
QEW			2006	CTR	84400	104500	100200	71600
QEW			2007	CTR	85600	106000	105100	72600
QEW			2008	CTR	87800	108700	106500	74600
QEW			2009	CTR	89500	109200	105600	76100
QEW			2010	CTR	90300	109900	105600	76700
QEW			2011	CTR	92100	112100	107800	78200
QEW			2012	CTR	93600	113600	112100	79700
QEW			2013	CTR	95200	115900	119700	80900
QEW			2014	IC	96700	107000	106500	85700
QEW			2015	IC	98300	108800	108300	87200
QEW			2016	IC	99800	110500	110000	88500
QEW			2017	IR	103100	120900	121000	92000
QEW			2018	IR	103200	121300	121300	92300
QEW			2019	IR	104700	122800	122900	93800
QEW	BARTLETT AV IC-68	2.5	1988	CTR	52600	68400	64200	44200
QEW			1989	CTR	54900	69700	66400	47200
QEW			1990	CTR	57100	71400	67400	49700
QEW			1991	CTR	58800	74100	73500	51200
QEW			1992	CTR	57600	70800	68500	50100
QEW			1993	CTR	58200	73300	70400	49500
QEW			1994	CTR	58500	74900	71400	49100
QEW			1995	CTR	63800	81900	78500	53500
QEW			1996	CTR	70200	89800	86400	58900
QEW			1997	CTR	70500	90200	86700	59200

Receiver

Name: Location 1

ID: Loc1

X: 17630408.62 m

Y: 4783477.74 m

Z: 14.50 m

Road, TNM, Name: "QEWE", ID: ""

Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	Ad (dB)	Aair (dB)	Agr (dB)	Afol (dB)	RL (dB)	Lr dB(A)
1	17630358.01	4782792.58	1.60	0	D	A	73.6	-24.7	0.0	1.9	0.0	0.0	47.0
1	17630358.01	4782792.58	1.60	0	N	A	73.5	-24.7	0.0	1.9	0.0	0.0	47.0
2	17630357.92	4782762.58	1.60	0	D	A	73.6	-25.0	0.0	1.9	0.0	0.0	46.6
2	17630357.92	4782762.58	1.60	0	N	A	73.5	-25.0	0.0	1.9	0.0	0.0	46.6
5	17630542.55	4782793.04	1.60	0	D	A	73.6	-34.8	0.0	1.9	0.0	0.0	36.9
5	17630542.55	4782793.04	1.60	0	N	A	73.5	-34.8	0.0	1.9	0.0	0.0	36.8
8	17630613.41	4782797.21	1.60	0	D	A	73.6	-29.8	0.0	1.9	0.0	0.0	41.9
8	17630613.41	4782797.21	1.60	0	N	A	73.5	-29.8	0.0	1.9	0.0	0.0	41.8
10	17630752.07	4782805.37	1.60	0	D	A	73.6	-28.4	0.0	2.0	0.0	0.0	43.2
10	17630752.07	4782805.37	1.60	0	N	A	73.5	-28.4	0.0	2.0	0.0	0.0	43.1
14	17630837.51	4782810.39	1.60	0	D	A	73.6	-47.9	0.0	2.0	0.0	0.0	23.6
14	17630837.51	4782810.39	1.60	0	N	A	73.5	-47.9	0.0	2.0	0.0	0.0	23.6
17	17630546.70	4782763.24	1.60	0	D	A	73.6	-34.6	0.0	1.9	0.0	0.0	37.1
17	17630546.70	4782763.24	1.60	0	N	A	73.5	-34.6	0.0	1.9	0.0	0.0	37.0
20	17630622.29	4782767.68	1.60	0	D	A	73.6	-30.0	0.0	2.0	0.0	0.0	41.6
20	17630622.29	4782767.68	1.60	0	N	A	73.5	-30.0	0.0	2.0	0.0	0.0	41.6
21	17630759.62	4782775.76	1.60	0	D	A	73.6	-29.0	0.0	2.0	0.0	0.0	42.6
21	17630759.62	4782775.76	1.60	0	N	A	73.5	-29.0	0.0	2.0	0.0	0.0	42.5
22	17630074.79	4782795.96	1.60	0	D	A	73.6	-27.2	0.0	2.0	0.0	0.0	44.5
22	17630074.79	4782795.96	1.60	0	N	A	73.5	-27.2	0.0	2.0	0.0	0.0	44.4
23	17630074.03	4782765.97	1.60	0	D	A	73.6	-27.5	0.0	2.0	0.0	0.0	44.1
23	17630074.03	4782765.97	1.60	0	N	A	73.5	-27.5	0.0	2.0	0.0	0.0	44.0
25	17630973.36	4782815.79	1.60	0	D	A	73.6	-27.6	0.0	2.2	0.0	0.0	43.8
25	17630973.36	4782815.79	1.60	0	N	A	73.5	-27.6	0.0	2.2	0.0	0.0	43.7
26	17630847.62	4782780.79	1.60	0	D	A	73.6	-39.6	0.0	2.1	0.0	0.0	31.9
26	17630847.62	4782780.79	1.60	0	N	A	73.5	-39.6	0.0	2.1	0.0	0.0	31.8
27	17630982.14	4782786.12	1.60	0	D	A	73.6	-28.1	0.0	2.3	0.0	0.0	43.2
27	17630982.14	4782786.12	1.60	0	N	A	73.5	-28.1	0.0	2.3	0.0	0.0	43.1
28	17630358.01	4782792.58	3.02	0	D	A	71.2	-24.7	0.0	2.3	0.0	0.0	44.3
28	17630358.01	4782792.58	3.02	0	N	A	71.1	-24.7	0.0	2.3	0.0	0.0	44.2
29	17630357.92	4782762.58	3.02	0	D	A	71.2	-25.0	0.0	1.6	0.0	0.0	44.6
29	17630357.92	4782762.58	3.02	0	N	A	71.1	-25.0	0.0	1.6	0.0	0.0	44.5
33	17630542.55	4782793.04	3.02	0	D	A	71.2	-34.8	0.0	1.1	0.0	0.0	35.3
33	17630542.55	4782793.04	3.02	0	N	A	71.1	-34.8	0.0	1.1	0.0	0.0	35.2
35	17630613.41	4782797.21	3.02	0	D	A	71.2	-29.8	0.0	1.1	0.0	0.0	40.3
35	17630613.41	4782797.21	3.02	0	N	A	71.1	-29.8	0.0	1.1	0.0	0.0	40.2
36	17630752.07	4782805.37	3.02	0	D	A	71.2	-28.4	0.0	1.0	0.0	0.0	41.7
36	17630752.07	4782805.37	3.02	0	N	A	71.1	-28.4	0.0	1.0	0.0	0.0	41.7
38	17630837.51	4782810.39	3.02	0	D	A	71.2	-47.9	0.0	1.0	0.0	0.0	22.3
38	17630837.51	4782810.39	3.02	0	N	A	71.1	-47.9	0.0	1.0	0.0	0.0	22.2
42	17630546.70	4782763.24	3.02	0	D	A	71.2	-34.6	0.0	1.1	0.0	0.0	35.5
42	17630546.70	4782763.24	3.02	0	N	A	71.1	-34.6	0.0	1.1	0.0	0.0	35.5
44	17630622.29	4782767.68	3.02	0	D	A	71.2	-30.0	0.0	1.1	0.0	0.0	40.1
44	17630622.29	4782767.68	3.02	0	N	A	71.1	-30.0	0.0	1.1	0.0	0.0	40.1
46	17630759.62	4782775.76	3.02	0	D	A	71.2	-29.0	0.0	1.0	0.0	0.0	41.2
46	17630759.62	4782775.76	3.02	0	N	A	71.1	-29.0	0.0	1.0	0.0	0.0	41.2
47	17629854.30	4782802.73	1.60	0	D	A	73.6	-28.7	0.0	2.2	0.0	0.0	42.7
47	17629854.30	4782802.73	1.60	0	N	A	73.5	-28.7	0.0	2.2	0.0	0.0	42.6
48	17629853.21	4782772.75	1.60	0	D	A	73.6	-28.9	0.0	2.3	0.0	0.0	42.4
48	17629853.21	4782772.75	1.60	0	N	A	73.5	-28.9	0.0	2.3	0.0	0.0	42.3
49	17630074.79	4782795.96	3.02	0	D	A	71.2	-27.2	0.0	1.0	0.0	0.0	43.0
49	17630074.79	4782795.96	3.02	0	N	A	71.1	-27.2	0.0	1.0	0.0	0.0	42.9

Road, TNM, Name: "QEW", ID: ""

Nr.	X	Y	Z	Ref.	DEN	Freq.	Lw	Ad	Aair	Agr	Afol	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
50	17630074.03	4782765.97	3.02	0	D	A	71.2	-27.5	0.0	1.5	0.0	0.0	42.2
50	17630074.03	4782765.97	3.02	0	N	A	71.1	-27.5	0.0	1.5	0.0	0.0	42.1
51	17630973.36	4782815.79	3.02	0	D	A	71.2	-27.6	0.0	1.0	0.0	0.0	42.6
51	17630973.36	4782815.79	3.02	0	N	A	71.1	-27.6	0.0	1.0	0.0	0.0	42.6
52	17630847.62	4782780.79	3.02	0	D	A	71.2	-39.6	0.0	1.0	0.0	0.0	30.6
52	17630847.62	4782780.79	3.02	0	N	A	71.1	-39.6	0.0	1.0	0.0	0.0	30.5
54	17630982.14	4782786.12	3.02	0	D	A	71.2	-28.1	0.0	1.0	0.0	0.0	42.1
54	17630982.14	4782786.12	3.02	0	N	A	71.1	-28.1	0.0	1.0	0.0	0.0	42.0
55	17629854.30	4782802.73	3.02	0	D	A	71.2	-28.7	0.0	1.0	0.0	0.0	41.6
55	17629854.30	4782802.73	3.02	0	N	A	71.1	-28.7	0.0	1.0	0.0	0.0	41.5
56	17629853.21	4782772.75	3.02	0	D	A	71.2	-28.9	0.0	1.0	0.0	0.0	41.3
56	17629853.21	4782772.75	3.02	0	N	A	71.1	-28.9	0.0	1.0	0.0	0.0	41.3
57	17630358.01	4782792.58	5.16	0	D	A	54.8	-24.7	0.0	2.8	0.0	0.0	27.3
57	17630358.01	4782792.58	5.16	0	N	A	54.7	-24.7	0.0	2.8	0.0	0.0	27.2
58	17630357.92	4782762.58	5.16	0	D	A	54.8	-25.0	0.0	2.8	0.0	0.0	26.9
58	17630357.92	4782762.58	5.16	0	N	A	54.7	-25.0	0.0	2.8	0.0	0.0	26.9
61	17630542.55	4782793.04	5.16	0	D	A	54.8	-34.8	0.0	1.6	0.0	0.0	18.3
61	17630542.55	4782793.04	5.16	0	N	A	54.7	-34.8	0.0	1.6	0.0	0.0	18.3
62	17630613.41	4782797.21	5.16	0	D	A	54.8	-29.8	0.0	1.7	0.0	0.0	23.3
62	17630613.41	4782797.21	5.16	0	N	A	54.7	-29.8	0.0	1.7	0.0	0.0	23.2
64	17630752.07	4782805.37	5.16	0	D	A	54.8	-28.4	0.0	1.8	0.0	0.0	24.5
64	17630752.07	4782805.37	5.16	0	N	A	54.7	-28.4	0.0	1.8	0.0	0.0	24.5
70	17630546.70	4782763.24	5.16	0	D	A	54.8	-34.6	0.0	1.7	0.0	0.0	18.4
70	17630546.70	4782763.24	5.16	0	N	A	54.7	-34.6	0.0	1.7	0.0	0.0	18.4
72	17630622.29	4782767.68	5.16	0	D	A	54.8	-30.0	0.0	1.8	0.0	0.0	23.0
72	17630622.29	4782767.68	5.16	0	N	A	54.7	-30.0	0.0	1.8	0.0	0.0	22.9
74	17630759.62	4782775.76	5.16	0	D	A	54.8	-29.0	0.0	1.9	0.0	0.0	23.9
74	17630759.62	4782775.76	5.16	0	N	A	54.7	-29.0	0.0	1.9	0.0	0.0	23.9
75	17630074.79	4782795.96	5.16	0	D	A	54.8	-27.2	0.0	1.8	0.0	0.0	25.8
75	17630074.79	4782795.96	5.16	0	N	A	54.7	-27.2	0.0	1.8	0.0	0.0	25.7
76	17630074.03	4782765.97	5.16	0	D	A	54.8	-27.5	0.0	2.1	0.0	0.0	25.2
76	17630074.03	4782765.97	5.16	0	N	A	54.7	-27.5	0.0	2.1	0.0	0.0	25.1
77	17630973.36	4782815.79	5.16	0	D	A	54.8	-27.6	0.0	2.0	0.0	0.0	25.2
77	17630973.36	4782815.79	5.16	0	N	A	54.7	-27.6	0.0	2.0	0.0	0.0	25.1
78	17630847.62	4782780.79	5.16	0	D	A	54.8	-39.6	0.0	1.9	0.0	0.0	13.2
78	17630847.62	4782780.79	5.16	0	N	A	54.7	-39.6	0.0	1.9	0.0	0.0	13.1
79	17630982.14	4782786.12	5.16	0	D	A	54.8	-28.1	0.0	2.0	0.0	0.0	24.6
79	17630982.14	4782786.12	5.16	0	N	A	54.7	-28.1	0.0	2.0	0.0	0.0	24.5
80	17629854.30	4782802.73	5.16	0	D	A	54.8	-28.7	0.0	2.0	0.0	0.0	24.1
80	17629854.30	4782802.73	5.16	0	N	A	54.7	-28.7	0.0	2.0	0.0	0.0	24.0
82	17629853.21	4782772.75	5.16	0	D	A	54.8	-28.9	0.0	2.0	0.0	0.0	23.8
82	17629853.21	4782772.75	5.16	0	N	A	54.7	-28.9	0.0	2.0	0.0	0.0	23.8

Receiver

Name: Location 10 OLA

ID: Loc10

X: 17630450.73 m

Y: 4783506.35 m

Z: 25.50 m

Road, TNM, Name: "QEWE", ID: ""													
Nr.	X (m)	Y (m)	Z (m)	Refl.	DEN	Freq. (Hz)	Lw dB(A)	Ad (dB)	Aair (dB)	Agr (dB)	Afol (dB)	RL (dB)	Lr dB(A)
3	17630212.94	4782792.99	1.60	0	D	A	73.6	-33.9	0.0	3.2	0.0	0.0	36.5
3	17630212.94	4782792.99	1.60	0	N	A	73.5	-33.9	0.0	3.2	0.0	0.0	36.4
16	17630280.48	4782792.80	1.60	0	D	A	73.6	-31.0	0.0	3.2	0.0	0.0	39.4
16	17630280.48	4782792.80	1.60	0	N	A	73.5	-31.0	0.0	3.2	0.0	0.0	39.3
37	17630418.46	4782792.40	1.60	0	D	A	73.6	-27.5	0.0	3.2	0.0	0.0	42.9
37	17630418.46	4782792.40	1.60	0	N	A	73.5	-27.5	0.0	3.2	0.0	0.0	42.9
41	17630519.80	4782792.11	1.60	0	D	A	73.6	-38.7	0.0	3.2	0.0	0.0	31.7
41	17630519.80	4782792.11	1.60	0	N	A	73.5	-38.7	0.0	3.2	0.0	0.0	31.6
43	17630208.40	4782763.01	1.60	0	D	A	73.6	-35.1	0.0	3.2	0.0	0.0	35.3
43	17630208.40	4782763.01	1.60	0	N	A	73.5	-35.1	0.0	3.2	0.0	0.0	35.2
45	17630273.32	4782762.82	1.60	0	D	A	73.6	-31.2	0.0	3.2	0.0	0.0	39.2
45	17630273.32	4782762.82	1.60	0	N	A	73.5	-31.2	0.0	3.2	0.0	0.0	39.1
59	17630417.10	4782762.41	1.60	0	D	A	73.6	-27.7	0.0	3.2	0.0	0.0	42.7
59	17630417.10	4782762.41	1.60	0	N	A	73.5	-27.7	0.0	3.2	0.0	0.0	42.7
65	17630521.06	4782762.11	1.60	0	D	A	73.6	-40.0	0.0	3.2	0.0	0.0	30.4
65	17630521.06	4782762.11	1.60	0	N	A	73.5	-40.0	0.0	3.2	0.0	0.0	30.3
69	17630671.69	4782800.64	1.60	0	D	A	73.6	-25.9	0.0	3.2	0.0	0.0	44.5
69	17630671.69	4782800.64	1.60	0	N	A	73.5	-25.9	0.0	3.2	0.0	0.0	44.4
73	17630827.99	4782809.83	1.60	0	D	A	73.6	-37.9	0.0	3.2	0.0	0.0	32.5
73	17630827.99	4782809.83	1.60	0	N	A	73.5	-37.9	0.0	3.2	0.0	0.0	32.5
81	17630680.24	4782771.09	1.60	0	D	A	73.6	-26.1	0.0	3.2	0.0	0.0	44.3
81	17630680.24	4782771.09	1.60	0	N	A	73.5	-26.1	0.0	3.2	0.0	0.0	44.3
83	17630836.53	4782780.28	1.60	0	D	A	73.6	-42.6	0.0	3.2	0.0	0.0	27.8
83	17630836.53	4782780.28	1.60	0	N	A	73.5	-42.6	0.0	3.2	0.0	0.0	27.7
84	17630973.36	4782815.79	1.60	0	D	A	73.6	-27.6	0.0	3.2	0.0	0.0	42.8
84	17630973.36	4782815.79	1.60	0	N	A	73.5	-27.6	0.0	3.2	0.0	0.0	42.8
85	17630974.55	4782785.82	1.60	0	D	A	73.6	-27.8	0.0	3.2	0.0	0.0	42.6
85	17630974.55	4782785.82	1.60	0	N	A	73.5	-27.8	0.0	3.2	0.0	0.0	42.5
87	17630074.79	4782795.96	1.60	0	D	A	73.6	-27.6	0.0	3.2	0.0	0.0	42.8
87	17630074.79	4782795.96	1.60	0	N	A	73.5	-27.6	0.0	3.2	0.0	0.0	42.7
89	17630074.03	4782765.97	1.60	0	D	A	73.6	-27.9	0.0	3.2	0.0	0.0	42.5
89	17630074.03	4782765.97	1.60	0	N	A	73.5	-27.9	0.0	3.2	0.0	0.0	42.4
90	17630212.94	4782792.99	3.02	0	D	A	71.2	-33.9	0.0	2.9	0.0	0.0	34.4
90	17630212.94	4782792.99	3.02	0	N	A	71.1	-33.9	0.0	2.9	0.0	0.0	34.4
91	17630280.48	4782792.80	3.02	0	D	A	71.2	-31.0	0.0	2.9	0.0	0.0	37.3
91	17630280.48	4782792.80	3.02	0	N	A	71.1	-31.0	0.0	2.9	0.0	0.0	37.2
92	17630418.46	4782792.40	3.02	0	D	A	71.2	-27.5	0.0	2.8	0.0	0.0	40.9
92	17630418.46	4782792.40	3.02	0	N	A	71.1	-27.5	0.0	2.8	0.0	0.0	40.8
96	17630519.80	4782792.11	3.02	0	D	A	71.2	-38.7	0.0	2.8	0.0	0.0	29.6
96	17630519.80	4782792.11	3.02	0	N	A	71.1	-38.7	0.0	2.8	0.0	0.0	29.6
98	17630208.40	4782763.01	3.02	0	D	A	71.2	-35.1	0.0	2.9	0.0	0.0	33.2
98	17630208.40	4782763.01	3.02	0	N	A	71.1	-35.1	0.0	2.9	0.0	0.0	33.1
100	17630273.32	4782762.82	3.02	0	D	A	71.2	-31.2	0.0	2.9	0.0	0.0	37.1
100	17630273.32	4782762.82	3.02	0	N	A	71.1	-31.2	0.0	2.9	0.0	0.0	37.0
105	17630417.10	4782762.41	3.02	0	D	A	71.2	-27.7	0.0	2.9	0.0	0.0	40.7
105	17630417.10	4782762.41	3.02	0	N	A	71.1	-27.7	0.0	2.9	0.0	0.0	40.6
109	17630521.06	4782762.11	3.02	0	D	A	71.2	-40.0	0.0	2.9	0.0	0.0	28.3
109	17630521.06	4782762.11	3.02	0	N	A	71.1	-40.0	0.0	2.9	0.0	0.0	28.2
111	17630671.69	4782800.64	3.02	0	D	A	71.2	-25.9	0.0	2.9	0.0	0.0	42.4
111	17630671.69	4782800.64	3.02	0	N	A	71.1	-25.9	0.0	2.9	0.0	0.0	42.4
113	17630827.99	4782809.83	3.02	0	D	A	71.2	-37.9	0.0	2.9	0.0	0.0	30.4
113	17630827.99	4782809.83	3.02	0	N	A	71.1	-37.9	0.0	2.9	0.0	0.0	30.4

Road, TNM, Name: "QEWE", ID: ""

Nr.	X (m)	Y (m)	Z (m)	Ref.	DEN	Freq. (Hz)	Lw dB(A)	Ad (dB)	Aair (dB)	Agr (dB)	Afol (dB)	RL (dB)	Lr dB(A)
116	17630680.24	4782771.09	3.02	0	D	A	71.2	-26.1	0.0	2.9	0.0	0.0	42.2
116	17630680.24	4782771.09	3.02	0	N	A	71.1	-26.1	0.0	2.9	0.0	0.0	42.2
118	17630836.53	4782780.28	3.02	0	D	A	71.2	-42.6	0.0	2.9	0.0	0.0	25.6
118	17630836.53	4782780.28	3.02	0	N	A	71.1	-42.6	0.0	2.9	0.0	0.0	25.6
121	17629807.32	4782804.45	1.60	0	D	A	73.6	-32.0	0.0	3.2	0.0	0.0	38.4
121	17629807.32	4782804.45	1.60	0	N	A	73.5	-32.0	0.0	3.2	0.0	0.0	38.4
122	17629913.29	4782800.57	1.60	0	D	A	73.6	-32.4	0.0	3.2	0.0	0.0	38.1
122	17629913.29	4782800.57	1.60	0	N	A	73.5	-32.4	0.0	3.2	0.0	0.0	38.0
123	17629794.68	4782774.89	1.60	0	D	A	73.6	-33.2	0.0	3.2	0.0	0.0	37.2
123	17629794.68	4782774.89	1.60	0	N	A	73.5	-33.2	0.0	3.2	0.0	0.0	37.1
126	17629900.65	4782771.02	1.60	0	D	A	73.6	-31.7	0.0	3.2	0.0	0.0	38.7
126	17629900.65	4782771.02	1.60	0	N	A	73.5	-31.7	0.0	3.2	0.0	0.0	38.6
128	17630973.36	4782815.79	3.02	0	D	A	71.2	-27.6	0.0	2.9	0.0	0.0	40.7
128	17630973.36	4782815.79	3.02	0	N	A	71.1	-27.6	0.0	2.9	0.0	0.0	40.7
129	17630974.55	4782785.82	3.02	0	D	A	71.2	-27.8	0.0	2.9	0.0	0.0	40.5
129	17630974.55	4782785.82	3.02	0	N	A	71.1	-27.8	0.0	2.9	0.0	0.0	40.5
132	17630074.79	4782795.96	3.02	0	D	A	71.2	-27.6	0.0	2.9	0.0	0.0	40.6
132	17630074.79	4782795.96	3.02	0	N	A	71.1	-27.6	0.0	2.9	0.0	0.0	40.6
134	17630074.03	4782765.97	3.02	0	D	A	71.2	-27.9	0.0	2.9	0.0	0.0	40.4
134	17630074.03	4782765.97	3.02	0	N	A	71.1	-27.9	0.0	2.9	0.0	0.0	40.3
135	17629807.32	4782804.45	3.02	0	D	A	71.2	-32.0	0.0	2.8	0.0	0.0	36.4
135	17629807.32	4782804.45	3.02	0	N	A	71.1	-32.0	0.0	2.8	0.0	0.0	36.4
138	17629913.29	4782800.57	3.02	0	D	A	71.2	-32.4	0.0	2.9	0.0	0.0	36.0
138	17629913.29	4782800.57	3.02	0	N	A	71.1	-32.4	0.0	2.9	0.0	0.0	35.9
140	17629794.68	4782774.89	3.02	0	D	A	71.2	-33.2	0.0	2.7	0.0	0.0	35.2
140	17629794.68	4782774.89	3.02	0	N	A	71.1	-33.2	0.0	2.7	0.0	0.0	35.2
142	17629900.65	4782771.02	3.02	0	D	A	71.2	-31.7	0.0	2.8	0.0	0.0	36.7
142	17629900.65	4782771.02	3.02	0	N	A	71.1	-31.7	0.0	2.8	0.0	0.0	36.6
143	17630212.94	4782792.99	5.16	0	D	A	54.8	-33.9	0.0	1.9	0.0	0.0	19.0
143	17630212.94	4782792.99	5.16	0	N	A	54.7	-33.9	0.0	1.9	0.0	0.0	18.9
147	17630280.48	4782792.80	5.16	0	D	A	54.8	-31.0	0.0	1.5	0.0	0.0	22.2
147	17630280.48	4782792.80	5.16	0	N	A	54.7	-31.0	0.0	1.5	0.0	0.0	22.2
150	17630418.46	4782792.40	5.16	0	D	A	54.8	-27.5	0.0	0.8	0.0	0.0	26.5
150	17630418.46	4782792.40	5.16	0	N	A	54.7	-27.5	0.0	0.8	0.0	0.0	26.4
151	17630519.80	4782792.11	5.16	0	D	A	54.8	-38.7	0.0	0.8	0.0	0.0	15.2
151	17630519.80	4782792.11	5.16	0	N	A	54.7	-38.7	0.0	0.8	0.0	0.0	15.2
153	17630208.40	4782763.01	5.16	0	D	A	54.8	-35.1	0.0	1.5	0.0	0.0	18.1
153	17630208.40	4782763.01	5.16	0	N	A	54.7	-35.1	0.0	1.5	0.0	0.0	18.0
155	17630273.32	4782762.82	5.16	0	D	A	54.8	-31.2	0.0	1.2	0.0	0.0	22.3
155	17630273.32	4782762.82	5.16	0	N	A	54.7	-31.2	0.0	1.2	0.0	0.0	22.3
158	17630417.10	4782762.41	5.16	0	D	A	54.8	-27.7	0.0	0.9	0.0	0.0	26.2
158	17630417.10	4782762.41	5.16	0	N	A	54.7	-27.7	0.0	0.9	0.0	0.0	26.1
163	17630521.06	4782762.11	5.16	0	D	A	54.8	-40.0	0.0	0.9	0.0	0.0	13.8
163	17630521.06	4782762.11	5.16	0	N	A	54.7	-40.0	0.0	0.9	0.0	0.0	13.7
165	17630671.69	4782800.64	5.16	0	D	A	54.8	-25.9	0.0	0.9	0.0	0.0	27.9
165	17630671.69	4782800.64	5.16	0	N	A	54.7	-25.9	0.0	0.9	0.0	0.0	27.9
168	17630827.99	4782809.83	5.16	0	D	A	54.8	-37.9	0.0	1.2	0.0	0.0	15.7
168	17630827.99	4782809.83	5.16	0	N	A	54.7	-37.9	0.0	1.2	0.0	0.0	15.7
173	17630680.24	4782771.09	5.16	0	D	A	54.8	-26.1	0.0	1.1	0.0	0.0	27.6
173	17630680.24	4782771.09	5.16	0	N	A	54.7	-26.1	0.0	1.1	0.0	0.0	27.6
175	17630836.53	4782780.28	5.16	0	D	A	54.8	-42.6	0.0	1.3	0.0	0.0	10.8
175	17630836.53	4782780.28	5.16	0	N	A	54.7	-42.6	0.0	1.3	0.0	0.0	10.7
176	17630973.36	4782815.79	5.16	0	D	A	54.8	-27.6	0.0	1.6	0.0	0.0	25.6
176	17630973.36	4782815.79	5.16	0	N	A	54.7	-27.6	0.0	1.6	0.0	0.0	25.5
177	17630974.55	4782785.82	5.16	0	D	A	54.8	-27.8	0.0	1.7	0.0	0.0	25.2
177	17630974.55	4782785.82	5.16	0	N	A	54.7	-27.8	0.0	1.7	0.0	0.0	25.1
178	17630074.79	4782795.96	5.16	0	D	A	54.8	-27.6	0.0	1.2	0.0	0.0	25.9
178	17630074.79	4782795.96	5.16	0	N	A	54.7	-27.6	0.0	1.2	0.0	0.0	25.8
179	17630074.03	4782765.97	5.16	0	D	A	54.8	-27.9	0.0	2.4	0.0	0.0	24.5
179	17630074.03	4782765.97	5.16	0	N	A	54.7	-27.9	0.0	2.4	0.0	0.0	24.4
185	17629807.32	4782804.45	5.16	0	D	A	54.8	-32.0	0.0	2.0	0.0	0.0	20.7
185	17629807.32	4782804.45	5.16	0	N	A	54.7	-32.0	0.0	2.0	0.0	0.0	20.7
187	17629913.29	4782800.57	5.16	0	D	A	54.8	-32.4	0.0	1.7	0.0	0.0	20.7

Road, TNM, Name: "QEW", ID: ""													
Nr.	X	Y	Z	Refl.	DEN	Freq.	Lw	Ad	Aair	Agr	Afol	RL	Lr
	(m)	(m)	(m)			(Hz)	dB(A)	(dB)	(dB)	(dB)	(dB)	(dB)	dB(A)
187	17629913.29	4782800.57	5.16	0	N	A	54.7	-32.4	0.0	1.7	0.0	0.0	20.6
191	17629794.68	4782774.89	5.16	0	D	A	54.8	-33.2	0.0	2.2	0.0	0.0	19.4
191	17629794.68	4782774.89	5.16	0	N	A	54.7	-33.2	0.0	2.2	0.0	0.0	19.3
193	17629900.65	4782771.02	5.16	0	D	A	54.8	-31.7	0.0	1.9	0.0	0.0	21.2
193	17629900.65	4782771.02	5.16	0	N	A	54.7	-31.7	0.0	1.9	0.0	0.0	21.1

APPENDIX C: WARNING CLAUSES

- TYPE A: “Purchasers/tenants are advised that sound levels due to increasing road traffic and rail traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment, Conservations and Parks.”
- TYPE B: “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 and rail traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment, Conservations and Parks.”
- TYPE C: “This dwelling unit has been designed with the provision for adding central air conditioning at the occupant’s discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment, Conservations and Parks.”
- TYPE D: “This dwelling unit has been supplied with a central air conditioning 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 Municipality and the Ministry of the Environment, Conservations and Parks.”
- TYPE E: “Purchasers/tenants are advised that due to the proximity of the adjacent commercial buildings, noise from the commercial buildings may at times be audible.”

APPENDIX D: REFERENCES

1. Ministry of the Environment, "Model Municipal Noise Control By-Law, Final Report," August 1978.
2. Ontario Ministry of the Environment, Environmental Approvals and Land Use Planning Branch, "Guidelines for Road Traffic Noise Assessment," July 1986.
3. Ministry of the Environment's *STAMSON* Computer Programme (Version 5.03) for the IBM PC.
4. Ministry of the Environment, *ORNAMENT*, "Ontario Road Noise Analysis Method for Environment and Transportation," November 1988.
5. Qirt, D.J., "Controlling Sound Transmission into Buildings," National Research Council, Building Practice Note 56, Update 1.1.
6. Ministry of the Environment, *STEAM* "Sound from Trains Environmental Analysis Method," July 1990
7. Ministry of the Environment, "Environmental Noise Guideline: Stationary and Transportation Sources – Approval and Planning," Publication *NPC-300*, August 2013.