



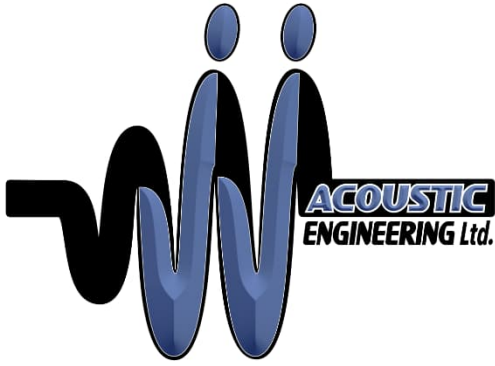
# Road Traffic and Stationary Noise Impact Study

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7081 Mcleod Rd, Niagara Falls

JJ-00487 NIS1





Nov 14<sup>th</sup>, 2022,

Reference No. JJ-00487-NIS1

Dave Gerrard  
Northshore Developments  
799 Kingsway  
Burlington, ON

Dear Mr. Gerrard:

**Re: Road Traffic and Stationary Noise Impact Study  
7081 Mcleod Rd, Niagara Falls, Ontario**

## **1. Introduction**

JJ Acoustic Engineering Ltd. (JJAE) was retained to complete a Road Traffic and Stationary Noise Impact Study (Study) for the residential development located at 7081 Mcleod Road, Niagara Falls, Ontario (Site). The Site will be developed into a 5-storey apartment building. JJAE has provided a copy of the most up-to-date Site Plan in Attachment A.

The Study was prepared consistent with Ontario Ministry of the Environment, Conservation and Parks (MOECP) NPC 300, "Environmental Noise Guideline, Stationary and Transportation Sources— Approval and Planning" dated August 2013.

This Study has determined that the potential environmental noise impact from road traffic noise is significant. The proposed development will need the following: a requirement for central air-conditioning, noise warning clauses and special building components. Road traffic noise control requirements for the Site were determined based on road traffic volumes provided by the Region of Niagara (Region) and forecasted to 10 years from the date of this study.

JJ Acoustic Engineering Ltd.  
[joey@jjae.ca](mailto:joey@jjae.ca)  
226-346-6473

The following attachments were included with this Study:

- Attachment A – Site Plan
- Attachment B – Traffic Data Summary Table, Sample Stamson Traffic Model Outputs & STC Calculations
- Attachment C – Stationary Noise Impact Figures
- Attachment D – Stationary Noise Impact Source Table

## **2. Road Traffic Analysis**

### **2.1 Road Traffic Noise Modeling Methodology**

The road traffic noise impact was conducted using STAMSON, the MOECP's computerized model of ORNAMENT. The Application of the model for the site was consistent with the ORNAMENT technical documents. The computer model input parameters include, among other data, the number of road segments, number of house rows, the positional relationship of the receptor to a noise source or barrier in terms of distance, elevation and angle of exposure to the source, the basic site topography, the ground surface type, traffic volumes, traffic composition and speed limit.

The predicted sound level is based on the 1-hour equivalent sound level, designated as Leq, and is adjusted by the STAMSON program to the 16-hour daytime and the 8-hour nighttime equivalent sound level. The applicable noise criteria for noise sensitive spaces are specified in terms of the 16-hour daytime period (7:00 a.m. to 11:00 p.m.) and 8-hour nighttime period (11:00 p.m. to 7:00 a.m.) enabling a direct comparison between the STAMSON model output and the noise limits.

### **2.2 Road Traffic Model Input Parameters**

This section describes the STAMSON model input parameters used to predict road traffic noise impact for the Site.

The Site has two significant roadways in the vicinity of the development: Mcleod Road approximately 15 meters to the South and Queen Elizabeth Highway (QEW) approximately 500 meters to the West. Where there are intervening and off-site structures that provide line-of-sight obstruction to the roads, JJAЕ did not include line-of-sight obstruction in our analysis as to calculate worst-case noise impact.

### **2.2.1 Road Traffic Parameters**

The traffic data provided by the Region has been summarized below:

#### ***McLeod Road:***

- Current AADT (2021): 31,015
- Forecast AADT (2032): 40,694
- Commercial Vehicle Rates: 4.2% medium trucks and 2.8% heavy trucks
- Posted Speed Limit: 50 km/h
- Day Night Splits: 90% day and 10% night

#### ***QEW Northbound:***

- Current AADT (2016): 22,550
- Forecast AADT (2032): 33,476
- Commercial Vehicle Rates: 5% medium trucks and 15% heavy trucks
- Posted Speed Limit: 100 km/h
- Day Night Splits: 66.67% day and 33.33% night

#### ***QEW Southbound:***

- Current AADT (2016): 22,550
- Forecast AADT (2032): 33,476
- Commercial Vehicle Rates: 5% medium trucks and 15% heavy trucks
- Posted Speed Limit: 100 km/h
- Day Night Splits: 66.67% day and 33.33% night

No AADT data was supplied but AM and PM Peak values were supplied. JJAЕ has used a very conservative calculations method which takes the sum of the AM Peak and PM Peak values for the roadway and multiplies that by 5. This approach is used by traffic engineers as a conservative calculation of the AADT for a roadway and is the calculation method used in this report.

The traffic data is the foundation of this analysis and the Study will be updated if the values change. JJAЕ assumed 2.5% annual growth to forecast AADT. Traffic data was supplied by the Region. The Region's AADT report for this Noise Studies report has been supplied in Attachment B.

### **2.3 Road Traffic Noise Modeling Results**

JJAЕ calculated the Plane of Window (POW) noise exposure for each floor at the Site for the separate daytime and nighttime periods.

The STAMSON road traffic model outputs are provided in Attachment B.

## 2.4 Road Traffic Modeling Discussion

Noise control requirements will be defined based on NPC 300.

### *Daytime Outdoor Living Area Assessment (NPC 300, Section C7.1.1)*

NPC 300 section A5 (pages 13-14) defines an Outdoor Living Area (OLA). As part of this definition, a balcony or terrace is considered an OLA if it has a minimum depth of 4 meters. All balconies are less than 4 m in depth and therefore will not be considered as OLAs.

The Site does not have any feasible location for an OLA and thus, JJAЕ has not provided any calculations for an OLA at the Site.

### *Plane of a Window – Ventilation Requirements (NPC 300, Section C7.1.2)*

The predicted daytime and nighttime Plane of Window (POW) noise impact assumes a worst-case and direct line of sight noise exposure to both roads, unless the building itself blocks line-of-sight (full or partial).

JJAЕ has used the following criteria, which is a summary of NPC 300 requirements, to evaluate the Site noise impacts from road traffic noise:

Daytime Level (dBA)	Nighttime Level (dBA)	Ventilation Requirements and Warning Clauses	Special Building Components
55	50	Not Required	Not Required
55 – 65	50 – 60	Yes, with Type C Warning Clause	Not Required
66 or more	60 or more	Yes, with Type D Warning Clause	Yes

Table B.1 summarizes the predicted worst-case sound levels and the requirements for the units. The following warning clause is required:

**Warning Clause 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, Conservation and Parks."

### *Indoor Living Areas – Building Components (NPC 300, Section C7.1.3)*

At minimum, the building must be constructed to standard Ontario Building Code requirements. Improved building components are required and summarized in Table B.1. JJAЕ has assumed 35% window to floor area coverage and that windows are thick and operable.

### 3. Stationary Noise Impact Analysis

#### 3.1 Stationary Noise Impact Sound Level Criteria

The general criteria for stationary noise sources are defined by NPC 300. The criteria defined in Table C-5 and C-6, "Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Outdoor Points of Reception" and "Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Plane of Window of Noise Sensitive Spaces" are used to evaluate the noise impact at the proposed development.

The criteria for a Class 1 area have been summarized below:

Receiver Category	Time Period	Stationary Noise Criteria
Outdoor Living Area (OLA)	Day = 7:00 to 23:00	Leq = 50 dBA
Plane of Window (POW)	Day = 7:00 to 23:00	Leq = 50 dBA
	Night = 23:00 to 7:00	Leq = 45 dBA

#### 3.2 Modelling Methodology

The stationary noise impact was evaluated using the CADNA A acoustic modelling software that is based on the ISO 9613-2 standard. The data for all potential stationary noise sources was summarized in Attachment D.

### 4. Noise Impact Summary – From Site

The noise from the Site to the neighboring buildings could not be accounted for because the site has not undergone mechanical design yet. An addendum to this report should be completed once a mechanical design is done to account for noise from the Site to the neighboring building.

## 5. Noise Impact Summary – From Environment to Site

There are several buildings near the site. JJAЕ has identified several potential stationary noise sources including:

- Medium HVAC Units
- Small HVAC Units
- Representative MUA

A summary of the noise sources used in our modelling is provided in Attachment D.

JJAЕ modelled the noise impact from all significant noise sources to the Site. The results are summarized in the table below and illustrated on Figure 1.

Block A	Worst Case Daytime Sound Level (dBA)	Daytime Noise Limit (dBA)	Worst Case Nighttime Sound Level (dBA)	Nighttime Noise Limit (dBA)	Limits met
North	28	50	25	45	Yes
East	43	50	39	45	Yes
South	45	50	41	45	Yes
West	43	50	39	45	Yes

From the table above it can be seen that all façades are below the noise limits.

## 6. Recommendations

The road traffic noise impacts were above the NPC 300 requirements. Noise mitigation measures include:

- Warning Clause Type D for all façades.
- Air Conditioning is required for all units.
- A minimum of STC 30 is required for all exterior glazing for the North façade.
- A minimum of STC 29 is required for all exterior glazing for the East façade.
- A minimum of STC 33 is required for all exterior glazing for the South and West façades.

The stationary noise impacts from neighboring buildings to the site were evaluated and the sound level predictions were determined to be below noise limits.

The noise from the Site to the neighboring buildings could not be accounted for because the site has not undergone mechanical design yet. An addendum to this report should be completed once a mechanical design is done to account for noise from the Site to the neighboring building.

## 7. Conclusions

The results of this Study indicate that the potential environmental impact from road traffic noise sources is significant. Mitigation measures will be required including ventilation requirements, noise warning clauses for each unit and special building components for all façades.

Should you have any questions on the above, please do not hesitate to contact us.

Yours truly,

Written by:

Reviewed by:

Nov. 12, 2022



Emmanuel Ghiorghis,  
Acoustic Technician

Joey Jraige, P.Eng., B.A.Sc.  
President



# ATTACHMENT A



3D Massing



## ATTACHMENT B

**Table B1**

**Road Traffic Noise Levels and Mitigation Measures Summary**  
7081 Mcleod Rd, Niagara Falls, Ontario

Point of Reception	Road Sound Level Daytime (dBA)	Road Sound Level Nighttime (dBA)	Ventilation Requirements NPC 300	Warning Clauses From NPC 300	Special Building Components
<b>North Façade</b>					
Plane of Window Level 1	64 (dBA)	64 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 30
Plane of Window Level 2	64 (dBA)	64 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 30
Plane of Window Level 3	64 (dBA)	64 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 30
Plane of Window Level 4	64 (dBA)	64 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 30
Plane of Window Level 5	64 (dBA)	64 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 30
<b>East Façade</b>					
Plane of Window Level 1	68 (dBA)	61 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 29
Plane of Window Level 2	68 (dBA)	61 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 29
Plane of Window Level 3	67 (dBA)	61 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 28
Plane of Window Level 4	67 (dBA)	60 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 28
Plane of Window Level 5	67 (dBA)	60 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 28
<b>South Façade</b>					
Plane of Window Level 1	72 (dBA)	67 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 33
Plane of Window Level 2	71 (dBA)	67 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 33
Plane of Window Level 3	71 (dBA)	67 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 33
Plane of Window Level 4	71 (dBA)	67 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 33
Plane of Window Level 5	71 (dBA)	66 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 32
<b>West Façade</b>					
Plane of Window Level 1	69 (dBA)	67 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 33
Plane of Window Level 2	69 (dBA)	67 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 33
Plane of Window Level 3	69 (dBA)	67 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 33
Plane of Window Level 4	69 (dBA)	67 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 33
Plane of Window Level 5	68 (dBA)	67 (dBA)	Requirement for Air Conditioning	Type D	Minimum Window STC Rating of 33

Outdoor Sound Level	65	Day/Night	Day
Indoor Sound Level	45	Road/Rail	Road
Noise Reduction	23		
Angle of Sound	60 to 90 Degrees	Angle Correction	3
		Sum	26

Component	Window	Sum	26
Sound Energy Transmitted	100%	Table 3	0
Component Area	35 % Floor Area		
Room Floor Area	100 31		
Room Absorption Category	Intermediate	Table 4	-4
Noise Spectrum Type	Mixed Road Traffic, Distance Aircraft		
Component Category	Openable Thick Window	Table 5	4
	REQUIRED STC FOR COMPONENT		26

Component	Exterior Wall	Sum	26
Sound Energy Transmitted	100%	Table 3	0
Component Area	25 % Floor Area		
Room Floor Area	100 6		
Room Absorption Category	Intermediate	Table 4	-11
Noise Spectrum Type	Mixed Road Traffic, Distance Aircraft		
Component Category	Openable Thin Window	Table 5	2
	REQUIRED STC FOR COMPONENT		17

Location..... Drummond Road @ McLeod Road

GeoID..... 01573

Municipality. NIAGARA FALLS

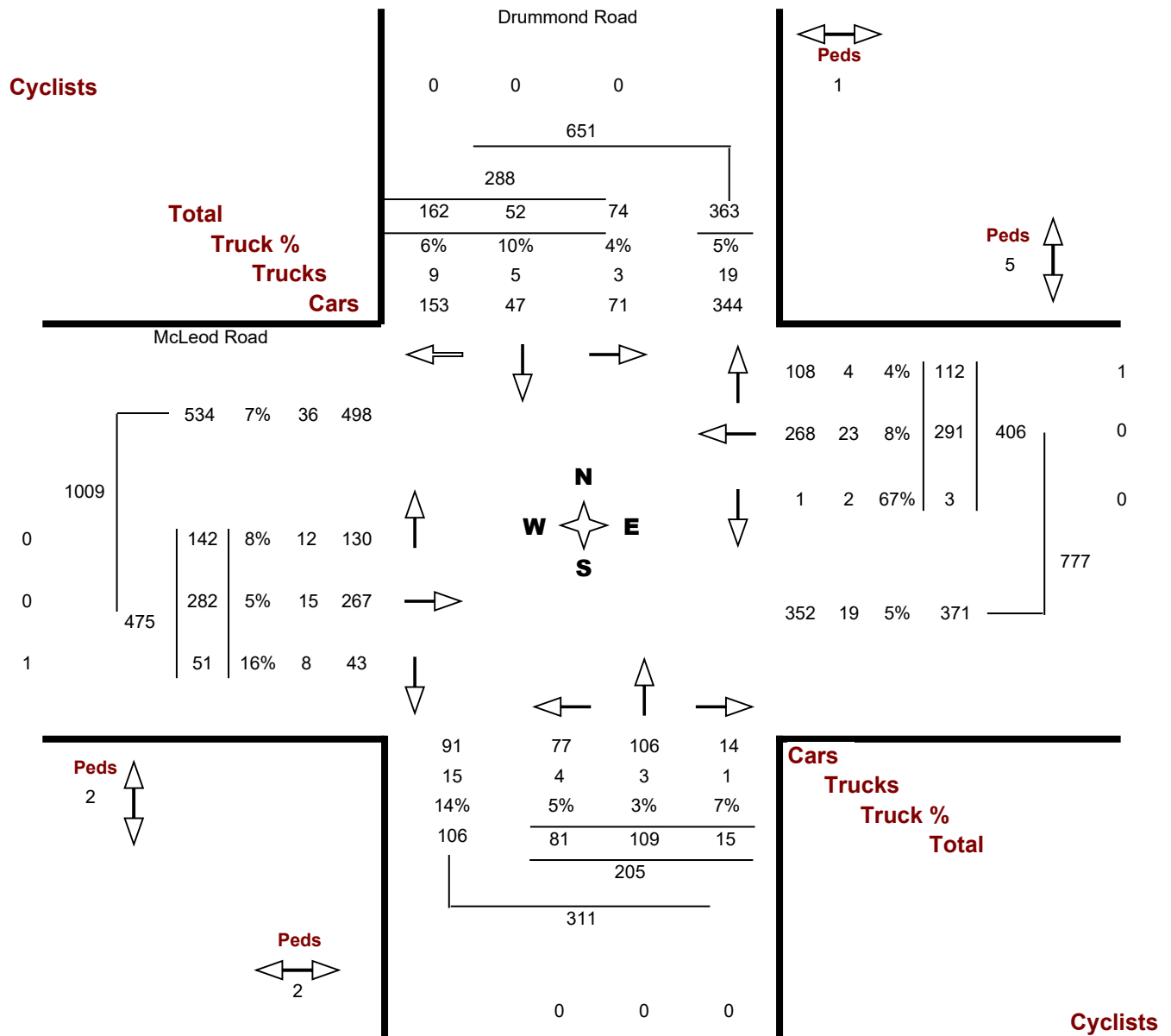
Count Date. Wednesday, 24 November, 2021

Traffic Cont.

Count Time. 07:00 AM — 09:00 AM

Major Dir..... East west

Peak Hour.. 08:00 AM — 09:00 AM



Location..... Drummond Road @ McLeod Road

GeoID..... 01573

Municipality. NIAGARA FALLS

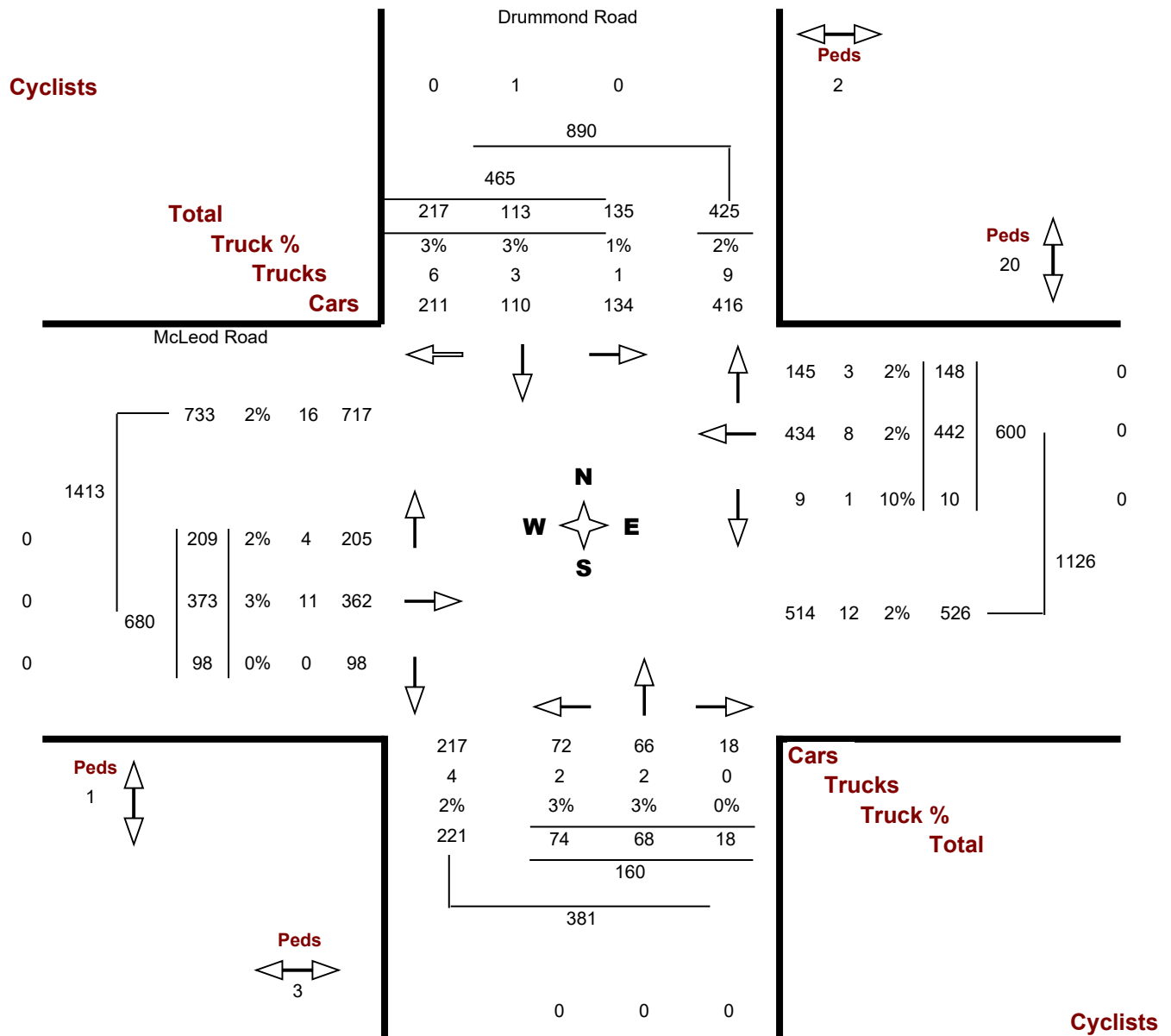
Count Date. Wednesday, 24 November, 2021

Traffic Cont.

Count Time. 03:00 PM — 06:00 PM

Major Dir..... East west

Peak Hour.. 04:15 PM — 05:15 PM



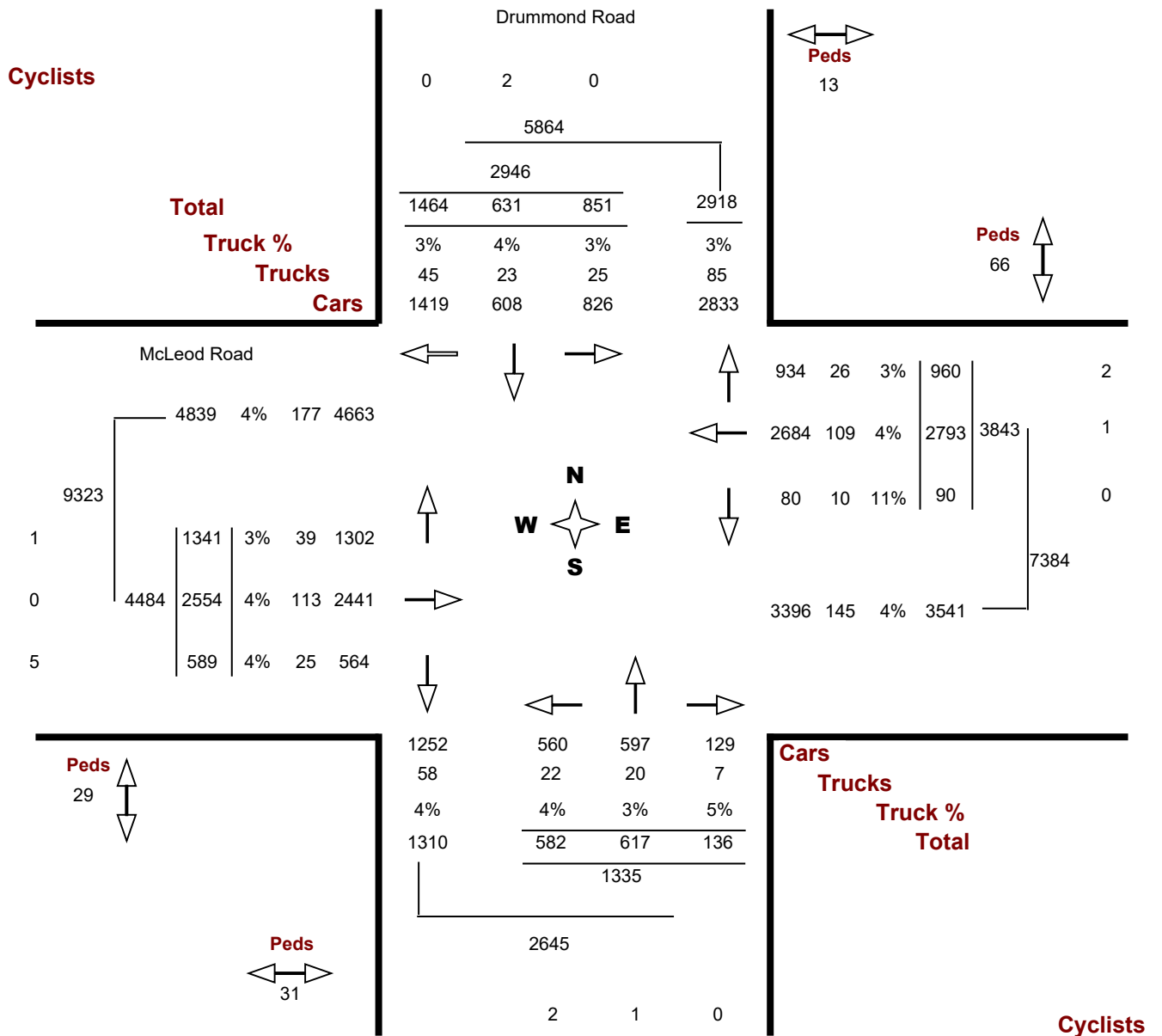


**Location.....** Drummond Road @ McLeod Road

**Municipality.....** NIAGARA FALLS

**GeoID.....** 01573

**Count Date.....** Wednesday, 24 November, 2021



## Turning Movement Count - Details Report (15 min)

**Location**..... Drummond Road @ McLeod Road

**Municipality**..... NIAGARA FALLS

**Count Date**..... Wednesday, November 24, 2021

Drummond Road

McLeod Road

North Approach

South Approach

East Approach

West Approach

Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00 07:15	19	7	16	0	42	11	6	2	0	19	2	52	9	0	63	16	49	6	0	71
07:15 07:30	11	5	19	0	35	19	8	3	0	30	2	50	12	0	64	19	49	6	0	74
07:30 07:45	16	5	28	0	49	29	18	1	0	48	0	55	15	0	70	20	68	9	0	97
07:45 08:00	18	8	25	0	51	20	16	1	0	37	4	65	14	0	83	28	81	10	0	119
Hourly Total	64	25	88	0	177	79	48	7	0	134	8	222	50	0	280	83	247	31	0	361
08:00 08:15	12	8	34	0	54	24	17	6	0	47	0	76	31	0	107	16	63	9	0	88
08:15 08:30	20	10	36	0	66	28	24	1	0	53	2	66	21	0	89	49	78	14	0	141
08:30 08:45	23	17	53	0	93	15	37	3	0	55	1	74	29	0	104	36	73	15	0	124
08:45 09:00	19	17	39	0	75	14	31	5	0	50	0	75	31	0	106	41	68	13	0	122
Hourly Total	74	52	162	0	288	81	109	15	0	205	3	291	112	0	406	142	282	51	0	475
11:00 11:15	23	14	45	0	82	11	18	6	0	35	4	79	29	0	112	46	64	13	0	123
11:15 11:30	25	18	47	0	90	14	23	5	0	42	1	83	39	0	123	38	66	27	0	131
11:30 11:45	26	18	42	0	86	16	21	2	0	39	2	96	36	0	134	55	76	25	0	156
11:45 12:00	20	18	46	0	84	15	20	4	0	39	1	69	30	0	100	46	79	12	0	137
Hourly Total	94	68	180	0	342	56	82	17	0	155	8	327	134	0	469	185	285	77	0	547
12:00 12:15	28	19	58	0	105	15	15	4	0	34	2	89	31	0	122	45	74	16	0	135
12:15 12:30	27	18	42	0	87	24	17	7	0	48	5	95	29	0	129	39	96	18	0	153
12:30 12:45	29	26	36	0	91	20	24	7	0	51	2	85	32	0	119	37	80	9	0	126
12:45 13:00	37	21	48	0	106	17	20	4	0	41	1	100	22	0	123	48	94	17	0	159
Hourly Total	121	84	184	0	389	76	76	22	0	174	10	369	114	0	493	169	344	60	0	573
13:00 13:15	28	11	73	0	112	18	23	2	0	43	5	80	33	0	118	43	84	19	0	146
13:15 13:30	27	19	51	0	97	20	18	10	0	48	6	84	34	0	124	50	73	23	0	146
13:30 13:45	26	14	46	0	86	13	19	4	0	36	3	97	33	0	133	45	92	14	0	151
13:45 14:00	33	21	62	0	116	19	15	9	0	43	6	90	29	0	125	36	74	18	0	128
Hourly Total	114	65	232	0	411	70	75	25	0	170	20	351	129	0	500	174	323	74	0	571
15:00 15:15	33	32	57	0	122	17	23	3	0	43	4	101	49	0	154	51	72	28	0	151
15:15 15:30	26	29	36	0	91	12	18	6	0	36	8	115	35	0	158	46	99	26	0	171
15:30 15:45	32	28	54	0	114	21	21	5	0	47	5	121	27	0	153	49	90	30	0	169
15:45 16:00	38	19	63	0	120	22	18	3	0	43	2	97	28	0	127	46	99	18	0	163
Hourly Total	129	108	210	0	447	72	80	17	0	169	19	434	139	0	592	192	360	102	0	654
16:00 16:15	32	23	55	0	110	19	23	3	0	45	2	124	43	0	169	41	88	22	0	151

Drummond Road

McLeod Road

North Approach

South Approach

East Approach

West Approach

Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:15 16:30	30	28	46	0	104	21	20	3	0	44	6	97	35	0	138	53	94	24	0	171
16:30 16:45	33	30	61	0	124	23	11	5	0	39	1	129	44	0	174	43	84	21	0	148
16:45 17:00	29	29	49	0	107	17	15	4	0	36	2	96	30	0	128	52	84	20	0	156
Hourly Total	124	110	211	0	445	80	69	15	0	164	11	446	152	0	609	189	350	87	0	626
17:00 17:15	43	26	61	0	130	13	22	6	0	41	1	120	39	0	160	61	111	33	0	205
17:15 17:30	29	35	47	0	111	13	15	2	0	30	4	73	32	0	109	50	81	33	0	164
17:30 17:45	33	33	41	0	107	20	17	5	0	42	5	86	22	0	113	50	85	26	0	161
17:45 18:00	26	25	48	0	99	22	24	5	0	51	1	74	37	0	112	46	86	15	0	147
Hourly Total	131	119	197	0	447	68	78	18	0	164	11	353	130	0	494	207	363	107	0	677
Grand Total	851	631	1464	0	2946	582	617	136	0	1335	90	2793	960	0	3843	1341	2554	589	0	4484
Truck %	3%	4%	3%	0%	3%	4%	3%	5%	0%	4%	11%	4%	3%	0%	4%	3%	4%	4%	0%	4%

QEW	FORT ERIE-GODERICH ST-PEACE BRIDGE PLAZA	CENTRAL AV IC	0.2	14,600
QEW	CENTRAL AV IC	CONCESSION RD IC-1	0.9	18,700
QEW	CONCESSION RD IC-1	THOMPSON RD IC-2	1.0	15,500
QEW	THOMPSON RD IC-2	GILMORE RD IC-5	2.4	17,700
QEW	GILMORE RD IC-5	BOWEN RD IC-7	2.0	24,200
QEW	BOWEN RD IC-7	NETHERBY RD IC-12 NIAGARA FALLS LTS	5.5	25,700
QEW	NETHERBY RD IC-12 NIAGARA FALLS LTS	SODOM RD IC-16	3.2	22,000
QEW	SODOM RD IC-16	LYONS CREEK RD IC-21	6.6	29,000
QEW	LYONS CREEK RD IC-21	MCLEOD RD IC-27	4.4	36,700
QEW	MCLEOD RD IC-27	HWY 420 IC-30	2.9	45,100
QEW	HWY 420 IC-30	THOROLD STONE RD IC-32	2.0	70,400
QEW	THOROLD STONE RD IC-32	MOUNTAIN RD IC-34	2.5	67,400
QEW	MOUNTAIN RD IC-34	HWY 405(WBL)IC-37	2.4	71,000
QEW	HWY 405(WBL)IC-37	GLENDALE AV IC-38	1.3	88,100
QEW	GLENDALE AV IC-38	NIAGARA ST SERVICE RDS	4.8	90,500
QEW	NIAGARA ST SERVICE RDS	NIAGARA ST IC-44	1.2	78,600
QEW	NIAGARA ST IC-44	LAKE ST IC-46	1.6	81,900
QEW	LAKE ST IC-46	ONTARIO ST IC-47	1.3	117,000
QEW	ONTARIO ST IC-47	MARTINDALE RD IC-48	0.7	97,400
QEW	MARTINDALE RD IC-48	HWY 406 IC-49	0.7	74,400
QEW	HWY 406 IC-49	SEVENTH ST IC-51	1.9	97,100
QEW	SEVENTH ST IC-51	JORDAN RD IC-55	4.3	98,100
QEW	JORDAN RD IC-55	VICTORIA AV IC-57	2.8	104,300
QEW	VICTORIA AV IC-57	ONTARIO ST IC-64	6.7	105,100
QEW	ONTARIO ST IC-64	BARTLETT AV IC-68	3.8	99,800
QEW	BARTLETT AV IC-68	MAPLE AV IC-71	2.5	99,300
QEW	MAPLE AV IC-71	CASABLANCA BV IC-74	3.6	107,100
QEW	CASABLANCA BV IC-74	FIFTY RD IC-78	3.5	112,300
QEW	FIFTY RD IC-78	FRUITLAND RD IC-83	5.1	120,300
QEW	FRUITLAND RD IC-83	HAMILTON 20 IC 88-CENTENNIAL PKWY	5.2	119,000
QEW	HAMILTON 20 IC 88-CENTENNIAL PKWY	BURLINGTON ST IC-89	1.6	130,000
QEW	BURLINGTON ST IC-89	EASTPORT RD IC-93 (7189)	4.0	135,000
QEW	EASTPORT RD IC-93 (7189)	HAMILTON HARBOUR ENTRANCE	0.9	149,400
QEW	HAMILTON HARBOUR ENTRANCE	NORTH SHORE BLVD IC 97	2.3	271,300
QEW	NORTH SHORE BLVD IC 97	FAIRVIEW ST IC-99	2.3	161,300
QEW	FAIRVIEW ST IC-99	HWY 403/407 IC-100	1.0	172,900
QEW	HWY 403/407 IC-100	BRANT ST IC 101	0.8	164,300
QEW	BRANT ST IC 101	GUELPH LINE IC-102	1.8	162,100
QEW	GUELPH LINE IC-102	WALKERS LINE IC-105	2.0	195,000
QEW	WALKERS LINE IC-105	APPLEBY LINE IC-107	2.0	190,000
QEW	APPLEBY LINE IC-107	BURLOAK DR IC-109	1.9	195,000
QEW	BURLOAK DR IC-109	BRONTE SERVICE RD IC-110	1.5	204,000
QEW	BRONTE SERVICE RD IC-110	REG. RD 25(N) BRONTE RD(S) IC-111	0.4	202,200
QEW	REG. RD 25(N) BRONTE RD(S) IC-111	THIRD LINE RD IC 113	2.0	191,300

Filename: north.te                            Time Period: Day/Night 16/8 hours  
Description: North Facade Floor 1

Road data, segment # 1: QWE NB (day/night)

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Car traffic volume : 17853/8927 veh/TimePeriod  
Medium truck volume : 1116/558 veh/TimePeriod  
Heavy truck volume : 3347/1674 veh/TimePeriod  
Posted speed limit : 100 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 1: QWE NB (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 500.00 / 500.00 m  
Receiver height : 2.00 / 2.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Road data, segment # 2: QWE SN (day/night)

-----  
Car traffic volume : 17853/8927 veh/TimePeriod  
Medium truck volume : 1116/558 veh/TimePeriod  
Heavy truck volume : 3347/1674 veh/TimePeriod  
Posted speed limit : 100 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: QWE SN (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 500.00 / 500.00 m  
Receiver height : 2.00 / 2.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Results segment # 1: QWE NB (day)

-----  
Source height = 1.97 m

ROAD (0.00 + 60.78 + 0.00) = 60.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	79.02	0.00	-15.23	-3.01	0.00	0.00	0.00	60.78

-----

Segment Leq : 60.78 dBA

Results segment # 2: QWE SN (day)  
-----

Source height = 1.97 m

ROAD (0.00 + 60.78 + 0.00) = 60.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	79.02	0.00	-15.23	-3.01	0.00	0.00	0.00	60.78

-----

Segment Leq : 60.78 dBA

Total Leq All Segments: 63.79 dBA

Results segment # 1: QWE NB (night)  
-----

Source height = 1.97 m

ROAD (0.00 + 60.78 + 0.00) = 60.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	79.02	0.00	-15.23	-3.01	0.00	0.00	0.00	60.78

-----

Segment Leq : 60.78 dBA

Results segment # 2: QWE SN (night)  
-----

Source height = 1.97 m

ROAD (0.00 + 60.78 + 0.00) = 60.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	79.02	0.00	-15.23	-3.01	0.00	0.00	0.00	60.78

-----  
-90      0    0.00   79.02   0.00   -15.23   -3.01   0.00   0.00   0.00   60.78  
-----

Segment Leq : 60.78 dBA

Total Leq All Segments: 63.79 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.79  
(NIGHT): 63.79

Filename: east.te                    Time Period: Day/Night 16/8 hours  
 Description: East Facade Floor 1

Road data, segment # 1: McLeod Rd (day/night)

-----  
 Car traffic volume : 34061/3785 veh/TimePeriod \*  
 Medium truck volume : 1538/171 veh/TimePeriod \*  
 Heavy truck volume : 1025/114 veh/TimePeriod \*  
 Posted speed limit : 50 km/h  
 Road gradient : 0 %  
 Road pavement : 1 (Typical asphalt or concrete)

\* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 31015  
 Percentage of Annual Growth : 2.50  
 Number of Years of Growth : 11.00  
 Medium Truck % of Total Volume : 4.20  
 Heavy Truck % of Total Volume : 2.80  
 Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: McLeod Rd (day/night)

-----  
 Angle1 Angle2 : 0.00 deg 90.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 15.00 / 15.00 m  
 Receiver height : 2.00 / 2.00 m  
 Topography : 1 (Flat/gentle slope; no barrier)  
 Reference angle : 0.00

Results segment # 1: McLeod Rd (day)

-----  
 Source height = 1.29 m

ROAD (0.00 + 67.87 + 0.00) = 67.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	70.88	0.00	0.00	-3.01	0.00	0.00	0.00	67.87

-----

Segment Leq : 67.87 dBA



Total Leq All Segments: 67.87 dBA

Results segment # 1: McLeod Rd (night)

-----  
Source height = 1.29 m

ROAD (0.00 + 61.34 + 0.00) = 61.34 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

-----  
0 90 0.00 64.35 0.00 0.00 -3.01 0.00 0.00 0.00 61.34  
-----

Segment Leq : 61.34 dBA

Total Leq All Segments: 61.34 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.87  
(NIGHT): 61.34

Filename: south.te                            Time Period: Day/Night 16/8 hours  
Description: South Facade Floor 1

Road data, segment # 1: McLeod (day/night)

-----  
Car traffic volume : 34061/3785 veh/TimePeriod \*  
Medium truck volume : 1538/171 veh/TimePeriod \*  
Heavy truck volume : 1025/114 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

\* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 31015  
Percentage of Annual Growth : 2.50  
Number of Years of Growth : 11.00  
Medium Truck % of Total Volume : 4.20  
Heavy Truck % of Total Volume : 2.80  
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: McLeod (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 15.00 / 15.00 m  
Receiver height : 2.00 / 2.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Road data, segment # 2: QWE NB (day/night)

-----  
Car traffic volume : 17855/8926 veh/TimePeriod \*  
Medium truck volume : 1116/558 veh/TimePeriod \*  
Heavy truck volume : 3348/1674 veh/TimePeriod \*  
Posted speed limit : 100 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

\* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 22550  
Percentage of Annual Growth : 2.50

Number of Years of Growth : 16.00  
Medium Truck % of Total Volume : 5.00  
Heavy Truck % of Total Volume : 15.00  
Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 2: QWE NB (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 500.00 / 500.00 m  
Receiver height : 2.00 / 2.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Road data, segment # 3: QWE SB (day/night)

-----  
Car traffic volume : 17855/8926 veh/TimePeriod \*  
Medium truck volume : 1116/558 veh/TimePeriod \*  
Heavy truck volume : 3348/1674 veh/TimePeriod \*  
Posted speed limit : 100 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

\* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 22550  
Percentage of Annual Growth : 2.50  
Number of Years of Growth : 16.00  
Medium Truck % of Total Volume : 5.00  
Heavy Truck % of Total Volume : 15.00  
Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 3: QWE SB (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 500.00 / 500.00 m  
Receiver height : 2.00 / 2.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Results segment # 1: McLeod (day)

-----



-----  
Segment Leq : 64.35 dBA

Results segment # 2: QWE NB (night)  
-----

Source height = 1.97 m

ROAD (0.00 + 60.78 + 0.00) = 60.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	79.02	0.00	-15.23	-3.01	0.00	0.00	0.00	60.78

-----

Segment Leq : 60.78 dBA

Results segment # 3: QWE SB (night)  
-----

Source height = 1.97 m

ROAD (0.00 + 60.78 + 0.00) = 60.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	79.02	0.00	-15.23	-3.01	0.00	0.00	0.00	60.78

-----

Segment Leq : 60.78 dBA

Total Leq All Segments: 67.09 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 71.66  
(NIGHT): 67.09

Filename: west.te                            Time Period: Day/Night 16/8 hours  
Description: West Facade Floor 1

Road data, segment # 1: McLeod (day/night)

-----  
Car traffic volume : 34061/3785 veh/TimePeriod \*  
Medium truck volume : 1538/171 veh/TimePeriod \*  
Heavy truck volume : 1025/114 veh/TimePeriod \*  
Posted speed limit : 50 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

\* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 31015  
Percentage of Annual Growth : 2.50  
Number of Years of Growth : 11.00  
Medium Truck % of Total Volume : 4.20  
Heavy Truck % of Total Volume : 2.80  
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: McLeod (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 38.00 / 38.00 m  
Receiver height : 2.00 / 2.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Road data, segment # 2: QWE NB (day/night)

-----  
Car traffic volume : 17855/8926 veh/TimePeriod \*  
Medium truck volume : 1116/558 veh/TimePeriod \*  
Heavy truck volume : 3348/1674 veh/TimePeriod \*  
Posted speed limit : 100 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

\* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 22550  
Percentage of Annual Growth : 2.50

Number of Years of Growth : 16.00  
Medium Truck % of Total Volume : 5.00  
Heavy Truck % of Total Volume : 15.00  
Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 2: QWE NB (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 500.00 / 500.00 m  
Receiver height : 2.00 / 2.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Road data, segment # 3: QWE SB (day/night)

-----  
Car traffic volume : 17855/8926 veh/TimePeriod \*  
Medium truck volume : 1116/558 veh/TimePeriod \*  
Heavy truck volume : 3348/1674 veh/TimePeriod \*  
Posted speed limit : 100 km/h  
Road gradient : 0 %  
Road pavement : 1 (Typical asphalt or concrete)

\* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 22550  
Percentage of Annual Growth : 2.50  
Number of Years of Growth : 16.00  
Medium Truck % of Total Volume : 5.00  
Heavy Truck % of Total Volume : 15.00  
Day (16 hrs) % of Total Volume : 66.67

Data for Segment # 3: QWE SB (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 500.00 / 500.00 m  
Receiver height : 2.00 / 2.00 m  
Topography : 1 (Flat/gentle slope; no barrier)  
Reference angle : 0.00

Results segment # 1: McLeod (day)

-----

Source height = 1.29 m

ROAD (0.00 + 63.83 + 0.00) = 63.83 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	70.88	0.00	-4.04	-3.01	0.00	0.00	0.00	63.83

Segment Leq : 63.83 dBA

Results segment # 2: QWE NB (day)

Source height = 1.97 m

ROAD (0.00 + 63.79 + 0.00) = 63.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	79.02	0.00	-15.23	0.00	0.00	0.00	0.00	63.79

Segment Leq : 63.79 dBA

Results segment # 3: QWE SB (day)

Source height = 1.97 m

ROAD (0.00 + 63.79 + 0.00) = 63.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	79.02	0.00	-15.23	0.00	0.00	0.00	0.00	63.79

Segment Leq : 63.79 dBA

Total Leq All Segments: 68.57 dBA

Results segment # 1: McLeod (night)

Source height = 1.29 m

ROAD (0.00 + 57.30 + 0.00) = 57.30 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	64.35	0.00	-4.04	-3.01	0.00	0.00	0.00	57.30



-----  
Segment Leq : 57.30 dBA

Results segment # 2: QWE NB (night)  
-----

Source height = 1.97 m

ROAD (0.00 + 63.79 + 0.00) = 63.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	79.02	0.00	-15.23	0.00	0.00	0.00	0.00	63.79

-----

Segment Leq : 63.79 dBA

Results segment # 3: QWE SB (night)  
-----

Source height = 1.97 m

ROAD (0.00 + 63.79 + 0.00) = 63.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	79.02	0.00	-15.23	0.00	0.00	0.00	0.00	63.79

-----

Segment Leq : 63.79 dBA

Total Leq All Segments: 67.26 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.57  
(NIGHT): 67.26

# ATTACHMENT C

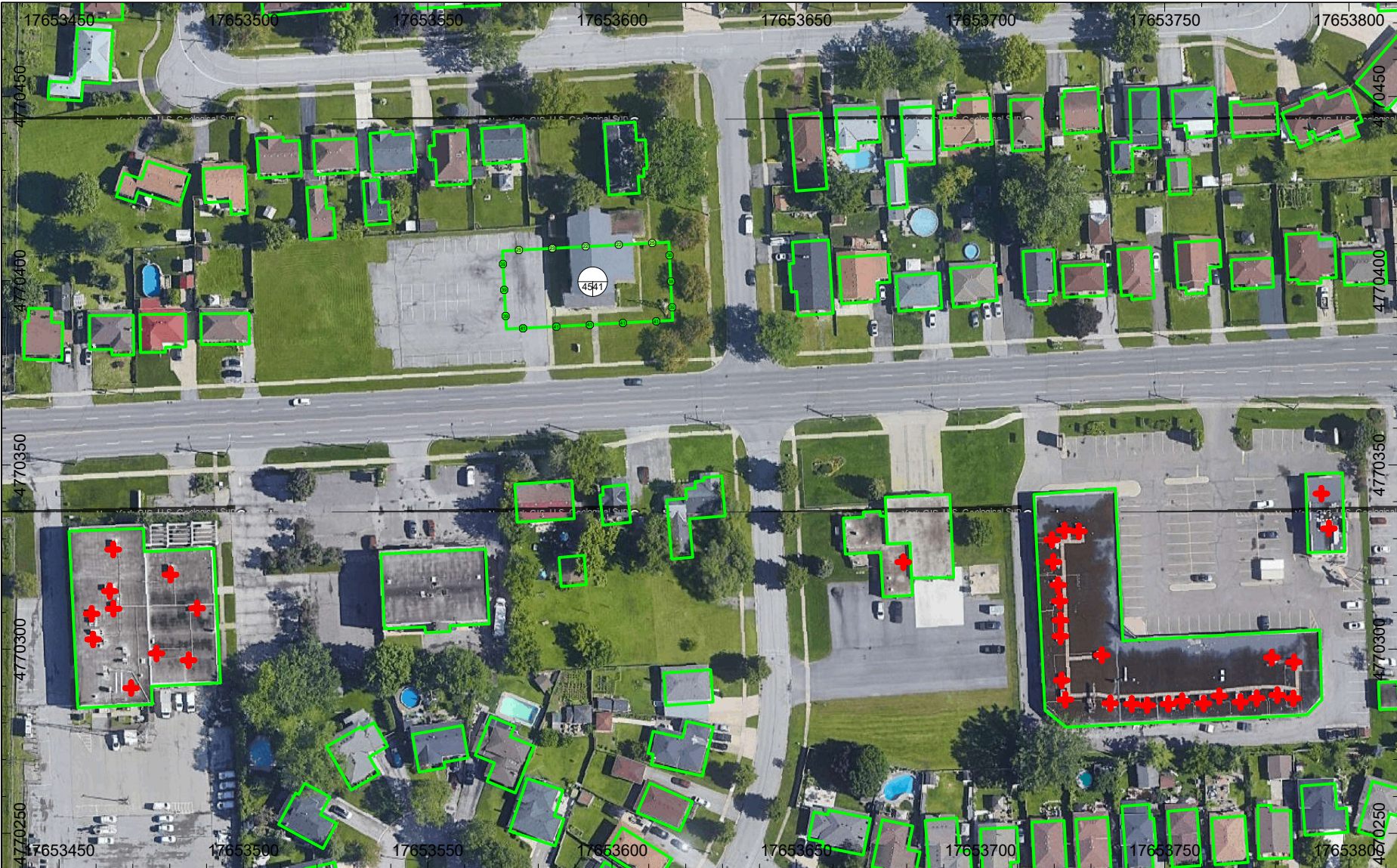


Figure 1 - Stationary Noise Impact from Neighboring Buildings to Site

## ATTACHMENT D

Table C1  
Stationary Noise Impact Source Data  
7081 Mcleod Road, Niagara Falls, Ontario

Noise Source Description	Cadna ID	Total SWL (dBA)	Data Source or Representative Data	Height Absolute (m)	Above Roof (m)	x	y
Medium_HVAC	OS_Medium_HVAC	90.9	Medium_HVAC	6.75	1.25	17653464	4770316
Medium_HVAC	OS_Medium_HVAC	90.9	Medium_HVAC	6.75	1.25	17653459	4770303
Representative_MUA	OS_Representative_MUA	80.6	Representative_MUA	7	1.5	17653459	4770310
Representative_MUA	OS_Representative_MUA	80.6	Representative_MUA	6.5	1.5	17653795	4770333
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	6.75	1.25	17653465	4770327
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	6.75	1.25	17653480	4770320
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	6.75	1.25	17653487	4770311
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	6.75	1.25	17653470	4770289
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653727	4770332
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653723	4770332
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653719	4770330
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653720	4770324
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653721	4770317
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653722	4770313
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653722	4770304
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653733	4770298
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653722	4770292
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653723	4770286
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653741	4770285
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653745	4770285
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653751	4770285
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653755	4770286
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653761	4770285
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653765	4770287
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653770	4770286
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653775	4770287
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653781	4770288
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653779	4770298
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	6.25	1.25	17653793	4770342
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	4.5	1.5	17653679	4770324
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	7	1.5	17653476	4770299
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	7	1.5	17653485	4770297
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	7	1.5	17653465	4770311
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653785	4770296
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653785	4770287
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653735	4770285
Small_HVAC	OS_Small_HVAC	81.9	Small_HVAC	5.75	1.25	17653722	4770308