

Date: February 20, 2024  
Memo No.: Vibration Assessment Report  
Project: 6<sup>th</sup> Concession Road Residential Development  
6<sup>th</sup> Concession Road, Windsor Ontario  
Project #: 21-150

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Baird AE has performed a ground vibration monitoring to support draft plan of subdivision process for the planned residential development located in Windsor, Ontario. This report addresses traffic vibration effects on the nearest sensitive receptors.

The subject land is approximately 0.84 hectares in size and bounded by 6<sup>th</sup> Concession Road to the West and existing residential to the North, South and East. The development proposal consists of 27 townhouse dwelling units, a landscape area, stormwater management and roadway. The location of the property is illustrated in Exhibit 1.



*Exhibit 1: Development location*

The City of Windsor shows concern that the heavy road traffic along 6<sup>th</sup> Concession Road may cause annoyance to the new owners and damage buildings due to vibration induced by road traffic.

Traffic vibrations are mainly caused by heavy vehicles such as buses and trucks. Based on traffic counts on 6<sup>th</sup> Concession Road, the morning traffic is approximately 391 veh/h with 2% of heavy traffic and evening traffic is approximately 644 veh/h with 0.6% heavy traffic.

There are no such national standards exist in Canada for vibration, but Ministry of Environment has publication Noise Pollution Control NPC 119 (MOE, 1982) and ISO 2631-2 (ISO, 1985) provide guidelines and regulatory requirement applied in the prediction of vibration effect. Other factor contributing to vibration amplitude includes vehicle speed, soil type and roughness of road.

The traffic vibration are assessed based on peak particle velocity (PPV) in mm/s to address effect on structure of houses. As shown in Sheet 1 – Vibration Information Plan (Appendix A), the back of proposed new units are approximately 29m and 28m from roadway. The amplitude of the vibration usually ranges between 0.05 and 25 mm/s (0.005 and 2 m/s<sup>2</sup>). And MOE cautionary levels are set to 10.0 mm/s when routine monitoring is conducted (see NPC 119) and an upper limit of 12.5 mm/s when vibration monitoring is conducted. For ground vibration, the threshold of human perception is in the order of 0.15 and 0.2 mm/s

Vibration monitoring was conducted at two sensitive locations are shown in Sheet 1. The measurements were completed on June 6 and June 7, 2023 during the peak traffic hours. The vibration analyser SSEYL Landtek VM3670 was securely placed on top of the concrete surface to measure the ground vibration generated by light and heavy vehicles. Monitoring results are provided in table 1.

**Table 1: Monitoring Results**

Monitoring Location	Morning (June 7)			Evening (June 6)		
	Time of Day	PPC	Distance to centerline of 6 <sup>th</sup> Conc	Time of Day	PPC	Distance to centerline of 6 <sup>th</sup> Conc
Monitoring 1	8:55am	0.05 - 29 mm/s	15.43m	4:55pm	0.06 - 29 mm/s	15.43m
Monitoring 2	8:40am	0.01 - 23 mm/s	12.85m	4:45pm	0.01 - 17 mm/s	12.85m

The results shows that the PPVs at receiver location B are within range of 0.05 and 25mm/s. Whereas, maximum vibration level is slightly higher at Receiver B. It can be noted that the Receiver B is closer to road as compared to Receiver A,

The traffic vibration can be characterized by a source-path-receive. Using the interpolation formula, the peak particle velocity measurements at receiver locations at distance will have decreased to maximum of 12 mm/s. To evaluate the effect of vibration on a building, measurements should be normally be made on building façade and midpoints of the floor.

**Table 2: Vibration Results**

Receiver Location	Peak Particle Velocity (PPV; mm/s)	Distance to Receptor	Sensitive Receptors
Receiver A	15.9 / 14.4	28.08m / 31.08m	Building façade/ Mid-Point of Room
Receiver B	10.2 / 9.3	28.98m / 31.82m	Building façade/ Mid-Point of Room

Based on the interpolation results, vibration from road may felt at sensitive receiver location A. The levels are not considered high enough to cause damage to buildings but are likely to complain of home owners. Following statement to be included in the agreement:

"Purchasers/tenants are advised that due to the proximity of the adjacent roadway, vibration from the roadway may be felt."

Further, based on acoustical report prepared by Baird AE dated December 2022, an acoustical fence of 1.8m high will be installed along the westerly limit of development. This acoustical fence will also help reduce vibration amplitudes.

We conclude that this vibration effect from surrounding roadway will be minimum effects and the development can be carried out safely.

If you have any questions or wish to discuss our findings, please advise us.

Yours truly,

Shurjeel Tunio, P.Eng.  
Senior Project Manager  
Baird AE



# Appendix A



**LEGEND**

- RECEIVER LOCATION
- PROPOSED DEVELOPMENT
- NOISE SOURCES
- VIBRATION



102 - 27 PRINCESS STREET LEAMINGTON, ONTARIO N8H 2X8  
 201 - 330 RICHMOND STREET, CHATHAM, ONTARIO N7M 1P7  
 1000 - 267 PEUSSIER STREET, WINDSOR, ONTARIO N9A 4K4.

PROJECT TITLE:  
**6TH CONCESSION ROAD**  
 CITY OF WINDSOR  
 WINDSOR, ON

SHEET TITLE:  
**SHEET 1 - NOISE INFORMATION PLAN**

DRAWN BY: S.T.	SCALE: NTS	DATE: FEB 14 2024
CHK'D BY: S.T.	SHEET No. : 1 OF 4	PROJECT No. : 21-150





# Sixth Concession Rd @ Holburn St

## Morning Peak Diagram

### Specified Period

**From:** 7:00:00

**To:** 9:00:00

### One Hour Peak

**From:** 8:00:00

**To:** 9:00:00

**Municipality:** Windsor  
**Site #:** 000000001  
**Intersection:** Sixth Concession Rd & Holburn St  
**TFR File #:** 1  
**Count date:** 26-Jul-2022

**Weather conditions:**  
 Cloudy/Dry  
**Person(s) who counted:**  
 Matt

**\*\* Non-Signalized Intersection \*\***

**Major Road:** Sixth Concession Rd runs N/S

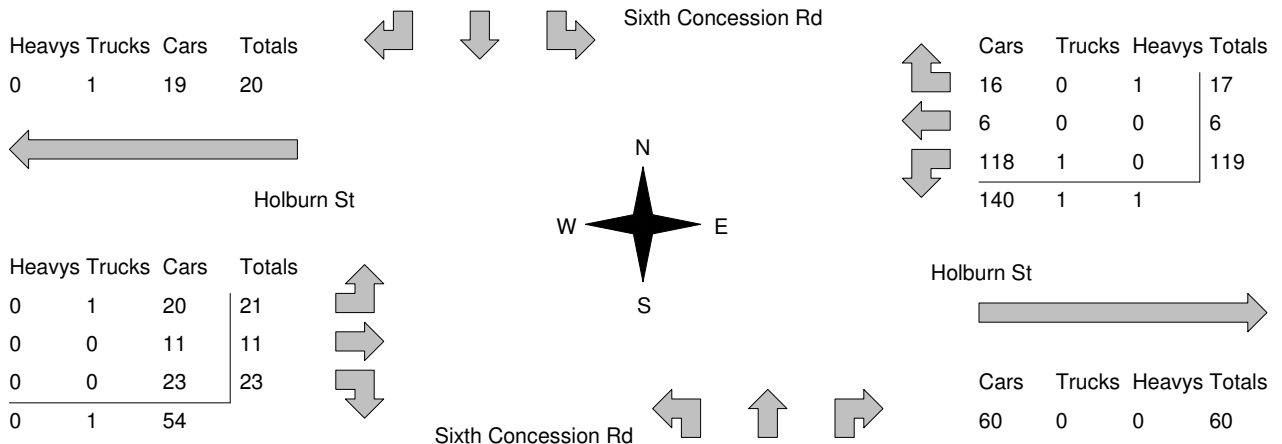
North Leg Total: 250  
 North Entering: 84  
 North Peds: 4  
 Peds Cross:  $\times$

Heavys	0	2	0	2
Trucks	1	2	0	3
Cars	5	67	7	79
<b>Totals</b>	<b>6</b>	<b>71</b>	<b>7</b>	



Heavys	1
Trucks	5
Cars	160
<b>Totals</b>	<b>166</b>

East Leg Total: 202  
 East Entering: 142  
 East Peds: 0  
 Peds Cross:  $\times$



Peds Cross:  $\times$   
 West Peds: 0  
 West Entering: 55  
 West Leg Total: 75

Cars	208	Cars	8	124	42	174
Trucks	3	Trucks	0	4	0	4
Heavys	2	Heavys	0	0	0	0
<b>Totals</b>	<b>213</b>	<b>Totals</b>	<b>8</b>	<b>128</b>	<b>42</b>	

Peds Cross:  $\times$   
 South Peds: 1  
 South Entering: 178  
 South Leg Total: 391

## Comments

# Sixth Concession Rd @ Holburn St

## Mid-day Peak Diagram

### Specified Period

**From:** 11:00:00

**To:** 14:00:00

### One Hour Peak

**From:** 11:45:00

**To:** 12:45:00

**Municipality:** Windsor  
**Site #:** 000000001  
**Intersection:** Sixth Concession Rd & Holburn St  
**TFR File #:** 1  
**Count date:** 26-Jul-2022

**Weather conditions:**  
 Cloudy/Dry  
**Person(s) who counted:**  
 Matt

**\*\* Non-Signalized Intersection \*\***

**Major Road:** Sixth Concession Rd runs N/S

North Leg Total: 347  
 North Entering: 189  
 North Peds: 1  
 Peds Cross:  $\times$

Heavys	0	5	0	5
Trucks	0	2	0	2
Cars	15	150	17	182
<b>Totals</b>	<b>15</b>	<b>157</b>	<b>17</b>	



Heavys	0
Trucks	4
Cars	154
<b>Totals</b>	<b>158</b>

East Leg Total: 211  
 East Entering: 116  
 East Peds: 2  
 Peds Cross:  $\times$

Heavys	0
Trucks	0
Cars	56
<b>Totals</b>	<b>56</b>



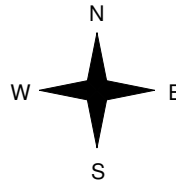
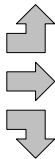
Sixth Concession Rd

Cars	16	1	0	17
Trucks	19	0	0	19
Heavys	79	1	0	80
<b>Totals</b>	<b>114</b>	<b>2</b>	<b>0</b>	



Holburn St

Heavys	0
Trucks	1
Cars	15
<b>Totals</b>	<b>16</b>
Heavys	0
Trucks	1
Cars	9
<b>Totals</b>	<b>10</b>
Heavys	0
Trucks	0
Cars	19
<b>Totals</b>	<b>19</b>
Heavys	0
Trucks	2
Cars	43
<b>Totals</b>	<b>43</b>



Sixth Concession Rd



Cars	93	1	1	95
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Cars

Trucks

Heavys

Totals

93

1

1

95

Holburn St

Peds Cross:  $\times$   
 West Peds: 1  
 West Entering: 45  
 West Leg Total: 101

Cars	248	22	123	67	212
Trucks	3	0	2	0	2
Heavys	5	0	0	1	1
<b>Totals</b>	<b>256</b>	<b>22</b>	<b>125</b>	<b>68</b>	



Peds Cross:  $\times$   
 South Peds: 0  
 South Entering: 215  
 South Leg Total: 471

## Comments

# Sixth Concession Rd @ Holburn St

## Afternoon Peak Diagram

### Specified Period

**From:** 15:00:00

**To:** 18:00:00

### One Hour Peak

**From:** 17:00:00

**To:** 18:00:00

**Municipality:** Windsor  
**Site #:** 000000001  
**Intersection:** Sixth Concession Rd & Holburn St  
**TFR File #:** 1  
**Count date:** 26-Jul-2022

**Weather conditions:**  
 Cloudy/Dry  
**Person(s) who counted:**  
 Matt

**\*\* Non-Signalized Intersection \*\***

**Major Road:** Sixth Concession Rd runs N/S

North Leg Total: 440  
 North Entering: 246  
 North Peds: 5  
 Peds Cross:  $\times$

Heavys	0	0	0	0	0
Trucks	0	0	0	0	0
Cars	23	190	33		246
<b>Totals</b>	<b>23</b>	<b>190</b>	<b>33</b>		



Heavys	0
Trucks	1
Cars	193
<b>Totals</b>	<b>194</b>

East Leg Total: 333  
 East Entering: 155  
 East Peds: 1  
 Peds Cross:  $\times$

Heavys	0	0	87	87
Trucks	0	0		
Cars				

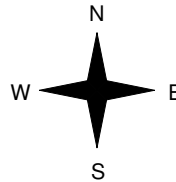


Holburn St

Heavys	0	0	27	27
Trucks	0	0	16	16
Cars	0	0	25	25
<b>Totals</b>	<b>0</b>	<b>0</b>	<b>68</b>	



Sixth Concession Rd



Cars	22	0	0	22
Trucks	0	0	0	0
Heavys	0	0	0	0
<b>Totals</b>	<b>22</b>	<b>0</b>	<b>0</b>	
Cars	21	0	0	21
Trucks	0	0	0	0
Heavys	0	0	0	0
<b>Totals</b>	<b>110</b>	<b>2</b>	<b>0</b>	<b>112</b>
<b>Totals</b>	<b>153</b>	<b>2</b>	<b>0</b>	

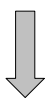
Holburn St



Cars	177	0	1	178
Trucks	0	0	0	0
Heavys	0	0	1	1
<b>Totals</b>	<b>177</b>	<b>0</b>	<b>1</b>	<b>178</b>

Peds Cross:  $\times$   
 West Peds: 2  
 West Entering: 68  
 West Leg Total: 155

Cars	325	Cars	43	144	128	315
Trucks	2	Trucks	0	1	0	1
Heavys	0	Heavys	0	0	1	1
<b>Totals</b>	<b>327</b>	<b>Totals</b>	<b>43</b>	<b>145</b>	<b>129</b>	



Peds Cross:  $\times$   
 South Peds: 5  
 South Entering: 317  
 South Leg Total: 644

## Comments

# Sixth Concession Rd @ Holburn St

## Total Count Diagram

**Municipality:** Windsor  
**Site #:** 000000001  
**Intersection:** Sixth Concession Rd & Holburn St  
**TFR File #:** 1  
**Count date:** 26-Jul-2022

**Weather conditions:**  
 Cloudy/Dry  
**Person(s) who counted:**  
 Matt

**\*\* Non-Signalized Intersection \*\***

**Major Road:** Sixth Concession Rd runs N/S

North Leg Total: 2657  
 North Entering: 1356  
 North Peds: 19  
 Peds Cross:  $\times$

Heavys	0	7	1	8
Trucks	3	11	0	14
Cars	146	1027	161	1334
Totals	149	1045	162	



Heavys	6
Trucks	19
Cars	1276
Totals	1301

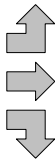
East Leg Total: 1805  
 East Entering: 986  
 East Peds: 8  
 Peds Cross:  $\times$

Heavys	Trucks	Cars	Totals
1	8	448	457

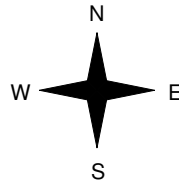


Holburn St

Heavys	Trucks	Cars	Totals
1	2	147	150
0	3	83	86
0	1	186	187
1	6	416	



Sixth Concession Rd



Cars	Trucks	Heavys	Totals
146	2	1	149
113	4	0	117
714	5	1	720
973	11	2	

Holburn St



Cars	Trucks	Heavys	Totals
804	3	12	819

Peds Cross:  $\times$   
 West Peds: 4  
 West Entering: 423  
 West Leg Total: 880

Cars	1927	Cars	189	983	560	1732
Trucks	17	Trucks	1	15	0	16
Heavys	8	Heavys	1	4	11	16
Totals	1952	Totals	191	1002	571	



Peds Cross:  $\times$   
 South Peds: 20  
 South Entering: 1764  
 South Leg Total: 3716

### Comments