# Environmental Noise Feasibility Study

# 591 Liverpool Road

## Proposed Mixed-use Development

City of Pickering

March 27, 2019
Project: 116-0519

Prepared for

## Pickering Harbour Company Limited


Prepared by

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VALCOUSTICS Canada Ltd.

# Version History

| Version # | Date | Comments |
|---|---|---|
| 1.0 | March 27, 2019 | Issued to Client |
| | | |

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# Environmental Noise Feasibility Study

# 591 Liverpool Road

## Proposed Mixed-use Development

City of Pickering

## EXECUTIVE SUMMARY

Valcoustics Canada Ltd. (VCL) was retained by Pickering Harbour Company Limited to prepare an Environmental Noise Feasibility Study addressing the potential noise impact from the existing environment onto the proposed residential development. The development will consist of two 23-storey buildings with ground-floor commercial spaces and residential suites above. The buildings will be separated by a pedestrian promenade.

The significant transportation noise source in the vicinity is road traffic on Liverpool Road. The significant stationary noise source in the vicinity is the Liverpool Road Pumping Station. Note, there is a wind turbine at Pickering Nuclear Generating Station which is located approximately 450 m from the proposed development. This wind turbine has been included in the assessment.

The sound levels on site have been determined and compared with the applicable Ministry of the Environment, Conservation and Parks (MECP) noise guideline limits to determine the need for noise mitigation.

To meet the applicable transportation noise source guideline limits:

- there are no ventilation requirements for noise control purposes;
- the applicable indoor noise guidelines at all dwelling units are predicted to be met without any special wall and window upgrades beyond the minimum non-acoustical requirements stated in the Ontario Building Code (OBC); and
- sound barriers are not required for traffic noise control purposes.

The sound levels from the emergency generator at the pumping station are predicted to meet the stationary noise source guideline limits. Thus, additional mitigation measures are not required for the pumping station.

The sound levels from the wind turbine are predicted to meet the applicable MECP noise guideline limits. Thus, noise mitigation measures are not required for the wind turbine.

# 1.0 INTRODUCTION

VCL was retained to prepare an Environmental Noise Feasibility Study for the proposed residential development in support of the submission to the City of Pickering. The potential sound levels due to the nearby road traffic noise source, stationary noise source and the wind turbine have been predicted on the site and compared to the applicable MECP noise guideline limits. Where sound level excesses above these guideline limits occur, noise mitigation measures have been recommended.

## 1.1 SITE LOCATION AND SURROUNDING AREA

The site is located at the foot of Liverpool Road in the City of Pickering. The site is bounded by:

- the existing Liverpool Road pumping station and existing low-rise mixed-use development to the north;
- natural lands, with the Pickering Nuclear Generating Station beyond, to the east;
- Liverpool Road, with an existing commercial development, parking lot and dock to the west; and
- an existing park and Lake Ontario to the south.

A Key Plan is shown as Figure 1. This report is based on the Concept Plan prepared by The Biglieri Group, dated March 22, 2019. Figure 2 shows the site plan in reduced form.

## 1.2 THE PROPOSED DEVELOPMENT

The proposed development consists of two 23-storey buildings (Buildings 1 and 2) separated by a pedestrian promenade. The buildings will have commercial uses on the ground floor and residential suites above. Common outdoor amenity space will be provided at the elevated courtyard at Building 1.

# 2.0 NOISE SOURCES

## 2.1 TRANSPORTATION NOISE SOURCES

The primary transportation noise source with potential to impact the site is road traffic on Liverpool Road. Traffic volumes on other surrounding roadways are anticipated to be minor are not anticipated to have a significant noise impact at the site. Thus, the surrounding roadways have not been considered further in this assessment.

Current (year 2015) hourly counts for Liverpool Road were obtained from the City of Pickering. Future (year 2029) volumes were obtained by escalating the current volume at a growth rate of 2%, compounded annually. Vehicle classifications were included in the counts. Based on these classifications, medium and heavy trucks were calculated to be 1.7% and 0.9%, respectively, of the total traffic volume. A day/night split of 95%/5% was calculated from the counts.

The road traffic data is summarized in Table 1. Correspondence is included as Appendix A.

### 2.2 STATIONARY NOISE SOURCES

The Liverpool Road Pumping Station is located to the north of the subject site. It is understood that the pumping station is currently in the process of being upgraded. The main noise source at the upgraded pumping station will be the emergency generator.

The Pickering Nuclear Generating Station is located approximately 700 m to the east of the subject site. Based on observations during several visits to the site, noise from this facility is not discernible from the background ambient sound in the area. Therefore noise from the Pickering Nuclear Generating Station is expected to comply with the applicable MECP noise guidelines and has not been considered further.

There is an existing restaurant to the west of the site, on the west side of Liverpool Road. The main noise sources at the restaurant are anticipated to be the rooftop mechanical units. The mechanical units are located in the vicinity of the rooftop patio. There are existing residential uses at a similar setback distance as those from the subject site to the restaurant. As a result, the rooftop units are not expected have a significant noise impact at the subject site and have not been considered further in the assessment. This was confirmed due the site visit on July 6, 2017.

### 2.3 WIND TURBINE

The existing wind turbine on the Pickering Nuclear Generating Station lands is located approximately 450 m to the east of the subject site. It is understood that the turbine is a Vestas model V80-1.8MW. The noise impact of the turbine onto the subject site has been included in the assessment.

## 3.0 ENVIRONMENTAL NOISE GUIDELINES

### 3.1 TRANSPORTATION AND STATIONARY NOISE SOURCES

The applicable noise guidelines for new residential development are those in MECP Publication NPC-300, *"Environmental Noise Guideline, Stationary and Transportation Sources - Approval and Planning"*.

The environmental noise guidelines of the MECP, as provided in Publication NPC-300, are discussed briefly below and summarized in Appendix B.

#### 3.1.1 TRANSPORTATION NOISE SOURCES

3.1.1.1 Architectural Elements

In the daytime (0700 to 2300), the indoor criterion for road noise is $L_{eq\ Day}$ of 45 dBA for sensitive spaces such as living/dining rooms, dens and bedrooms. At night, the indoor criterion for road noise is $L_{eq\ Night}$ of 45 dBA for sensitive spaces such as living/dining rooms and dens and 40 dBA for bedrooms.

The architectural design of the building envelope (walls, windows, etc.) must provide adequate sound isolation to achieve these indoor sound level limits, based on the applicable outdoor sound level on the facades.

3.1.1.2 Ventilation

In accordance with the MECP noise guideline for road traffic sources, if the daytime sound level, $L_{eq\ Day}$, at the exterior face of a noise sensitive window is greater than 65 dBA, means must be provided so that windows can be kept closed for noise control purposes and central air conditioning is required. For daytime sound levels between 56 dBA and 65 dBA inclusive, there need only be the provision for adding air conditioning at a later date. A warning clause advising the occupant of the potential interference with some activities is also required. At nighttime, air conditioning would be required when the sound level exceeds 60 dBA ($L_{eq\ Night}$) at a noise sensitive window (provision for adding air conditioning is required when greater than 50 dBA).

3.1.1.3 Outdoors

For outdoor amenity areas ("Outdoor Living Areas" - OLA's), the guideline is $L_{eq\ Day}$ (0700 to 2300 hours) of 55 dBA, with an excess not exceeding 5 dBA considered acceptable if it is technically not practicable to achieve the 55 dBA objective, providing warning clauses are registered on title. Note, a balcony is not considered an OLA unless it is the only OLA for the occupant and is:

- at least 4 m in depth; and
- unenclosed.

### 3.1.2 STATIONARY NOISE SOURCES

Stationary sources are treated differently by the MECP guideline than transportation sources of noise such as road traffic and railways. Stationary source noise criteria used for noise impact assessment are dependent on the type of area and the ambient sound environment. The site and area are Class 1 - Urban; i.e., an area where the ambient sound environment is dominated by "urban hum", primarily traffic noise. This is due to the proximity to the area road network.

3.1.2.1 Sound Level Criteria

MECP Publication NPC-300 states that the guideline limits shall be defined by the higher of the ambient sound level, due to road traffic noise, or the minimum exclusion limits for a Class 1 area of 50 dBA daytime (0700 to 1900 hours), 50 dBA evening (1900 to 2300 hours) and 45 dBA nighttime (2300 to 0700 hours). The limits apply at a noise sensitive plane of window (at all times) or at an outdoor point of reception in the daytime and evening only. There are no sound level limits for outdoor points of reception at night.

For emergency equipment, such as the generator, the sound level limits do not apply during actual emergency operations. The sound level limits only apply during the routine testing, which is typically done in the daytime only, once a month for an hour or less. During this testing, the noise guideline limits applicable to the emergency equipment are 5 dBA higher than those stated above. In addition, NPC-300 indicates that the noise emissions from the emergency equipment are to be assessed separately from all other equipment.

The MECP requires a "worst case" one-hour operating scenario be analysed. This would typically occur when the background ambient sound level is at a minimum and the noise generated from the stationary noise sources is at a maximum.

The guideline limits apply to habitable spaces such as living/dining/family rooms and sleep areas. No indoor sound level guidelines are provided for stationary sources.

3.1.2.2 Applicable Guideline Limits

For this assessment, the minimum exclusion limits have been taken to apply at all assessment locations.

## 3.2 WIND TURBINES

The applicable environmental noise guidelines are found in the MECP Publication, *"Noise guidelines for wind farms",* PIBS 9900e, last revised May 2016. The wind turbine sound level limits for wind turbines are given at integer values of the wind speed. The sound level limits, expressed in terms of the hourly, "A-weighted," equivalent sound level ($L_{eq}$), apply at the point(s) of reception.

### 3.2.1 Applicable Guideline Limits

In Class 3 areas, these sound level limits range from the lowest value of 40 dBA for wind speeds at or below 6 m/s to the maximum value of 51 dBA for wind speeds at or above 10 m/s. In Class 1 Areas, these sound level limits range from the lowest value of 45 dBA for wind speeds at or below 8 m/s to the maximum value of 51 dBA for wind speeds at or above 10 m/s.

Table 4 summarizes these limits and are taken from the MECP Publication, *"Noise guidelines for wind farms"*.

If the wind facility is located in Class 3 (Rural) and only operates during daytime or it impacts sensitive areas which are only used in the daytime (such as schools, daycares, etc.), then the Class 1 & 2 (Urban) noise limits are applicable at that noise receptor.

In cases where the noise impact at a point of reception is comprised of a transformer substation(s) as well as wind turbine generator(s), the combined noise impact (i.e. from significant noise sources associated with a proposed wind facility) must comply with the sound level limits in Table 4 at all the wind speeds from 0 m/s to 10 m/s.

In determining the combined noise impact, a 5 dB tonal penalty adjustment must be added to the transformer substation(s) noise.

Note, the wind speeds used in the MECP wind turbine noise criteria are at 10 m above ground.

For Class 2 and 3 Areas, the assessment of wind turbines must use ground factor values not exceeding the following:

Gs = 1.0
Gm = 0.8
Gr = 0.5

Where: Gs is the ground factor for the source region,
Gm is the ground factor for the middle region, and
Gr is the ground factor for the receiver region.

Alternatively, a global ground factor value not exceeding 0.7 may be used.

# 4.0 NOISE IMPACT ASSESSMENT – TRANSPORTATION NOISE SOURCES

## 4.1 ASSESSMENT

Using the road traffic data in Table 1, the sound levels, in terms of $L_{eq\ Day}$ and $L_{eq\ Night}$, were determined using STAMSON V5.04 - ORNAMENT, the computerized road traffic noise prediction model of the MECP.

The daytime and nighttime sound levels at the building facades were calculated at the 3rd, 6th and 23rd storeys at Building 1 and the 3rd, 5th and 23rd storeys at Building 2, to represent the varying setback distances from Liverpool Road. The assessment locations are marked on Figure 2.

The outdoor amenity area at Building 1 is located on the roof of the first floor, in the courtyard area at the centre of the building. The daytime OLA sound level at Building 1 was calculated in the centre of the outdoor amenity area, at a standing height of 1.5 m above the first floor roof.

The highest unmitigated daytime/nighttime sound levels of 54 dBA/45 dBA are predicted to occur at the west facades of Buildings 1 and 2, at the locations closest to Liverpool Road. The daytime OLA sound level at the common outdoor amenity area is predicted to be 33 dBA.

Table 2 summarizes the predicted sound levels outdoors at specific locations due to the transportation noise sources.

Appendix D contains a sample sound level calculation.

## 4.2 NOISE ABATEMENT REQUIREMENTS

The noise control measures can generally be classified into two categories which are interrelated, but which can be treated separately for the most part:

(a) architectural elements to achieve acceptable indoor noise guidelines for transportation sources; and

(b) design features to protect the OLA's.

Noise abatement requirements are summarized in Table 3 and the notes to Table 3.

### 4.2.1 Indoors

4.2.1.1 Architectural Requirements

The indoor noise guidelines can be achieved by using appropriate construction for exterior walls, windows and doors. In determining the worst case architectural requirements for the residential suites, exterior wall and window areas were assumed to be 20% and 80% of the associated floor area, respectively, on the facades of a corner room with both facades exposed directly or at an angle to the road traffic noise sources, for both living/dining areas and sleeping quarters.

For all residential dwellings in this development, exterior walls and windows meeting the minimum non-acoustical requirements of the OBC will be sufficient to achieve the indoor noise guideline criteria of the MECP.

4.2.1.2 Ventilation Requirements

Based on the predicted sound levels, there are no ventilation requirements for noise control purposes.

### 4.2.2 Outdoors

The unmitigated daytime OLA sound levels at the outdoor common amenity area is predicted to be with in the 55 dBA design objective. Thus, sound barriers are not required for noise control purposes.

Other than the common amenity area discussed above, it is understood that all terraces and balconies will be less than 4 m in depth. The terraces and balconies would therefore not be considered OLA's under the MECP guidelines and noise mitigation measures would not be required.

### 4.2.3 Warning Clauses

Warning clauses are a tool to inform prospective owners/occupants of potential annoyance due to existing noise sources. Where the guideline sound level limits are exceeded, appropriate warning clauses should be registered on title or included in the development agreement that is registered on title. The warning clauses should also be included in agreements of Offers of Purchase and Sale and lease/rental agreements to make future occupants aware of the potential noise situation. Locations requiring warning clauses and the appropriate wording are given in Table 3 and in the notes to Table 3, respectively.

## 5.0 NOISE IMPACT ASSESSMENT – STATIONARY NOISE SOURCES

To assess the noise impact of the pumping station and the wind turbine on the subject site, a 3-D acoustical model was developed using CadnaA Version v2018 MR1 environmental noise modelling software, which implements the methods of calculation described in ISO standard 9613.2 – "Acoustics- Attenuation During Propagation Outdoors".

Since the noise from the pumping station and the wind turbine as assessed against different MECP guidelines, the two sources were assessed separately. The results are outlined below.

As indicated in Section 3.1.2, The site and area are Class 1 - Urban; i.e., an area where the ambient sound environment is dominated by "urban hum", primarily traffic noise. This is due to the proximity to the area road network. Thus, the sound level limits for Class 1 Areas apply.

### 5.1 PUMPING STATION

### 5.1.1 Assessment Receptors

The worst case locations at each building were determined using the building evaluation feature in CadnaA, where the highest sound level at any storey, at multiple points on the facade is assessed. Based on the building evaluation assessment, the highest predicted sound level at each of the buildings was determined for each receptor in the assessment. To be conservative, hard ground (G=0) was used in the analysis.

The worst case locations are represented by receptors R01A and R02A. Both receptors were assessed at a height of 4.5 m above grade, representing a second-storey plane of window.

Figure 3 shows the locations of the assessment receptors.

### 5.1.2 Noise Sources

The main noise source at the Liverpool Road Pumping Station will be the emergency generator. It is understood that the new emergency generator will be an outdoor unit, located to the west of the existing pumping station building. Based on information provided by the Works Department at the Regional Municipality of Durham, the specific make and model has not yet been selected, but the generator will be designed to achieve 60 dBA at 7 m, and 50 dBA at the existing marina building on site (see Appendix D).

### 5.1.3 Operating Scenarios

As the generator is tested during daytime hours only (0700 to 1900), a single operating scenario corresponding to the daytime criterion period was assessed. In this scenario, the generator operates continuously for the full hour.

### 5.1.4 Unmitigated Sound Level Assessment

Figure 3 and Table 5 summarize the predicted unmitigated hourly sound levels for the above operating scenarios. As noted in the guideline section, the sound level limits for the emergency generator are 5 dBA higher than the applicable guide limits (the daytime minimum exclusion limit of 50 dBA in this case). Thus, the sound level limit at the exterior plane of windows at the proposed residential development is 55 dBA.

As shown on Figure 3, the sound levels at the proposed development are predicted to be below the 55 dBA sound level limit. Thus, noise mitigation measures are not required for the emergency generator.

## 5.2 WIND TURBINE ASSESSMENT

### 5.2.1 Assessment Receptors

Similar to the assessment for pumping station above, the worst case locations at each building were determined using the building evaluation feature in CadnaA, where the highest sound level at any storey, at multiple points on the facade is assessed. Again, to be conservative hard ground (G=0) was used in the analysis. Based on the building evaluation assessment, the highest predicted sound level at each of the buildings was determined for each receptor in the assessment.

The worst case locations are represented by the following receptor locations:

- R01B - representing the 23$^{rd}$ storey of Building 1, assessed at a height of 67.5 m above grade;
- R02B - representing the 6$^{th}$ storey of Building 1, assessed at a height of 16.5 m above grade;
- R03B - representing the 3$^{rd}$ storey of Building 1, assessed at a height of 7.5 m above grade;

- R04B - representing the 23rd storey of Building 2, assessed at a height of 67.5 m above grade; and
- R05B - representing the 3rd storey of Building 2, assessed at a height of 7.5 m above grade.

Figure 4 shows the receptor locations.

### 5.2.2 Noise Sources

The wind turbine on the Pickering Nuclear Generating Station lands is a Vestas model V80-1.8MW.

The technical specifications show that the sound level due to the wind turbine increases with wind speed, but levels off around 8 m/s. Since the noise guideline limits start to increase after 8 m/s, the noise impact was assessed at a wind speed of 8 m/s (when the sound level is near the maximum but the guideline limits are the lowest) to be conservative.

Based on the technical specifications, the wind turbine has a sound power level of 105.5 dBA at 8 m/s. The turbine was modelled a height of 80 m above grade.

Wind turbine technical specifications are contained in Appendix E.

### 5.2.3 Operating Scenarios

The wind turbine was assumed to be operational 100% of the time, during any of the daytime (0700 to 1900 hours), evening (1900 to 2300 hours) or nighttime (2300 to 0700 hours) time periods.

### 5.2.4 Unmitigated Sound Level Assessment

Figure 4 and Table 6 summarize the predicted unmitigated hourly sound levels due to the turbine.

As shown on Figure 4, the sound levels at the proposed development are predicted to be 42 dBA as the assessment receptors. This is below the lowest sound level limits of 45 dBA for wind turbine noise. Thus, noise mitigation measures are not required for the wind turbine.

## 6.0 THE EFFECT OF THE PROJECT ON THE NEIGHBOURHOOD

The main source of noise associated with this development, with the potential for significant impact on surrounding buildings, is the mechanical equipment.

Mechanical equipment interfacing to the outdoors must comply with the MECP noise guideline limits in NPC-300. By proper engineering design, all requirements can be met and no significant noise impact would be created for surrounding uses. Appropriate choice of location, equipment type, and noise control features should be considered during detailed design for such items as rooftop equipment and air intakes and exhausts, including underground parking garage ventilation systems. Any parking garage air shafts located immediately adjacent to residential uses, in addition to appropriate choice of fan type, may need special noise control treatment such as acoustically lining the shaft or providing silencers.

For any emergency generators, appropriate steps should be taken to ensure that the equipment placement, treatment, and the routine testing schedule will not generate adverse noise impact on neighbouring properties. The generator will require silencers on the intake and exhaust cooling air paths, as well as a muffler on the combustion exhaust.

## 7.0 CONCLUSIONS

Based on the predicted sound levels, the applicable MECP noise guidelines can be met without additional noise mitigation measures.

## 8.0 REFERENCES

1. PC STAMSON 5.04, “Computer Program for Road Traffic Noise Assessment”, Ontario Ministry of the Environment.

2. Building Practice Note No. 56: "Controlling Sound Transmission into Buildings", by J. D. Quirt, Division of Building Research, National Council of Canada, September 1985.

3. “Environmental Noise Guideline – Stationary and Transportation Sources, Approval and Planning”, Ontario Ministry of the Environment, Publication NPC-300, October 2013.

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J:\2016\1160519\000\Reports\591 Liverpool Road, Pickering - Noise v1_0 Fnl.docx

## TABLE 1: ROAD TRAFFIC DATA

| Roadway | 24-Hour Volume | % Trucks | | Day/Night (%) | Speed Limit (kph) |
|---|---|---|---|---|---|
| | | Medium | Heavy | | |
| Liverpool Road | 4 593 | 1.7 | 0.9 | 95/5 | 40 |

Note:

(1) Hourly counts for the year 2015 (shown in the table) were obtained from City of Pickering. Traffic volumes were projected to the year 2029 at a growth rate of 2%, compounded annually. Truck percentages and day/night split were calculated from the counts.

## TABLE 2: PREDICTED OUTDOOR SOUND LEVELS

| Location(1) | Source | Distance (m)(2) | $L_{eq\ Day}$ (dBA) | $L_{eq\ Night}$ (dBA) |
|---|---|---|---|---|
| Building 1 – 3rd floor (West Façade) | Liverpool Road | 22 | 54 | 45 |
| Building 1 – 6th floor (West Façade) | Liverpool Road | 52 | 51 | 41 |
| Building 1 – 23rd floor (West Façade) | Liverpool Road | 91 | 49 | 39 |
| Building 1 – Common Outdoor Amenity Area (OLA) | Liverpool Road | 77 | 33 | - |
| Building 2 – 3rd floor (West Façade) | Liverpool Road | 22 | 54 | 45 |
| Building 2 – 5th floor (West Façade) | Liverpool Road | 40 | 51 | 41 |
| Building 2 – 23rd floor (West Façade) | Liverpool Road | 66 | 51 | 41 |

Notes:

(1) See Figure 2. Sound levels at building facades were evaluated at the top storey outside plane of window. Sound levels at the OLA were evaluated at a standing height of 1.5 m above grade.

(2) Distance indicated is from the centreline of the noise source to indicated facade location.

## TABLE 3: NOISE ABATEMENT MEASURES

| Location | Air Conditioning(1) | Exterior Wall(2) | Window STC Rating(3) | Sound Barrier(4) | Warning Clauses(5) |
|---|---|---|---|---|---|
| All dwelling units | No special acoustical requirements | | | | A |

Notes:

(1) Air conditioning allows windows to remain closed for noise control purposes.

(2) STC - Sound Transmission Class Rating (Reference ASTM-E413). The STC ratings are based on assumed wall to associated indoor floor area. The final requirements should be confirmed when floor plans are available.

(3) STC - Sound Transmission Class Rating (Reference ASTM-E413). A sliding glass walkout door should be considered as a window and be included in the percentage of glazing. The STC ratings shown are based on assumed window to associated indoor floor area. The final requirements should be confirmed when floor plans are available.

(4) Sound barriers must be of solid construction with no gaps, cracks or holes and must have a minimum surface density of 20 kg/m$^2$. A variety of materials are available including wood, masonry, composites, plastics, earth berms, or a combination of materials.

(5) Warning clauses to be included in Occupancy Agreements:

A. "Purchasers/tenants are advised that due to the proximity of the adjacent pumping station, the wind turbine and the Pickering Nuclear Generating Station, sound levels from these facilities may at times be audible."

(6) Conventional ventilated attic roof construction meeting OBC requirements is satisfactory.

(7) All exterior doors shall be fully weatherstripped.

## TABLE 4: WIND TURBINE NOISE CRITERIA (ASSUMED 24-HOURS OPERATION)

| Wind Speed (m/sec) | <=6 | 7 | 8 | 9 | >=10 |
|---|---|---|---|---|---|
| Class 1 and 2 Areas [dBA] | 45 | 45 | 45 | 49 | 51 |
| Class 3 Areas [dBA] | 40 | 43 | 45 | 49 | 51 |

## TABLE 5: UNMITIGATED SOUND LEVELS DUE TO PUMPING STATION

| Receptor(1) | $L_{eq\ (1\ hr)}$ (dBA) for Indicated Hour(2) | |
|---|---|---|
| | Daytime (dBA) | Daytime Guideline Limit (dBA)(3) |
| R01A | 53 | 55 |
| R02A | 52 | 55 |

Notes:

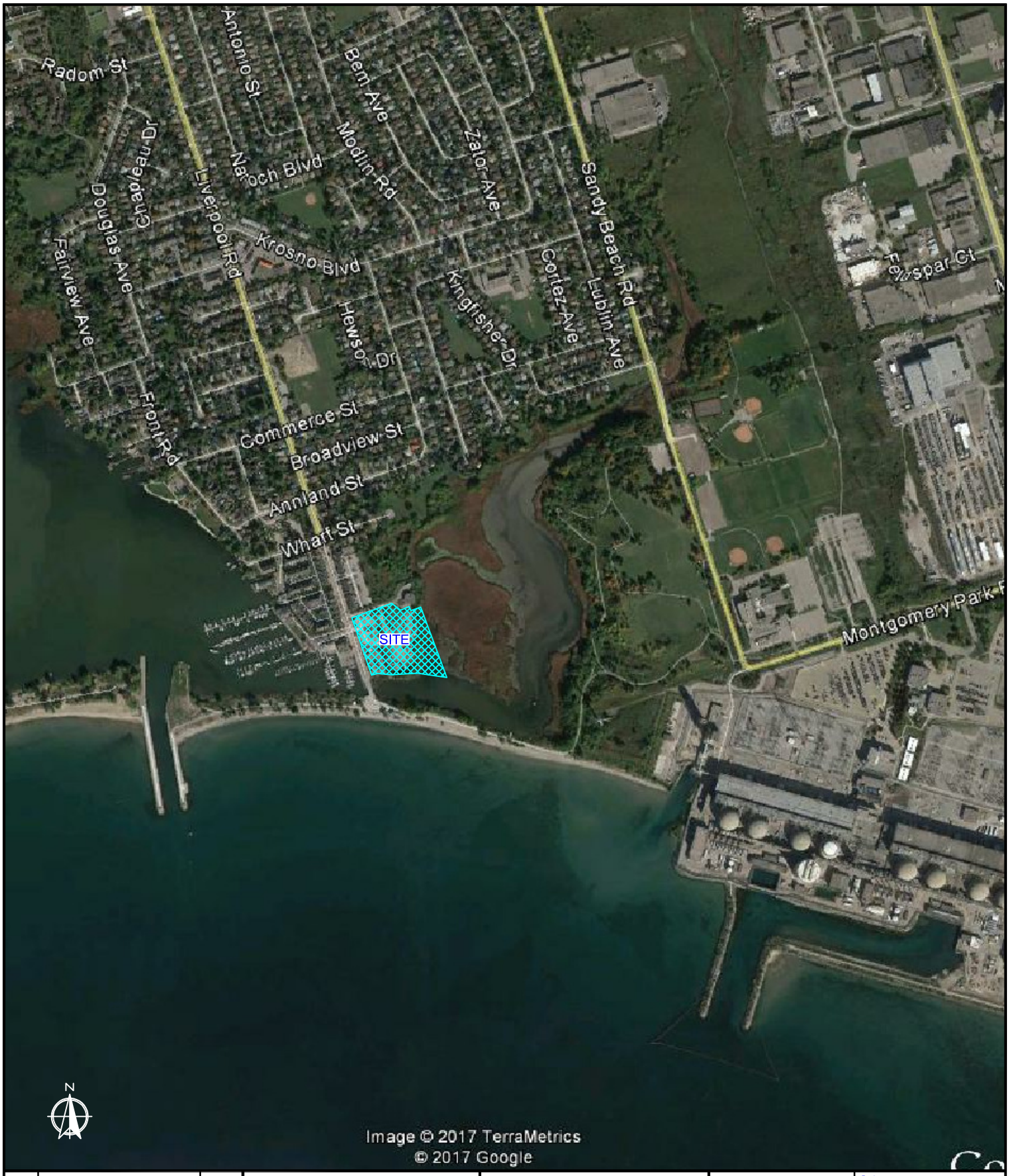
(1) See Figure 3.
(2) Daytime (0700-1900).
(3) MECP Class 1 exclusion limit.

## TABLE 6: UNMITIGATED SOUND LEVELS DUE TO WIND TURBINE

| Receptor(1) | $L_{eq\ (1\ hr)}$ (dBA) for Indicated Hour(2) | |
|---|---|---|
| | Daytime (dBA) | Daytime Guideline Limit (dBA)(3) |
| R01B | 42 | 45 |
| R02B | 42 | 45 |
| R03B | 42 | 45 |
| R04B | 42 | 45 |
| R05B | 42 | 45 |

Notes:

(1) See Figure 4.
(2) Daytime (0700-1900), evening (1900-2300) and nighttime (2300-0700).
(3) MECP Class 1 exclusion limit.




| No. | Revision/Issue | Date |
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| Title | Project No. | Date |
|---|---|---|
| Key Plan | 116-0519 | Mar. 26, 2019 |
| **Project Name** | **Scale** | **Figure** |
| 591 Liverpool Road, Pickering | N.T.S. | 1 |

LEGEND

Traffic noise assessment locations


BASE DRAWING BY THE BIGLIERI GROUP

| No. | Revision/Issue | Date |
|---|---|---|
| | | |


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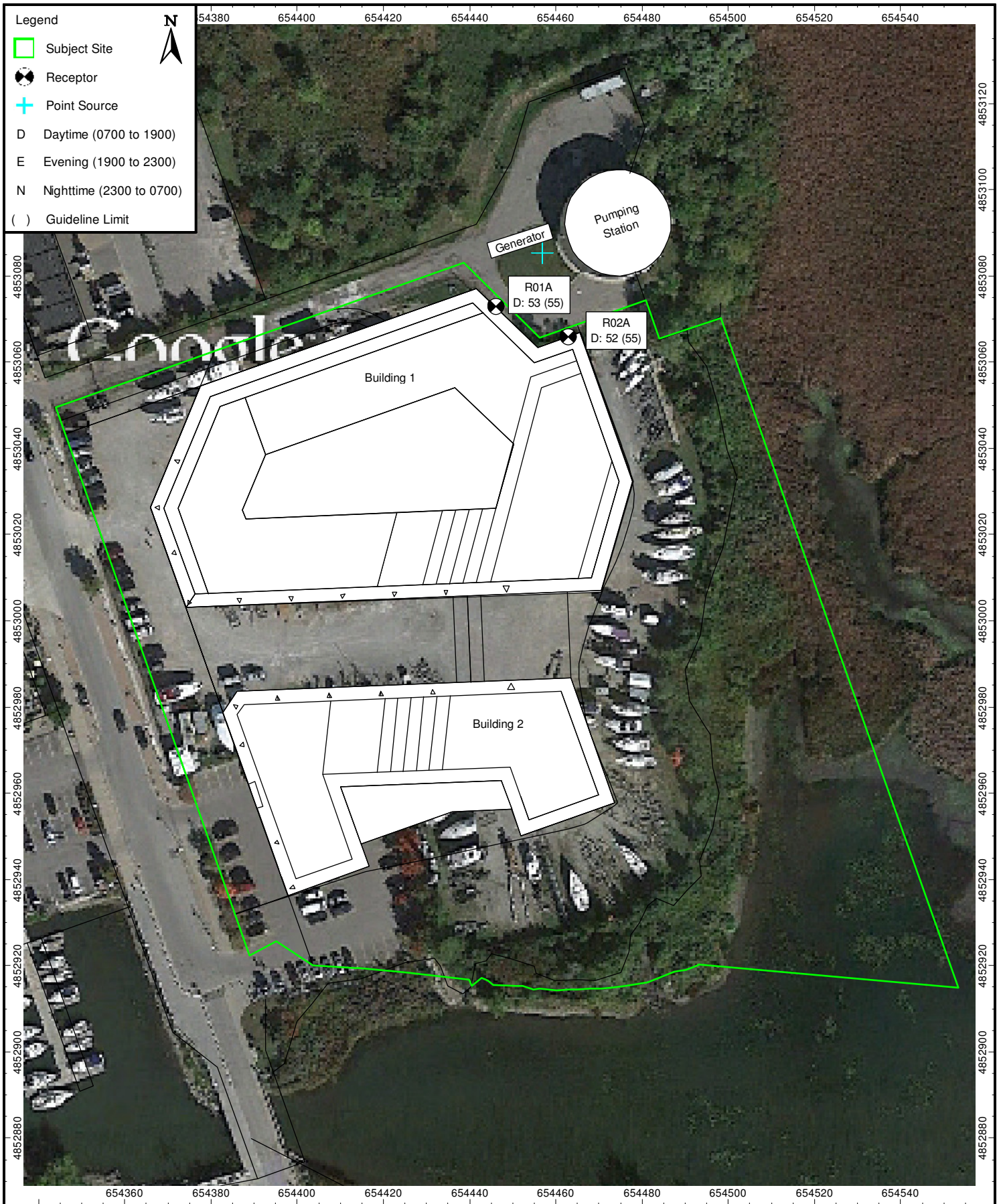
| Title | Project No. | Date |
|---|---|---|
| Site Plan | 116-0519 | Mar. 26, 2019 |
| **Project Name** | **Scale** | **Figure** |
| 591 Liverpool Road, Pickering | N.T.S. | 2 |

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| Title | Date | Figure |
|---|---|---|
| Hourly Sound Levels due to Pumping Station (dBA) | Mar. 26, 2019 | 3 |
| Project Name: 591 Liverpool Road, Pickering | Project No.: 116-0519 | |

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Date Plotted: 26.03.19


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| Title | Date | Figure |
|---|---|---|
| Hourly Sound Levels due to Wind Turbine (dBA) | Mar. 26, 2019 | 4 |
| Project Name: 591 Liverpool Road, Pickering | Project No.: 116-0519 | |

J:\2016\1160519\000\Analysis\Cadna\2019-02-04 Updated based on new site plan\2019-02-04 591 Liverpool Rd, Pickering - with increased wind turbine sound level.cna

Date Plotted: 28.03.19

# APPENDIX A
## ROAD TRAFFIC DATA

**Ontario Traffic, Inc.**
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 7
Station ID: T36
Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

NB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/18/15 | 0 | 40 | 6 | **1** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| 01:00 | 1 | 22 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 02:00 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 03:00 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 | 0 | 4 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 06:00 | 0 | 7 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 07:00 | 2 | 23 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| 08:00 | 1 | 42 | 13 | 0 | 1 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 |
| 09:00 | 3 | 58 | 9 | 0 | 0 | 1 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 72 |
| 10:00 | **8** | 82 | **16** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 107 |
| 11:00 | 0 | **118** | 15 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **134** |
| 12 PM | 4 | 129 | 26 | 0 | 1 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 162 |
| 13:00 | 9 | 141 | 17 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 170 |
| 14:00 | 7 | 151 | 27 | 0 | **3** | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 190 |
| 15:00 | **14** | 180 | 28 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 227 |
| 16:00 | 7 | 168 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 195 |
| 17:00 | 7 | 142 | 20 | **1** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 171 |
| 18:00 | 4 | 182 | **33** | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 222 |
| 19:00 | 6 | **213** | 22 | 0 | 1 | **4** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **247** |
| 20:00 | 4 | 204 | 26 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 237 |
| 21:00 | 3 | 171 | 28 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 206 |
| 22:00 | 4 | 110 | 13 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 |
| 23:00 | 3 | 79 | 14 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 97 |
| Day Total | 87 | 2275 | 345 | 2 | 27 | 14 | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 2757 |
| Percent | 3.2% | 82.5% | 12.5% | 0.1% | 1.0% | 0.5% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 10:00 | 11:00 | 10:00 | 00:00 | 07:00 | 08:00 | | 09:00 | | | | | | 11:00 |
| Vol. | 8 | 118 | 16 | 1 | 2 | 1 | | 1 | | | | | | 134 |
| PM Peak | 15:00 | 19:00 | 18:00 | 17:00 | 14:00 | 19:00 | | 12:00 | | | 20:00 | | | 19:00 |
| Vol. | 14 | 213 | 33 | 1 | 3 | 4 | | 2 | | | 1 | | | 247 |

**Ontario Traffic, Inc.**
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 7
Station ID: T36
Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

NB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/19/15 | 1 | 49 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 |
| 01:00 | 0 | 34 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| 02:00 | 0 | 17 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| 03:00 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 04:00 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 05:00 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 7 |
| 06:00 | 0 | 9 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 07:00 | 0 | 21 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| 08:00 | 2 | 32 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| 09:00 | 1 | 54 | 18 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 75 |
| 10:00 | **4** | 75 | 13 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 94 |
| 11:00 | 4 | **113** | **25** | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **146** |
| 12 PM | 2 | 157 | 15 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 177 |
| 13:00 | 11 | 166 | 32 | 0 | 2 | 2 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 214 |
| 14:00 | 7 | 183 | 17 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 211 |
| 15:00 | **13** | 176 | 15 | 0 | 2 | 2 | 0 | 1 | **1** | **1** | 0 | 0 | 0 | 211 |
| 16:00 | 3 | **254** | 37 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **296** |
| 17:00 | 2 | 106 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 |
| 18:00 | 7 | 156 | 26 | 0 | 2 | **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 194 |
| 19:00 | 2 | 182 | 23 | **1** | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 214 |
| 20:00 | 3 | 204 | **38** | 0 | **5** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 251 |
| 21:00 | 2 | 74 | 11 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 88 |
| 22:00 | 0 | 52 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 |
| 23:00 | 0 | 37 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| Day Total | 64 | 2168 | 324 | 1 | 24 | 17 | 0 | 6 | 1 | 1 | 0 | 0 | 0 | 2606 |
| Percent | 2.5% | 83.2% | 12.4% | 0.0% | 0.9% | 0.7% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 10:00 | 11:00 | 11:00 | | 09:00 | 10:00 | | 05:00 | | | | | | 11:00 |
| Vol. | 4 | 113 | 25 | | 2 | 2 | | 2 | | | | | | 146 |
| PM Peak | 15:00 | 16:00 | 20:00 | 19:00 | 20:00 | 18:00 | | 13:00 | 15:00 | 15:00 | | | | 16:00 |
| Vol. | 13 | 254 | 38 | 1 | 5 | 3 | | 1 | 1 | 1 | | | | 296 |

**Ontario Traffic, Inc.**
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Station ID: T36
Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

NB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/20/15 | 0 | 13 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 01:00 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 02:00 | 0 | 9 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 03:00 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 04:00 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:00 | 0 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 06:00 | 0 | 7 | 6 | 0 | 3 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 17 |
| 07:00 | 0 | 16 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| 08:00 | 0 | 36 | 9 | 0 | 1 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 48 |
| 09:00 | 0 | 48 | 9 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 |
| 10:00 | 0 | 56 | 12 | **1** | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 73 |
| 11:00 | **3** | **80** | **13** | 0 | **8** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **104** |
| 12 PM | 0 | 103 | 22 | **1** | **6** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 133 |
| 13:00 | 1 | 115 | 16 | 1 | 4 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 138 |
| 14:00 | 6 | 130 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 156 |
| 15:00 | 6 | 127 | 19 | 0 | 3 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 157 |
| 16:00 | 3 | 115 | 25 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 |
| 17:00 | **10** | 124 | 16 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 154 |
| 18:00 | 1 | 113 | 13 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 |
| 19:00 | 3 | 132 | 24 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 164 |
| 20:00 | 8 | **209** | **29** | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **249** |
| 21:00 | 3 | 136 | 20 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 160 |
| 22:00 | 0 | 65 | 13 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 79 |
| 23:00 | 0 | 29 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| Day Total | 44 | 1688 | 278 | 3 | 46 | 10 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 2073 |
| Percent | 2.1% | 81.4% | 13.4% | 0.1% | 2.2% | 0.5% | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 11:00 | 11:00 | 11:00 | 10:00 | 11:00 | 08:00 | | 08:00 | 06:00 | | | | | 11:00 |
| Vol. | 3 | 80 | 13 | 1 | 8 | 1 | | 1 | 1 | | | | | 104 |
| PM Peak | 17:00 | 20:00 | 20:00 | 12:00 | 12:00 | 15:00 | | 13:00 | | | | | | 20:00 |
| Vol. | 10 | 209 | 29 | 1 | 6 | 2 | | 1 | | | | | | 249 |

**Ontario Traffic, Inc.**
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Date Start: 18-Jul-15
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/21/15 | 0 | 20 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| 01:00 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 02:00 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 03:00 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:00 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 05:00 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 06:00 | 1 | 7 | 8 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| 07:00 | 1 | 13 | 6 | 0 | 2 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| 08:00 | 1 | 36 | 10 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| 09:00 | 1 | 51 | 11 | **1** | **6** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 71 |
| 10:00 | 1 | 69 | 16 | 0 | 6 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 94 |
| 11:00 | **2** | **79** | **23** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **106** |
| 12 PM | 3 | 103 | 26 | 0 | **6** | **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 141 |
| 13:00 | 5 | 122 | **41** | **1** | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 172 |
| 14:00 | 6 | 135 | 27 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 174 |
| 15:00 | 4 | 128 | 30 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 165 |
| 16:00 | 4 | 124 | 17 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 149 |
| 17:00 | 5 | 115 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 140 |
| 18:00 | 4 | 180 | 29 | 0 | 1 | 1 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 216 |
| 19:00 | **7** | **196** | 28 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **234** |
| 20:00 | 7 | 195 | 25 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 230 |
| 21:00 | 3 | 119 | 18 | 0 | 3 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 144 |
| 22:00 | 3 | 68 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 83 |
| 23:00 | 3 | 28 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 39 |
| Day Total | 62 | 1807 | 361 | 3 | 42 | 14 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 2294 |
| Percent | 2.7% | 78.8% | 15.7% | 0.1% | 1.8% | 0.6% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 11:00 | 11:00 | 11:00 | 09:00 | 09:00 | 07:00 | | 10:00 | | | | | | 11:00 |
| Vol. | 2 | 79 | 23 | 1 | 6 | 1 | | 2 | | | | | | 106 |
| PM Peak | 19:00 | 19:00 | 13:00 | 13:00 | 12:00 | 12:00 | | 18:00 | | 21:00 | | | | 19:00 |
| Vol. | 7 | 196 | 41 | 1 | 6 | 3 | | 1 | | 1 | | | | 234 |

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Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

NB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/22/15 | **2** | 19 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 01:00 | 0 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 02:00 | 0 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 03:00 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 | 0 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 06:00 | 1 | 8 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| 07:00 | 0 | 19 | 2 | 0 | 2 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 24 |
| 08:00 | 0 | 47 | 6 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55 |
| 09:00 | 0 | 44 | 13 | 0 | 2 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 |
| 10:00 | 0 | 44 | 12 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 |
| 11:00 | 1 | **97** | **23** | 0 | **7** | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | **129** |
| 12 PM | 3 | 108 | 10 | 0 | 4 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 127 |
| 13:00 | 2 | 136 | 31 | 0 | **5** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175 |
| 14:00 | 1 | 151 | 28 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 184 |
| 15:00 | 2 | 137 | 18 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 160 |
| 16:00 | 2 | 126 | 22 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 156 |
| 17:00 | **7** | 115 | 18 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 142 |
| 18:00 | 4 | 137 | **33** | 0 | 4 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 180 |
| 19:00 | 3 | 131 | 19 | 0 | 1 | **3** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 159 |
| 20:00 | 4 | **186** | 29 | 0 | 0 | 3 | 0 | **3** | 0 | 0 | 0 | 0 | 0 | **225** |
| 21:00 | 5 | 118 | 18 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 143 |
| 22:00 | 1 | 61 | 9 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 74 |
| 23:00 | 0 | 44 | 4 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| Day Total | 38 | 1745 | 311 | 0 | 44 | 14 | 0 | 13 | 2 | 0 | 0 | 0 | 0 | 2167 |
| Percent | 1.8% | 80.5% | 14.4% | 0.0% | 2.0% | 0.6% | 0.0% | 0.6% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 00:00 | 11:00 | 11:00 | | 11:00 | 09:00 | | | 07:00 | | | | | 11:00 |
| Vol. | 2 | 97 | 23 | | 7 | 1 | | | 1 | | | | | 129 |
| PM Peak | 17:00 | 20:00 | 18:00 | | 13:00 | 19:00 | | 20:00 | | | | | | 20:00 |
| Vol. | 7 | 186 | 33 | | 5 | 3 | | 3 | | | | | | 225 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/23/15 | 0 | 30 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| 01:00 | 0 | 21 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| 02:00 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 03:00 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:00 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 06:00 | 0 | 22 | 3 | 0 | 3 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 07:00 | 0 | 20 | 7 | **1** | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 29 |
| 08:00 | 0 | 39 | 7 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| 09:00 | 1 | 42 | 9 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 |
| 10:00 | 1 | 70 | 12 | 0 | **7** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 91 |
| 11:00 | **2** | **90** | **18** | 0 | 4 | 0 | 0 | 1 | 0 | **1** | 0 | 0 | 0 | **116** |
| 12 PM | 3 | 137 | 22 | 0 | **3** | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 168 |
| 13:00 | 3 | 131 | 22 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 159 |
| 14:00 | 7 | 120 | 21 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150 |
| 15:00 | 3 | 112 | 20 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 |
| 16:00 | 1 | 124 | 14 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 143 |
| 17:00 | 2 | 125 | 19 | 0 | 3 | 3 | 0 | **3** | 0 | 0 | 0 | 0 | 0 | 155 |
| 18:00 | **9** | 173 | 17 | 0 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 204 |
| 19:00 | 9 | **246** | 16 | 0 | 2 | **6** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **281** |
| 20:00 | 6 | 229 | **25** | 0 | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 266 |
| 21:00 | 8 | 218 | 21 | 0 | 1 | 1 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 250 |
| 22:00 | 2 | 56 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 71 |
| 23:00 | 0 | 39 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 |
| Day Total | 57 | 2055 | 276 | 1 | 39 | 23 | 0 | 11 | 2 | 1 | 0 | 0 | 0 | 2465 |
| Percent | 2.3% | 83.4% | 11.2% | 0.0% | 1.6% | 0.9% | 0.0% | 0.4% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 11:00 | 11:00 | 11:00 | 07:00 | 10:00 | 06:00 | | 10:00 | 07:00 | 11:00 | | | | 11:00 |
| Vol. | 2 | 90 | 18 | 1 | 7 | 1 | | 1 | 1 | 1 | | | | 116 |
| PM Peak | 18:00 | 19:00 | 20:00 | | 12:00 | 19:00 | | 17:00 | 21:00 | | | | | 19:00 |
| Vol. | 9 | 246 | 25 | | 3 | 6 | | 3 | 1 | | | | | 281 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/24/15 | 1 | 28 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| 01:00 | 0 | 13 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| 02:00 | **3** | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| 03:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:00 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:00 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 06:00 | 0 | 10 | 7 | 0 | **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 07:00 | 0 | 28 | 7 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 |
| 08:00 | 0 | 42 | 4 | **1** | 1 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 |
| 09:00 | 0 | 45 | 7 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55 |
| 10:00 | 2 | 65 | **18** | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 88 |
| 11:00 | 2 | **91** | 14 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **110** |
| 12 PM | 8 | 140 | 25 | 0 | 5 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 181 |
| 13:00 | 1 | 132 | **26** | 0 | **6** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 165 |
| 14:00 | 2 | 120 | 16 | **2** | 3 | **4** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 148 |
| 15:00 | 3 | 108 | 18 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 133 |
| 16:00 | 4 | 115 | 18 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 139 |
| 17:00 | 2 | 93 | 14 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 111 |
| 18:00 | 8 | 103 | 18 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 |
| 19:00 | **9** | **190** | 25 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **227** |
| 20:00 | 7 | 167 | 21 | 0 | 4 | 1 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 202 |
| 21:00 | 3 | 156 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 178 |
| 22:00 | 5 | 99 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 113 |
| 23:00 | 2 | 75 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 83 |
| Day Total | 62 | 1837 | 276 | 6 | 40 | 10 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 2237 |
| Percent | 2.8% | 82.1% | 12.3% | 0.3% | 1.8% | 0.4% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 02:00 | 11:00 | 10:00 | 08:00 | 06:00 | 08:00 | | | | | | | | 11:00 |
| Vol. | 3 | 91 | 18 | 1 | 3 | 1 | | | | | | | | 110 |
| PM Peak | 19:00 | 19:00 | 13:00 | 14:00 | 13:00 | 14:00 | | 20:00 | | | | | | 19:00 |
| Vol. | 9 | 190 | 26 | 2 | 6 | 4 | | 2 | | | | | | 227 |
| Grand Total | 414 | 13575 | 2171 | 16 | 262 | 102 | 0 | 49 | 6 | 3 | 1 | 0 | 0 | 16599 |
| Percent | 2.5% | 81.8% | 13.1% | 0.1% | 1.6% | 0.6% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |

**Ontario Traffic, Inc.**
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Site Code: 7
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Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/18/15 | 1 | 21 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| 01:00 | 0 | 10 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 02:00 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 03:00 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 | 0 | 8 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 06:00 | 1 | 20 | 6 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 28 |
| 07:00 | 1 | 34 | 4 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 |
| 08:00 | 0 | 72 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 79 |
| 09:00 | **7** | 87 | 5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 100 |
| 10:00 | 1 | 108 | **18** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 129 |
| 11:00 | 1 | **172** | 13 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **188** |
| 12 PM | 3 | 128 | 19 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 151 |
| 13:00 | 6 | 161 | 10 | 0 | 1 | **1** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 180 |
| 14:00 | **11** | 174 | 20 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 207 |
| 15:00 | 11 | 197 | **22** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 231 |
| 16:00 | 6 | 196 | 11 | 0 | **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 217 |
| 17:00 | 7 | 194 | 14 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 220 |
| 18:00 | 5 | 190 | 14 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 211 |
| 19:00 | 8 | **219** | 13 | **1** | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **243** |
| 20:00 | 7 | 174 | 8 | 0 | 3 | 1 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 195 |
| 21:00 | 5 | 109 | 10 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 129 |
| 22:00 | 5 | 87 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 95 |
| 23:00 | 1 | 43 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 |
| Day Total | 87 | 2412 | 208 | 2 | 30 | 4 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 2750 |
| Percent | 3.2% | 87.7% | 7.6% | 0.1% | 1.1% | 0.1% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 09:00 | 11:00 | 10:00 | | 07:00 | | | 06:00 | | | | | | 11:00 |
| Vol. | 7 | 172 | 18 | | 2 | | | 1 | | | | | | 188 |
| PM Peak | 14:00 | 19:00 | 15:00 | 19:00 | 16:00 | 13:00 | | 20:00 | | | | | | 19:00 |
| Vol. | 11 | 219 | 22 | 1 | 4 | 1 | | 2 | | | | | | 243 |

**Ontario Traffic, Inc.**
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Site Code: 7
Station ID: T36
Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/19/15 | 0 | 28 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 01:00 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| 02:00 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 03:00 | 0 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 04:00 | 0 | 5 | 3 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 9 |
| 05:00 | 0 | 8 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 11 |
| 06:00 | 0 | 17 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 07:00 | 2 | 31 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| 08:00 | 0 | 47 | 10 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 |
| 09:00 | 1 | 74 | 9 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 86 |
| 10:00 | 3 | 114 | 12 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 |
| 11:00 | **5** | **156** | **18** | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **180** |
| 12 PM | 7 | 185 | **17** | 0 | 3 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 213 |
| 13:00 | **10** | 199 | 17 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **231** |
| 14:00 | 6 | 176 | 10 | 0 | 1 | 1 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 195 |
| 15:00 | 4 | 195 | 17 | 0 | **4** | **4** | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 225 |
| 16:00 | 3 | 191 | 15 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 210 |
| 17:00 | 2 | 138 | 14 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 155 |
| 18:00 | 8 | 174 | 7 | 0 | 4 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 196 |
| 19:00 | 4 | **200** | 17 | 0 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 228 |
| 20:00 | 1 | 120 | 12 | 0 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 139 |
| 21:00 | 1 | 49 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 |
| 22:00 | 0 | 28 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 |
| 23:00 | 0 | 28 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| Day Total | 57 | 2193 | 205 | 0 | 26 | 17 | 0 | 6 | 4 | 0 | 0 | 0 | 0 | 2508 |
| Percent | 2.3% | 87.4% | 8.2% | 0.0% | 1.0% | 0.7% | 0.0% | 0.2% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 11:00 | 11:00 | 11:00 | | 08:00 | | | 04:00 | | | | | | 11:00 |
| Vol. | 5 | 156 | 18 | | 2 | | | 1 | | | | | | 180 |
| PM Peak | 13:00 | 19:00 | 12:00 | | 15:00 | 15:00 | | 12:00 | 14:00 | | | | | 13:00 |
| Vol. | 10 | 200 | 17 | | 4 | 4 | | 1 | 1 | | | | | 231 |

**Ontario Traffic, Inc.**
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Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
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SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/20/15 | 0 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 01:00 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 02:00 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 03:00 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 04:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 | 0 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 12 |
| 06:00 | 1 | 9 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 07:00 | 0 | 27 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| 08:00 | 0 | 56 | 6 | 0 | 3 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 66 |
| 09:00 | **4** | 78 | **11** | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 96 |
| 10:00 | 0 | **103** | 7 | 0 | **6** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | **117** |
| 11:00 | 3 | 97 | 7 | **1** | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 114 |
| 12 PM | 1 | 137 | 17 | 0 | **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 159 |
| 13:00 | 4 | 140 | 14 | **1** | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 163 |
| 14:00 | 4 | 106 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 |
| 15:00 | 7 | 121 | 11 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 142 |
| 16:00 | 1 | 123 | 6 | 1 | 3 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 136 |
| 17:00 | 5 | 118 | 16 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 141 |
| 18:00 | 2 | **178** | 9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **190** |
| 19:00 | 4 | 145 | **20** | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 172 |
| 20:00 | **8** | 143 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 164 |
| 21:00 | 1 | 68 | 8 | 0 | 2 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 80 |
| 22:00 | 1 | 42 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 |
| 23:00 | 0 | 20 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| Day Total | 46 | 1753 | 177 | 4 | 44 | 5 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2032 |
| Percent | 2.3% | 86.3% | 8.7% | 0.2% | 2.2% | 0.2% | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 09:00 | 10:00 | 09:00 | 11:00 | 10:00 | 08:00 | | 10:00 | 05:00 | | | | | 10:00 |
| Vol. | 4 | 103 | 11 | 1 | 6 | 1 | | 1 | 1 | | | | | 117 |
| PM Peak | 20:00 | 18:00 | 19:00 | 13:00 | 12:00 | 16:00 | | 21:00 | | | | | | 18:00 |
| Vol. | 8 | 178 | 20 | 1 | 4 | 2 | | 1 | | | | | | 190 |

**Ontario Traffic, Inc.**
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Station ID: T36
Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/21/15 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 01:00 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 02:00 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 03:00 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 04:00 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 05:00 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 06:00 | **2** | 10 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| 07:00 | 0 | 27 | 3 | 0 | 1 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| 08:00 | 1 | 64 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72 |
| 09:00 | 2 | 112 | 12 | **1** | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 131 |
| 10:00 | 1 | 96 | 17 | 0 | 5 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | 0 | 122 |
| 11:00 | 1 | **125** | **19** | 0 | **6** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **152** |
| 12 PM | 3 | 137 | 17 | 0 | **5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 |
| 13:00 | 3 | 145 | **21** | **1** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 171 |
| 14:00 | 3 | 127 | 12 | 1 | 1 | **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 148 |
| 15:00 | 4 | 113 | 10 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 132 |
| 16:00 | 6 | 141 | 18 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 167 |
| 17:00 | 2 | 166 | 13 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 183 |
| 18:00 | **8** | **211** | 18 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **241** |
| 19:00 | 6 | 205 | 21 | 0 | 4 | 1 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 239 |
| 20:00 | 6 | 135 | 10 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 152 |
| 21:00 | 1 | 57 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 |
| 22:00 | 3 | 39 | 6 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 49 |
| 23:00 | 1 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| Day Total | 53 | 1950 | 211 | 3 | 42 | 11 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 2276 |
| Percent | 2.3% | 85.7% | 9.3% | 0.1% | 1.8% | 0.5% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 06:00 | 11:00 | 11:00 | 09:00 | 11:00 | 07:00 | | 10:00 | | | | | | 11:00 |
| Vol. | 2 | 125 | 19 | 1 | 6 | 1 | | 3 | | | | | | 152 |
| PM Peak | 18:00 | 18:00 | 13:00 | 13:00 | 12:00 | 14:00 | | 19:00 | | | | | | 18:00 |
| Vol. | 8 | 211 | 21 | 1 | 5 | 4 | | 2 | | | | | | 241 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/22/15 | 1 | 12 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| 01:00 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 02:00 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 03:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 | 0 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 06:00 | 1 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 07:00 | 0 | 31 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| 08:00 | **4** | 71 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 |
| 09:00 | 0 | 77 | 6 | 0 | 2 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 86 |
| 10:00 | 0 | 87 | 10 | **1** | 5 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 104 |
| 11:00 | 3 | **129** | **17** | 0 | **6** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | **156** |
| 12 PM | 2 | 145 | 13 | 0 | **10** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 170 |
| 13:00 | 4 | 143 | 17 | 0 | 3 | 0 | 0 | 1 | **1** | 0 | 0 | 0 | 0 | 169 |
| 14:00 | 4 | 141 | 15 | **2** | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 166 |
| 15:00 | 2 | 123 | 14 | 0 | 2 | **4** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 147 |
| 16:00 | 2 | 128 | 17 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 152 |
| 17:00 | 4 | 141 | 13 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 162 |
| 18:00 | 4 | **182** | **20** | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **211** |
| 19:00 | **7** | 158 | 13 | 0 | 1 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | 0 | 182 |
| 20:00 | 7 | 129 | 9 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 147 |
| 21:00 | 2 | 68 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 76 |
| 22:00 | 1 | 47 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 |
| 23:00 | 1 | 23 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| Day Total | 49 | 1864 | 183 | 3 | 44 | 8 | 0 | 13 | 2 | 0 | 0 | 0 | 0 | 2166 |
| Percent | 2.3% | 86.1% | 8.4% | 0.1% | 2.0% | 0.4% | 0.0% | 0.6% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 08:00 | 11:00 | 11:00 | 10:00 | 11:00 | 09:00 | | 11:00 | 10:00 | | | | | 11:00 |
| Vol. | 4 | 129 | 17 | 1 | 6 | 1 | | 1 | 1 | | | | | 156 |
| PM Peak | 19:00 | 18:00 | 18:00 | 14:00 | 12:00 | 15:00 | | 19:00 | 13:00 | | | | | 18:00 |
| Vol. | 7 | 182 | 20 | 2 | 10 | 4 | | 3 | 1 | | | | | 211 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/23/15 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| 01:00 | 0 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 02:00 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 03:00 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 | 0 | 23 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| 06:00 | 0 | 9 | 2 | 0 | 0 | **1** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 13 |
| 07:00 | 1 | 22 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 08:00 | 1 | 64 | 10 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 78 |
| 09:00 | **4** | 83 | **12** | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 102 |
| 10:00 | 0 | 97 | 11 | 0 | **7** | 0 | 0 | **2** | 0 | **1** | 0 | 0 | 0 | 118 |
| 11:00 | 4 | **140** | 11 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **158** |
| 12 PM | 8 | 170 | **22** | 0 | 3 | 1 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 205 |
| 13:00 | 1 | 122 | 15 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 141 |
| 14:00 | 5 | 110 | 15 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 131 |
| 15:00 | 2 | 98 | 14 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 117 |
| 16:00 | 0 | 121 | 12 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 136 |
| 17:00 | 5 | 193 | 18 | 0 | **4** | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 221 |
| 18:00 | 10 | 242 | 16 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 272 |
| 19:00 | **18** | **250** | 16 | **1** | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **289** |
| 20:00 | 7 | 169 | 16 | 0 | 1 | **2** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 196 |
| 21:00 | 3 | 83 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 88 |
| 22:00 | 0 | 40 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 |
| 23:00 | 1 | 27 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| Day Total | 70 | 2098 | 205 | 1 | 43 | 6 | 0 | 7 | 1 | 1 | 0 | 0 | 0 | 2432 |
| Percent | 2.9% | 86.3% | 8.4% | 0.0% | 1.8% | 0.2% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 09:00 | 11:00 | 09:00 | | 10:00 | 06:00 | | 10:00 | | 10:00 | | | | 11:00 |
| Vol. | 4 | 140 | 12 | | 7 | 1 | | 2 | | 1 | | | | 158 |
| PM Peak | 19:00 | 19:00 | 12:00 | 19:00 | 17:00 | 20:00 | | 12:00 | 20:00 | | | | | 19:00 |
| Vol. | 18 | 250 | 22 | 1 | 4 | 2 | | 1 | 1 | | | | | 289 |

**Ontario Traffic, Inc.**
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Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 7
Station ID: T36
Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/24/15 | 0 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 01:00 | 1 | 11 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| 02:00 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 03:00 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:00 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:00 | 0 | 12 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| 06:00 | 0 | 13 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 07:00 | 0 | 33 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 |
| 08:00 | **2** | 58 | 5 | 0 | 2 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 |
| 09:00 | 1 | 84 | 7 | **1** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 94 |
| 10:00 | 2 | 100 | 13 | 1 | **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 119 |
| 11:00 | 1 | **149** | **14** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **166** |
| 12 PM | **8** | 159 | **19** | 0 | **9** | **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 198 |
| 13:00 | 1 | 127 | 15 | 0 | 2 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 146 |
| 14:00 | 4 | 119 | 12 | **1** | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 141 |
| 15:00 | 3 | 108 | 12 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 126 |
| 16:00 | 3 | 98 | 16 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 120 |
| 17:00 | 2 | 112 | 9 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 125 |
| 18:00 | 8 | 150 | 17 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 179 |
| 19:00 | 7 | **198** | 15 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **223** |
| 20:00 | 3 | 157 | 15 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 177 |
| 21:00 | 3 | 115 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 122 |
| 22:00 | 3 | 51 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 |
| 23:00 | 3 | 39 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45 |
| Day Total | 56 | 1913 | 197 | 4 | 36 | 10 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2219 |
| Percent | 2.5% | 86.2% | 8.9% | 0.2% | 1.6% | 0.5% | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 08:00 | 11:00 | 11:00 | 09:00 | 10:00 | 08:00 | | | | | | | | 11:00 |
| Vol. | 2 | 149 | 14 | 1 | 3 | 1 | | | | | | | | 166 |
| PM Peak | 12:00 | 19:00 | 12:00 | 14:00 | 12:00 | 12:00 | | 13:00 | | | | | | 19:00 |
| Vol. | 8 | 198 | 19 | 1 | 9 | 3 | | 1 | | | | | | 223 |
| Grand Total | 418 | 14183 | 1386 | 17 | 265 | 61 | 0 | 44 | 8 | 1 | 0 | 0 | 0 | 16383 |
| Percent | 2.6% | 86.6% | 8.5% | 0.1% | 1.6% | 0.4% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |

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Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

NB, SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/18/15 | 1 | 61 | 9 | **1** | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 74 |
| 01:00 | 1 | 32 | 6 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 |
| 02:00 | 0 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 03:00 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 04:00 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 | 0 | 12 | 4 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| 06:00 | 1 | 27 | 10 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 39 |
| 07:00 | 3 | 57 | 4 | 0 | **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68 |
| 08:00 | 1 | 114 | 20 | 0 | 1 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 137 |
| 09:00 | **10** | 145 | 14 | 0 | 0 | 1 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 172 |
| 10:00 | 9 | 190 | **34** | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 236 |
| 11:00 | 1 | **290** | 28 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **322** |
| 12 PM | 7 | 257 | 45 | 0 | 2 | 0 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 313 |
| 13:00 | 15 | 302 | 27 | 0 | 3 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 350 |
| 14:00 | 18 | 325 | 47 | 0 | 4 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 397 |
| 15:00 | **25** | 377 | **50** | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 458 |
| 16:00 | 13 | 364 | 31 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 412 |
| 17:00 | 14 | 336 | 34 | **1** | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 391 |
| 18:00 | 9 | 372 | 47 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 433 |
| 19:00 | 14 | **432** | 35 | 1 | 2 | **5** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **490** |
| 20:00 | 11 | 378 | 34 | 0 | 3 | 3 | 0 | 2 | 0 | 0 | **1** | 0 | 0 | 432 |
| 21:00 | 8 | 280 | 38 | 1 | **7** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 335 |
| 22:00 | 9 | 197 | 16 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 225 |
| 23:00 | 4 | 122 | 18 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 145 |
| Day Total | 174 | 4687 | 553 | 4 | 57 | 18 | 0 | 13 | 0 | 0 | 1 | 0 | 0 | 5507 |
| Percent | 3.2% | 85.1% | 10.0% | 0.1% | 1.0% | 0.3% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 09:00 | 11:00 | 10:00 | 00:00 | 07:00 | 08:00 | | 09:00 | | | | | | 11:00 |
| Vol. | 10 | 290 | 34 | 1 | 4 | 1 | | 2 | | | | | | 322 |
| PM Peak | 15:00 | 19:00 | 15:00 | 17:00 | 21:00 | 19:00 | | 12:00 | | | 20:00 | | | 19:00 |
| Vol. | 25 | 432 | 50 | 1 | 7 | 5 | | 2 | | | 1 | | | 490 |

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NB, SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/19/15 | 1 | 77 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 90 |
| 01:00 | 0 | 48 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 |
| 02:00 | 0 | 26 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| 03:00 | 0 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| 04:00 | 0 | 12 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 16 |
| 05:00 | 0 | 12 | 3 | 0 | 0 | 0 | 0 | **3** | 0 | 0 | 0 | 0 | 0 | 18 |
| 06:00 | 0 | 26 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| 07:00 | 2 | 52 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| 08:00 | 2 | 79 | 16 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 99 |
| 09:00 | 2 | 128 | 27 | 0 | **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 161 |
| 10:00 | 7 | 189 | 25 | 0 | 1 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 224 |
| 11:00 | **9** | **269** | **43** | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **326** |
| 12 PM | 9 | 342 | 32 | 0 | 6 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 390 |
| 13:00 | **21** | 365 | 49 | 0 | 3 | 5 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | 445 |
| 14:00 | 13 | 359 | 27 | 0 | 2 | 3 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 406 |
| 15:00 | 17 | 371 | 32 | 0 | 6 | **6** | 0 | 1 | **2** | **1** | 0 | 0 | 0 | 436 |
| 16:00 | 6 | **445** | **52** | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | **506** |
| 17:00 | 4 | 244 | 27 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 276 |
| 18:00 | 15 | 330 | 33 | 0 | 6 | 4 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 390 |
| 19:00 | 6 | 382 | 40 | **1** | **8** | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 442 |
| 20:00 | 4 | 324 | 50 | 0 | 7 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 390 |
| 21:00 | 3 | 123 | 17 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 145 |
| 22:00 | 0 | 80 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 95 |
| 23:00 | 0 | 65 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72 |
| Day Total | 121 | 4361 | 529 | 1 | 50 | 34 | 0 | 12 | 5 | 1 | 0 | 0 | 0 | 5114 |
| Percent | 2.4% | 85.3% | 10.3% | 0.0% | 1.0% | 0.7% | 0.0% | 0.2% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 11:00 | 11:00 | 11:00 | | 09:00 | 10:00 | | 05:00 | | | | | | 11:00 |
| Vol. | 9 | 269 | 43 | | 4 | 2 | | 3 | | | | | | 326 |
| PM Peak | 13:00 | 16:00 | 16:00 | 19:00 | 19:00 | 15:00 | | 13:00 | 15:00 | 15:00 | | | | 16:00 |
| Vol. | 21 | 445 | 52 | 1 | 8 | 6 | | 2 | 2 | 1 | | | | 506 |

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Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

NB, SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/20/15 | 0 | 24 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| 01:00 | 0 | 17 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| 02:00 | 0 | 16 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 03:00 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 04:00 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| 05:00 | 0 | 16 | 4 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 21 |
| 06:00 | 1 | 16 | 11 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 33 |
| 07:00 | 0 | 43 | 4 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 |
| 08:00 | 0 | 92 | 15 | 0 | 4 | **2** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 114 |
| 09:00 | 4 | 126 | **20** | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 155 |
| 10:00 | 0 | 159 | 19 | **1** | 10 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 190 |
| 11:00 | **6** | **177** | 20 | 1 | **13** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **218** |
| 12 PM | 1 | 240 | 39 | 1 | **10** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 292 |
| 13:00 | 5 | 255 | 30 | **2** | 8 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 301 |
| 14:00 | 10 | 236 | 38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 284 |
| 15:00 | 13 | 248 | 30 | 0 | 5 | **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 299 |
| 16:00 | 4 | 238 | 31 | 1 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 280 |
| 17:00 | 15 | 242 | 32 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 295 |
| 18:00 | 3 | 291 | 22 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 320 |
| 19:00 | 7 | 277 | **44** | 1 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 336 |
| 20:00 | **16** | **352** | 42 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **413** |
| 21:00 | 4 | 204 | 28 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 240 |
| 22:00 | 1 | 107 | 15 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 |
| 23:00 | 0 | 49 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 |
| Day Total | 90 | 3441 | 455 | 7 | 90 | 15 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 4105 |
| Percent | 2.2% | 83.8% | 11.1% | 0.2% | 2.2% | 0.4% | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 11:00 | 11:00 | 09:00 | 10:00 | 11:00 | 08:00 | | 08:00 | 05:00 | | | | | 11:00 |
| Vol. | 6 | 177 | 20 | 1 | 13 | 2 | | 1 | 1 | | | | | 218 |
| PM Peak | 20:00 | 20:00 | 19:00 | 13:00 | 12:00 | 15:00 | | 13:00 | | | | | | 20:00 |
| Vol. | 16 | 352 | 44 | 2 | 10 | 3 | | 1 | | | | | | 413 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/21/15 | 0 | 29 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 |
| 01:00 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| 02:00 | 0 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| 03:00 | 0 | 5 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 04:00 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| 05:00 | 1 | 5 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 06:00 | **3** | 17 | 10 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 |
| 07:00 | 1 | 40 | 9 | 0 | 3 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55 |
| 08:00 | 2 | 100 | 17 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 120 |
| 09:00 | 3 | 163 | 23 | **2** | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 202 |
| 10:00 | 2 | 165 | 33 | 0 | **11** | 0 | 0 | **5** | 0 | 0 | 0 | 0 | 0 | 216 |
| 11:00 | 3 | **204** | **42** | 0 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **258** |
| 12 PM | 6 | 240 | 43 | 0 | **11** | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 303 |
| 13:00 | 8 | 267 | **62** | **2** | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 343 |
| 14:00 | 9 | 262 | 39 | 2 | 4 | **6** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 322 |
| 15:00 | 8 | 241 | 40 | 0 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 297 |
| 16:00 | 10 | 265 | 35 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 316 |
| 17:00 | 7 | 281 | 33 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 323 |
| 18:00 | 12 | 391 | 47 | 0 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 457 |
| 19:00 | **13** | **401** | 49 | 0 | 5 | 3 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | **473** |
| 20:00 | 13 | 330 | 35 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 382 |
| 21:00 | 4 | 176 | 21 | 0 | 3 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 205 |
| 22:00 | 6 | 107 | 18 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 132 |
| 23:00 | 4 | 42 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55 |
| Day Total | 115 | 3757 | 572 | 6 | 84 | 25 | 0 | 10 | 0 | 1 | 0 | 0 | 0 | 4570 |
| Percent | 2.5% | 82.2% | 12.5% | 0.1% | 1.8% | 0.5% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 06:00 | 11:00 | 11:00 | 09:00 | 10:00 | 07:00 | | 10:00 | | | | | | 11:00 |
| Vol. | 3 | 204 | 42 | 2 | 11 | 2 | | 5 | | | | | | 258 |
| PM Peak | 19:00 | 19:00 | 13:00 | 13:00 | 12:00 | 14:00 | | 19:00 | | 21:00 | | | | 19:00 |
| Vol. | 13 | 401 | 62 | 2 | 11 | 6 | | 2 | | 1 | | | | 473 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/22/15 | 3 | 31 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| 01:00 | 0 | 12 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| 02:00 | 0 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| 03:00 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:00 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 05:00 | 0 | 11 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 06:00 | 2 | 19 | 4 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| 07:00 | 0 | 50 | 3 | 0 | 2 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 56 |
| 08:00 | **4** | 118 | 8 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 135 |
| 09:00 | 0 | 121 | 19 | 0 | 4 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 146 |
| 10:00 | 0 | 131 | 22 | **1** | 7 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 162 |
| 11:00 | 4 | **226** | **40** | 0 | **13** | 0 | 0 | **1** | 1 | 0 | 0 | 0 | 0 | **285** |
| 12 PM | 5 | 253 | 23 | 0 | **14** | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 297 |
| 13:00 | 6 | 279 | 48 | 0 | 8 | 1 | 0 | 1 | **1** | 0 | 0 | 0 | 0 | 344 |
| 14:00 | 5 | 292 | 43 | **2** | 7 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 350 |
| 15:00 | 4 | 260 | 32 | 0 | 2 | **6** | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 307 |
| 16:00 | 4 | 254 | 39 | 0 | 7 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 308 |
| 17:00 | **11** | 256 | 31 | 0 | 3 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 304 |
| 18:00 | 8 | **319** | **53** | 0 | 6 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | **391** |
| 19:00 | 10 | 289 | 32 | 0 | 2 | 3 | 0 | **5** | 0 | 0 | 0 | 0 | 0 | 341 |
| 20:00 | 11 | 315 | 38 | 0 | 1 | 3 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 372 |
| 21:00 | 7 | 186 | 23 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 219 |
| 22:00 | 2 | 108 | 12 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 125 |
| 23:00 | 1 | 67 | 5 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 75 |
| Day Total | 87 | 3609 | 494 | 3 | 88 | 22 | 0 | 26 | 4 | 0 | 0 | 0 | 0 | 4333 |
| Percent | 2.0% | 83.3% | 11.4% | 0.1% | 2.0% | 0.5% | 0.0% | 0.6% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 08:00 | 11:00 | 11:00 | 10:00 | 11:00 | 09:00 | | 11:00 | 07:00 | | | | | 11:00 |
| Vol. | 4 | 226 | 40 | 1 | 13 | 2 | | 1 | 1 | | | | | 285 |
| PM Peak | 17:00 | 18:00 | 18:00 | 14:00 | 12:00 | 15:00 | | 19:00 | 13:00 | | | | | 18:00 |
| Vol. | 11 | 319 | 53 | 2 | 14 | 6 | | 5 | 1 | | | | | 391 |

**Ontario Traffic, Inc.**
17705 Leslie St., Unit 6
Newmarket, Ontario L3Y 3E3
Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 7
Station ID: T36
Liverpool Rd south of Wharf St

Date Start: 18-Jul-15
Date End: 24-Jul-15
Date Start: 18-Jul-15

NB, SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/23/15 | 0 | 53 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 |
| 01:00 | 0 | 30 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| 02:00 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 03:00 | 0 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 04:00 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 | 0 | 27 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| 06:00 | 0 | 31 | 5 | 0 | 3 | **2** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 42 |
| 07:00 | 1 | 42 | 12 | **1** | 1 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 58 |
| 08:00 | 1 | 103 | 17 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 126 |
| 09:00 | 5 | 125 | 21 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 158 |
| 10:00 | 1 | 167 | 23 | 0 | **14** | 0 | 0 | **3** | 0 | **1** | 0 | 0 | 0 | 209 |
| 11:00 | **6** | **230** | **29** | 0 | 7 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | **274** |
| 12 PM | 11 | 307 | **44** | 0 | 6 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 373 |
| 13:00 | 4 | 253 | 37 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 300 |
| 14:00 | 12 | 230 | 36 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 281 |
| 15:00 | 5 | 210 | 34 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 254 |
| 16:00 | 1 | 245 | 26 | 0 | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 279 |
| 17:00 | 7 | 318 | 37 | 0 | **7** | 3 | 0 | **4** | 0 | 0 | 0 | 0 | 0 | 376 |
| 18:00 | 19 | 415 | 33 | 0 | 3 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 476 |
| 19:00 | **27** | **496** | 32 | **1** | 5 | **7** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **570** |
| 20:00 | 13 | 398 | 41 | 0 | 3 | 4 | 0 | 2 | **1** | 0 | 0 | 0 | 0 | 462 |
| 21:00 | 11 | 301 | 22 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 338 |
| 22:00 | 2 | 96 | 14 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 113 |
| 23:00 | 1 | 66 | 4 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 73 |
| Day Total | 127 | 4153 | 481 | 2 | 82 | 29 | 0 | 18 | 3 | 2 | 0 | 0 | 0 | 4897 |
| Percent | 2.6% | 84.8% | 9.8% | 0.0% | 1.7% | 0.6% | 0.0% | 0.4% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 11:00 | 11:00 | 11:00 | 07:00 | 10:00 | 06:00 | | 10:00 | 07:00 | 10:00 | | | | 11:00 |
| Vol. | 6 | 230 | 29 | 1 | 14 | 2 | | 3 | 1 | 1 | | | | 274 |
| PM Peak | 19:00 | 19:00 | 12:00 | 19:00 | 17:00 | 19:00 | | 17:00 | 20:00 | | | | | 19:00 |
| Vol. | 27 | 496 | 44 | 1 | 7 | 7 | | 4 | 1 | | | | | 570 |

**Ontario Traffic, Inc.**
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Tel: (905) 898-7711 Fax: (905) 898-3664

Site Code: 7
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Date Start: 18-Jul-15
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NB, SB

| Start Time | Bikes | Cars & Trailers | 2 Axle Long | Buses | 2 Axle 6 Tire | 3 Axle Single | 4 Axle Single | <5 Axl Double | 5 Axle Double | >6 Axl Double | <6 Axl Multi | 6 Axle Multi | >6 Axl Multi | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 07/24/15 | 1 | 40 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 |
| 01:00 | 1 | 24 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 |
| 02:00 | **4** | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| 03:00 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:00 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 05:00 | 0 | 14 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| 06:00 | 0 | 23 | 13 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| 07:00 | 0 | 61 | 15 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 77 |
| 08:00 | 2 | 100 | 9 | 1 | 3 | **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 117 |
| 09:00 | 1 | 129 | 14 | **2** | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 149 |
| 10:00 | 4 | 165 | **31** | 1 | **6** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 207 |
| 11:00 | 3 | **240** | 28 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **276** |
| 12 PM | **16** | 299 | **44** | 0 | **14** | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 379 |
| 13:00 | 2 | 259 | 41 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 311 |
| 14:00 | 6 | 239 | 28 | **3** | 6 | **6** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 289 |
| 15:00 | 6 | 216 | 30 | 1 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 259 |
| 16:00 | 7 | 213 | 34 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 259 |
| 17:00 | 4 | 205 | 23 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 236 |
| 18:00 | 16 | 253 | 35 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 309 |
| 19:00 | 16 | **388** | 40 | 1 | 1 | 2 | 0 | **2** | 0 | 0 | 0 | 0 | 0 | **450** |
| 20:00 | 10 | 324 | 36 | 0 | 4 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 379 |
| 21:00 | 6 | 271 | 22 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 300 |
| 22:00 | 8 | 150 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 169 |
| 23:00 | 5 | 114 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 |
| Day Total | 118 | 3750 | 473 | 10 | 76 | 20 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 4456 |
| Percent | 2.6% | 84.2% | 10.6% | 0.2% | 1.7% | 0.4% | 0.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |
| AM Peak | 02:00 | 11:00 | 10:00 | 09:00 | 10:00 | 08:00 | | | | | | | | 11:00 |
| Vol. | 4 | 240 | 31 | 2 | 6 | 2 | | | | | | | | 276 |
| PM Peak | 12:00 | 19:00 | 12:00 | 14:00 | 12:00 | 14:00 | | 19:00 | | | | | | 19:00 |
| Vol. | 16 | 388 | 44 | 3 | 14 | 6 | | 2 | | | | | | 450 |
| Grand Total | 832 | 27758 | 3557 | 33 | 527 | 163 | 0 | 93 | 14 | 4 | 1 | 0 | 0 | 32982 |
| Percent | 2.5% | 84.2% | 10.8% | 0.1% | 1.6% | 0.5% | 0.0% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |

# APPENDIX B

## ENVIRONMENTAL NOISE GUIDELINES

# APPENDIX B

## ENVIRONMENTAL NOISE GUIDELINES

## MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS(MECP)

Reference: MECP Publication NPC-300, October 2013: *"Environmental Noise Guideline, Stationary and Transportation Source – Approval and Planning"*.

| SPACE | SOURCE | TIME PERIOD | CRITERION |
|---|---|---|---|
| Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc. | Road | 07:00 to 23:00 | 45 dBA |
| | Rail | 07:00 to 23:00 | 40 dBA |
| | Aircraft | 24-hour period | NEF/NEP 5 |
| Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres) | Road | 23:00 to 07:00 | 45 dBA |
| | Rail | 23:00 to 07:00 | 40 dBA |
| | Aircraft | 24-hour period | NEF/NEP 5 |
| Sleeping quarters | Road | 07:00 to 23:00 | 45 dBA |
| | Rail | 07:00 to 23:00 | 40 dBA |
| | Aircraft | 24-hour period | NEF/NEP 0 |
| Sleeping quarters | Road | 23:00 to 07:00 | 40 dBA |
| | Rail | 23:00 to 07:00 | 35 dBA |
| | Aircraft | 24-hour period | NEF/NEP 0 |
| Outdoor Living Areas | Road and Rail | 07:00 to 23:00 | 55 dBA |
| Outdoor Point of Reception | Aircraft | 24-hour period | NEF/NEP 30[#] |
| | Stationary Source | | |
| | Class 1 Area | 07:00 to 19:00[(1)] | 50[*] dBA |
| | | 19:00 to 23:00[(1)] | 50[*] dBA |
| | Class 2 Area | 07:00 to 19:00[(2)] | 50[*] dBA |
| | | 19:00 to 23:00[(2)] | 45[*] dBA |
| | Class 3 Area | 07:00 to 19:00[(3)] | 45[*] dBA |
| | | 19:00 to 23:00[(3)] | 40[*] dBA |
| | Class 4 Area | 07:00 to 19:00[(4)] | 55[*] dBA |
| | | 19:00 to 23:00[(4)] | 55[*] dBA |

…./cont'd

| SPACE | SOURCE | TIME PERIOD | CRITERION |
|---|---|---|---|
| Plane of a Window of Noise Sensitive Spaces | Stationary Source | | |
| | Class 1 Area | 07:00 to 19:00(1) | 50* dBA |
| | | 19:00 to 23:00(1) | 50* dBA |
| | | 23:00 to 07:00(1) | 45* dBA |
| | Class 2 Area | 07:00 to 19:00(2) | 50* dBA |
| | | 19:00 to 23:00(2) | 50* dBA |
| | | 23:00 to 07:00(2) | 45* dBA |
| | Class 3 Area | 07:00 to 19:00(3) | 45* dBA |
| | | 19:00 to 23:00(3) | 45* dBA |
| | | 23:00 to 07:00(3) | 40* dBA |
| | Class 4 Area | 07:00 to 19:00(4) | 60* dBA |
| | | 19:00 to 23:00(4) | 60* dBA |
| | | 23:00 to 07:00(4) | 55* dBA |

\# may not apply to in-fill or re-development.
* or the minimum hourly background sound exposure $L_{eq(1)}$, due to road traffic, if higher.
(1) Class 1 Area: Urban.
(2) Class 2 Area: Urban during day; rural-like evening and night.
(3) Class 3 Area: Rural.
(4) Class 4 Area: Subject to land use planning authority's approval.

Reference: MECP Publication ISBN 0-7729-2804-5, 1987: *"Environmental Noise Assessment in Land-Use Planning"*.

| EXCESS ABOVE RECOMMENDED SOUND LEVEL LIMITS (dBA) | CHANGE IN SUBJECTIVE LOUDNESS ABOVE | MAGNITUDE OF THE NOISE PROBLEM | NOISE CONTROL MEASURES (OR ACTION TO BE TAKEN) |
|---|---|---|---|
| No excess (<55 dBA) | — | No expected noise problem | None |
| 1 to 5 inclusive (56 to 60 dBA) | Noticeably louder | Slight noise impact | If no physical measures are taken, then prospective purchasers or tenants should be made aware by suitable warning clauses. |
| 6 to 10 inclusive (61 - 65 dBA) | Almost twice as loud | Definite noise impact | Recommended. |
| 11 to 15 inclusive (66 - 70 dBA) | Almost three times as loud | Serious noise impact | Strongly Recommended. |
| 16 and over (>70 dBA) | Almost four times as loud | Very serious noise impact | Strongly Recommended (may be mandatory). |

# APPENDIX C

## TRANSPORTATIONS SAMPLE CALCULATIONS

```
STAMSON 5.04        NORMAL REPORT        Date: 26-03-2019 12:43:58
MINISTRY OF ENVIRONMENT, CONSERVATION AND PARKS / NOISE ASSESSMENT

Filename: b1_3_wf.te           Time Period: Day/Night 16/8 hours
Description: Building 1 - 3rd floor


Road data, segment # 1: Liverpool (day/night)
----------------------------------------------
Car traffic volume  :  5608/295   veh/TimePeriod  *
Medium truck volume :    98/5     veh/TimePeriod  *
Heavy truck volume  :    52/3     veh/TimePeriod  *
Posted speed limit  :    40 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):   4593
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   1.70
    Heavy Truck  % of Total Volume     :   0.90
    Day (16 hrs) % of Total Volume     :  95.00

Data for Segment # 1: Liverpool (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  22.00 / 22.00  m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Liverpool (day)
-------------------------------------

Source height = 0.97 m

ROAD (0.00 + 54.32 + 0.00) = 54.32 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.50  57.98   0.00  -2.49  -1.17   0.00   0.00   0.00  54.32
-------------------------------------------------------------------------------

Segment Leq : 54.32 dBA

Total Leq All Segments: 54.32 dBA
```

```
Results segment # 1: Liverpool (night)
--------------------------------------

Source height = 1.00 m

ROAD (0.00 + 44.68 + 0.00) = 44.68 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.50  48.34   0.00  -2.49  -1.17   0.00   0.00   0.00  44.68
-------------------------------------------------------------------------------

Segment Leq : 44.68 dBA

Total Leq All Segments: 44.68 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.32
                           (NIGHT): 44.68
```

# APPENDIX D

## STATIONARY SOURCE SAMPLE CALCULATIONS

## Seema Nagaraj

**From:** Barry Laverick <Barry.Laverick@Durham.ca>
**Sent:** Wednesday, May 24, 2017 4:24 PM
**To:** Robert Adamsz; Seema Nagaraj
**Cc:** Melinda Holland (mholland@thebiglierigroup.com); John Emeljanow; rlaw@rvanderson.com
**Subject:** RE: Pumping Station near 591 Liverpool Road in Pickering (VCL File: 116-0519)
**Attachments:** 153228 - G001.pdf

All,
Please see responses to the questions below:

- If there will be an emergency generator at this station and, if so, where will it be located? [See attached dwg for the general site plan]
- What will be the make and model of the generator, and do you expect to include any acoustic enclosures? [the make and the model of the generator is not confirmed yet, as there are multiple suppliers that can bid for the supply of the generator, however we are basing our design on Cummins 2000kW generator, with a noise criteria of the whole assembly to achieve 60 dBA at 7m in a free field environment (and 50dBA at the nearest receptor). This means that it will meet the noise requirements to the closest receptor – which would be the Marina]
- Would there be any other mechanical equipment interfacing with the exterior that has the potential to generate noise? [there are a few existing exhaust pipes and HVAC equipment on the roof of the Liverpool station]
- When updating the pumping station, would the design have taken into account noise emissions to existing or potential residential developments in the vicinity? [see above note. The intent is to have the required acoustic equipment in the enclosure to meet the specified noise criteria]
- Would there have been any noise study done for the update that we would be able to access? This can be supplied when the tender is finalized.

Regards,
Barry

Barry Laverick, P. Eng.
Environmental Services Design
Works Department
Regional Municipality of Durham
605 Rossland Road East
Whitby ON L1N 6A3
T: 905-668-7711 ext 3840
C: 289-927-1541

---

**From:** Robert Adamsz
**Sent:** Wednesday, May 17, 2017 4:08 PM
**To:** 'Seema Nagaraj'
**Cc:** Melinda Holland (mholland@thebiglierigroup.com); John Emeljanow; Barry Laverick
**Subject:** RE: Pumping Station near 591 Liverpool Road in Pickering (VCL File: 116-0519)

Hi Seema,

I am referring your request to Barry Laverick, the project engineer familiar with the equipment installed at that location.

Thank you,
Robert

**Robert Adamsz, P.Eng., PMP | Manager Facilities Maintenance and Operations**
---
The Regional Municipality of Durham | 289 Water St. | Whitby, ON L1N 9J2
P:905-668-0250 | C: 905-442-9011 | Email: robert.adamsz@durham.ca

## Point Sources

| Name | M. | ID | Result. PWL | | | Lw / Li | | | Correction | | | Sound Reduction | | Attenuation | Operating Time | | | K0 | Freq. | Direct. | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Type | Value | norm. | Day | Evening | Night | R | Area | | Day | Special | Night | | | | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | | | dB(A) | dB(A) | dB(A) | dB(A) | | (m²) | | (min) | (min) | (min) | (dB) | (Hz) | | (m) | | (m) | (m) | (m) |
| Generator | ~ | PS_Generator | 85.0 | 85.0 | 85.0 | Lw | Gen | 85.0 | 0.0 | 0.0 | 0.0 | | | | 60.00 | 0.00 | 0.00 | 0.0 | | (none) | 2.50 | r | 654456.78 | 4853085.41 | 2.50 |
| Turbine | | Turbine | 105.5 | 105.5 | 105.5 | Lw | Turbine | 105.5 | 0.0 | 0.0 | 0.0 | | | | 60.00 | 60.00 | 60.00 | 0.0 | | (none) | 80.00 | r | 654905.53 | 4852829.15 | 80.00 |

## Sound Level Library

| Name | ID | Type | Oktave Spectrum (dB) | | | | | | | | | | | | Source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Weight. | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | A | lin | |
| Outdoor radiated normalized to 75 dBA @ 7m | Gen | Lw | | | 92.0 | 96.0 | 96.0 | 95.0 | 95.0 | 94.0 | 88.0 | 81.0 | 99.8 | 102.8 | AGA |
| Vestas v80 1.8MW - Sound pressure level at 8 m/s | Turbine | Lw | | 28.5 | 36.8 | 43.9 | 48.4 | 50.1 | 48.6 | 46.1 | 38.5 | 28.6 | 52.9 | 55.1 | Acoustic Noise Measurement Report for Vestas V80 |

## Calculation Configuration

| Configuration | |
|---|---|
| Parameter | Value |
| General | |
| Country | International |
| Max. Error (dB) | 0.00 |
| Max. Search Radius (#(Unit,LEN)) | 2000.00 |
| Min. Dist Src to Rcvr | 0.00 |
| Partition | |
| Raster Factor | 0.50 |
| Max. Length of Section (#(Unit,LEN)) | 1000.00 |
| Min. Length of Section (#(Unit,LEN)) | 1.00 |
| Min. Length of Section (%) | 0.00 |
| Proj. Line Sources | On |
| Proj. Area Sources | On |
| Ref. Time | |
| Reference Time Day (min) | 60.00 |
| Reference Time Night (min) | 60.00 |
| Daytime Penalty (dB) | 0.00 |
| Recr. Time Penalty (dB) | 0.00 |
| Night-time Penalty (dB) | 0.00 |
| DTM | |
| Standard Height (m) | 0.00 |
| Model of Terrain | Triangulation |
| Reflection | |
| max. Order of Reflection | 2 |
| Search Radius Src | 100.00 |
| Search Radius Rcvr | 100.00 |
| Max. Distance Source - Rcvr | 1000.00 1000.00 |
| Min. Distance Rvcr - Reflector | 1.00 1.00 |
| Min. Distance Source - Reflector | 0.10 |
| Industrial (ISO 9613) | |
| Lateral Diffraction | some Obj |
| Obst. within Area Src do not shield | On |
| Screening | Excl. Ground Att. over Barrier |
| | Dz with limit (20/25) |
| Barrier Coefficients C1,2,3 | 3.0 20.0 0.0 |
| Temperature (#(Unit,TEMP)) | 10 |
| rel. Humidity (%) | 70 |
| Ground Absorption G | 0.00 |
| Wind Speed for Dir. (#(Unit,SPEED)) | 3.0 |
| Roads (RLS-90) | |
| Strictly acc. to RLS-90 | |

| Configuration | |
|---|---|
| Parameter | Value |
| Railways (Schall 03 (1990)) | |
| Strictly acc. to Schall 03 / Schall-Transrapid | |
| Aircraft (???) | |
| Strictly acc. to AzB | |

Receiver
Name: R01A
ID: R01A
X: 654446.02 m
Y: 4853072.84 m
Z: 4.50 m

| Point Source, ISO 9613, Name: "Generator", ID: "PS_Generator" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 3 | 654456.78 | 4853085.41 | 2.50 | 0 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 35.4 | 0.1 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 52.4 |
| 3 | 654456.78 | 4853085.41 | 2.50 | 0 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 35.4 | 0.1 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -135.6 |
| 3 | 654456.78 | 4853085.41 | 2.50 | 0 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 35.4 | 0.1 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -135.6 |
| 4 | 654456.78 | 4853085.41 | 2.50 | 2 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 44.0 | 0.4 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.9 | 35.8 |
| 4 | 654456.78 | 4853085.41 | 2.50 | 2 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 44.0 | 0.4 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.9 | -152.2 |
| 4 | 654456.78 | 4853085.41 | 2.50 | 2 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 44.0 | 0.4 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.9 | -152.2 |
| 7 | 654456.78 | 4853085.41 | 2.50 | 1 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 38.1 | 0.2 | -3.0 | 0.0 | 0.0 | 27.3 | 0.0 | 2.0 | 20.3 |
| 7 | 654456.78 | 4853085.41 | 2.50 | 1 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 38.1 | 0.2 | -3.0 | 0.0 | 0.0 | 27.3 | 0.0 | 2.0 | -167.7 |
| 7 | 654456.78 | 4853085.41 | 2.50 | 1 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 38.1 | 0.2 | -3.0 | 0.0 | 0.0 | 27.3 | 0.0 | 2.0 | -167.7 |
| 8 | 654456.78 | 4853085.41 | 2.50 | 2 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 41.9 | 0.3 | -3.0 | 0.0 | 0.0 | 27.2 | 0.0 | 6.0 | 12.6 |
| 8 | 654456.78 | 4853085.41 | 2.50 | 2 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 41.9 | 0.3 | -3.0 | 0.0 | 0.0 | 27.2 | 0.0 | 6.0 | -175.4 |
| 8 | 654456.78 | 4853085.41 | 2.50 | 2 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 41.9 | 0.3 | -3.0 | 0.0 | 0.0 | 27.2 | 0.0 | 6.0 | -175.4 |
| 9 | 654456.78 | 4853085.41 | 2.50 | 1 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 43.3 | 0.3 | -3.0 | 0.0 | 0.0 | 27.6 | 0.0 | 2.0 | 14.7 |
| 9 | 654456.78 | 4853085.41 | 2.50 | 1 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 43.3 | 0.3 | -3.0 | 0.0 | 0.0 | 27.6 | 0.0 | 2.0 | -173.3 |
| 9 | 654456.78 | 4853085.41 | 2.50 | 1 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 43.3 | 0.3 | -3.0 | 0.0 | 0.0 | 27.6 | 0.0 | 2.0 | -173.3 |
| 10 | 654456.78 | 4853085.41 | 2.50 | 2 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 44.9 | 0.4 | -3.0 | 0.0 | 0.0 | 24.2 | 0.0 | 11.7 | 6.8 |
| 10 | 654456.78 | 4853085.41 | 2.50 | 2 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 44.9 | 0.4 | -3.0 | 0.0 | 0.0 | 24.2 | 0.0 | 11.7 | -181.2 |
| 10 | 654456.78 | 4853085.41 | 2.50 | 2 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 44.9 | 0.4 | -3.0 | 0.0 | 0.0 | 24.2 | 0.0 | 11.7 | -181.2 |
| 11 | 654456.78 | 4853085.41 | 2.50 | 1 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 45.4 | 0.4 | -3.0 | 0.0 | 0.0 | 28.0 | 0.0 | 2.0 | 12.1 |
| 11 | 654456.78 | 4853085.41 | 2.50 | 1 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 45.4 | 0.4 | -3.0 | 0.0 | 0.0 | 28.0 | 0.0 | 2.0 | -175.9 |
| 11 | 654456.78 | 4853085.41 | 2.50 | 1 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 45.4 | 0.4 | -3.0 | 0.0 | 0.0 | 28.0 | 0.0 | 2.0 | -175.9 |
| 12 | 654456.78 | 4853085.41 | 2.50 | 1 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 44.4 | 0.4 | -3.0 | 0.0 | 0.0 | 27.9 | 0.0 | 2.0 | 13.2 |
| 12 | 654456.78 | 4853085.41 | 2.50 | 1 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 44.4 | 0.4 | -3.0 | 0.0 | 0.0 | 27.9 | 0.0 | 2.0 | -174.8 |
| 12 | 654456.78 | 4853085.41 | 2.50 | 1 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 44.4 | 0.4 | -3.0 | 0.0 | 0.0 | 27.9 | 0.0 | 2.0 | -174.8 |
| 13 | 654456.78 | 4853085.41 | 2.50 | 1 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 40.3 | 0.2 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.2 | 44.3 |
| 13 | 654456.78 | 4853085.41 | 2.50 | 1 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 40.3 | 0.2 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.2 | -143.7 |
| 13 | 654456.78 | 4853085.41 | 2.50 | 1 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 40.3 | 0.2 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.2 | -143.7 |
| 14 | 654456.78 | 4853085.41 | 2.50 | 2 | D | A | 85.0 | 0.0 | 0.0 | 0.0 | 0.0 | 46.7 | 0.5 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.2 | 24.7 |
| 14 | 654456.78 | 4853085.41 | 2.50 | 2 | N | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 46.7 | 0.5 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.2 | -163.3 |
| 14 | 654456.78 | 4853085.41 | 2.50 | 2 | E | A | 85.0 | 0.0 | -188.0 | 0.0 | 0.0 | 46.7 | 0.5 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.2 | -163.3 |

Receiver
Name: R01B
ID: R01B
X: 654470.03 m
Y: 4853026.62 m
Z: 67.50 m

| Point Source, ISO 9613, Name: "Turbine", ID: "Turbine" | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nr. | X | Y | Z | Refl. | DEN | Freq. | Lw | l/a | Optime | K0 | Di | Adiv | Aatm | Agr | Afol | Ahous | Abar | Cmet | RL | Lr |
| | (m) | (m) | (m) | | | (Hz) | dB(A) | dB | dB | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | (dB) | dB(A) |
| 1 | 654905.53 | 4852829.15 | 80.00 | 0 | D | A | 105.5 | 0.0 | 0.0 | 0.0 | 0.0 | 64.6 | 2.3 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 41.7 |
| 1 | 654905.53 | 4852829.15 | 80.00 | 0 | N | A | 105.5 | 0.0 | 0.0 | 0.0 | 0.0 | 64.6 | 2.3 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 41.7 |
| 1 | 654905.53 | 4852829.15 | 80.00 | 0 | E | A | 105.5 | 0.0 | 0.0 | 0.0 | 0.0 | 64.6 | 2.3 | -3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 41.7 |

# APPENDIX E

## WIND TURBINE SPECIFICATIONS

# V80-1.8 MW

## Versatile megawattage

Vestas

## Top of its class

The Vestas V80 has been engineered to make the very most of aggressive sites, as it provides unparallelled productivity in both high and moderate winds. In terms of power output and swept area, it is the best turbine on the market in the 2 MW class. More than 1,000 of these turbines have already been installed around the world, and have proved themselves to be seasoned performers in both onshore and offshore environments. The high energy yield of the V80 makes it an excellent choice for locations where space is limited. However, it also boasts an excellent track record in challenging offshore conditions, where its high operational availability, excellent grid compliance and proven technology make it a competitive choice with respect to both cost and performance.

One of the factors that contribute to the superior performance of the V80 is OptiTip®, its pitch regulation system. This system features microprocessors that rotate the blades around their longitudinal axes, thus ensuring continuous adjustment to maintain optimal blade angles in relation to the prevailing wind. At the same time, OptiTip® makes it possible to keep sound levels within the limits stipulated by local regulations.

## Optimal output

Another factor that helps to maximize the efficiency and optimize the sound level of the V80 is OptiSlip® technology. The OptiSlip® generator allows the turbine rotor speed to vary between 9 and 19 rpm, depending on conditions. While the technology involved may be advanced, its purpose is simple: to optimize output. It does this by tapping the higher efficiency of slow and variable rotation, storing excess energy in rotational form and exploiting the full force of transient gusts. All told, OptiSlip® boosts annual energy production by around five per cent in relation to traditional fixed-speed turbines.

As an added benefit, OptiSlip® also reduces wear and tear on the gearbox, blades and tower on account of lower peak loading. Moreover, as turbine sound is a function of wind speed, the lower rotation speeds made possible by OptiSlip® naturally reduce sound levels.

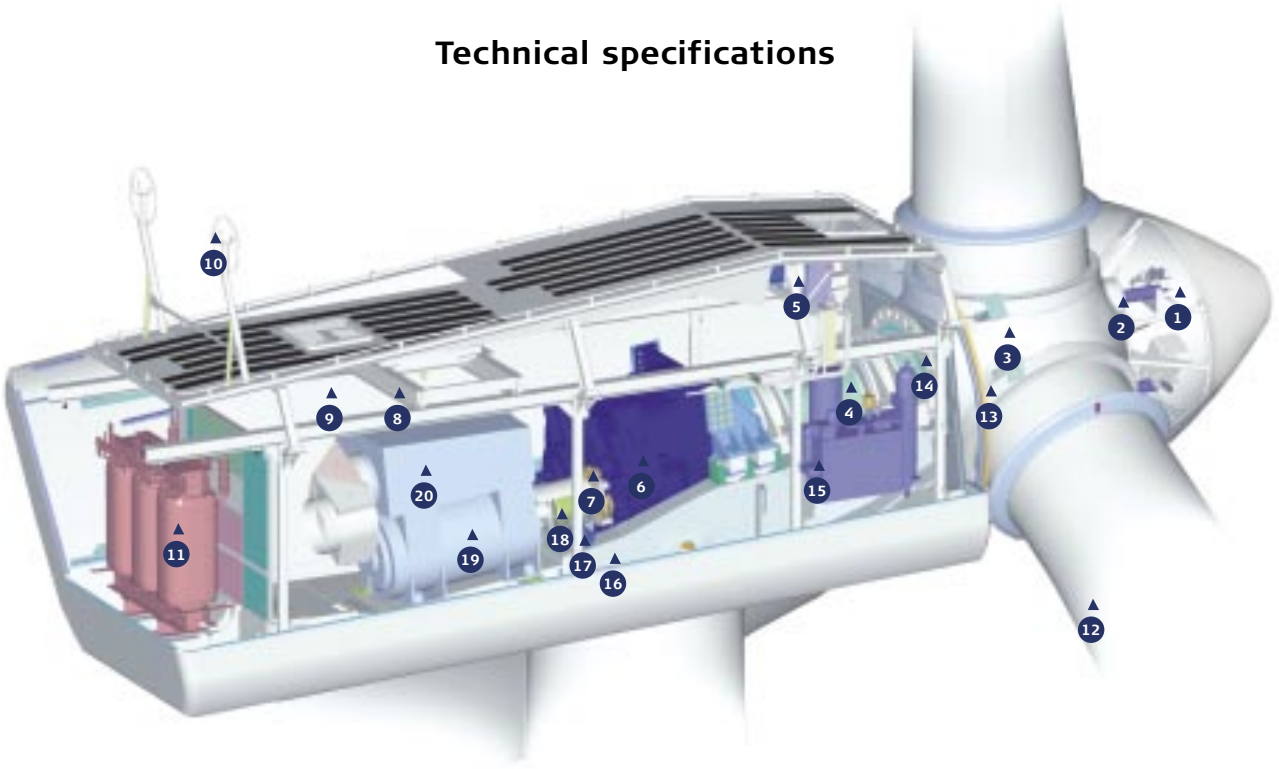
Finally, OptiSlip® helps the V80 deliver better quality power to the grid, with rapid synchronization, reduced harmonic distortion and less flicker. Quite simply, the V80-1.8 MW turbine is synonymous with more output, better quality power and less mechanical strain and sound.

## Proven performance

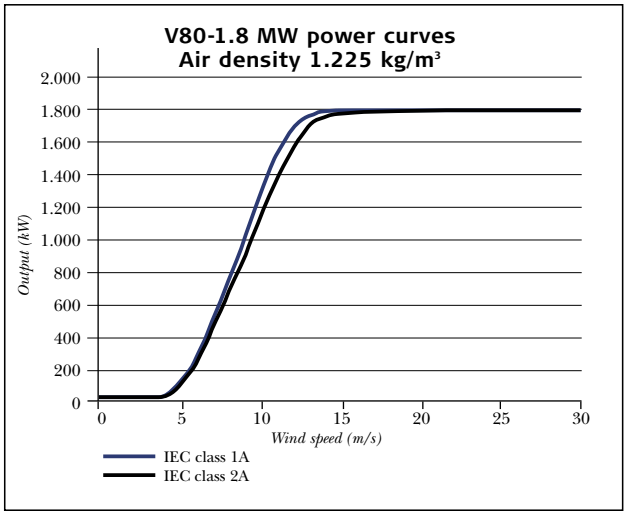
Wind power plants require substantial investments, and the process can be very complex. To assist in the evaluation and purchasing process, Vestas has identified four factors that are critical to wind turbine quality: energy production, operational availability, power quality and sound level.

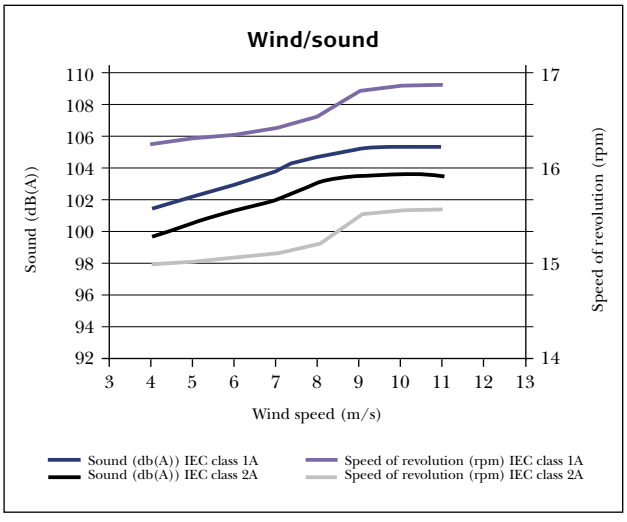
We spend months testing and documenting these performance areas for all Vestas turbines. When we are finally satisfied, we ask an independent testing organisation to verify the results – a practice we call Proven Performance. At Vestas we do not just talk about quality. We prove it.

# Technical specifications



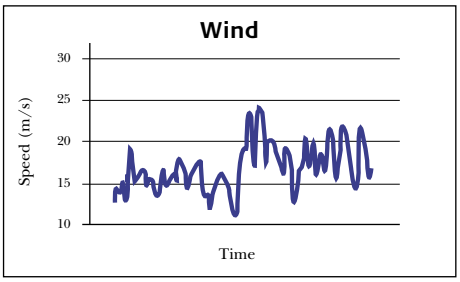

1. Hub controller
2. Pitch cylinders
3. Blade hub
4. Main shaft
5. Oil cooler
6. Gearbox
7. Mechanical disc brake
8. Service crane
9. VMP-Top controller with converter
10. Ultrasonic sensors
11. High voltage transformer (6-33 kW)
12. Blade
13. Blade bearing
14. Rotor lock system
15. Hydraulic unit
16. Machine foundation
17. Yaw gears
18. Composite disc coupling
19. OptiSplip® generator
20. Air cooler for generator

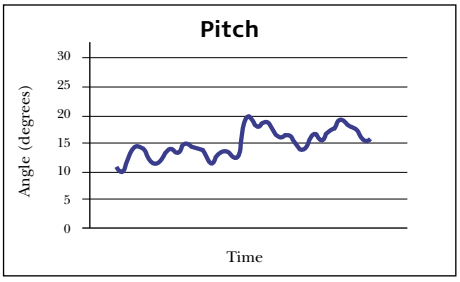


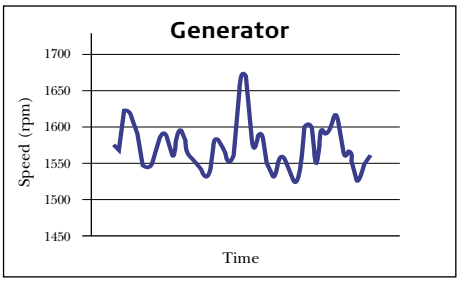



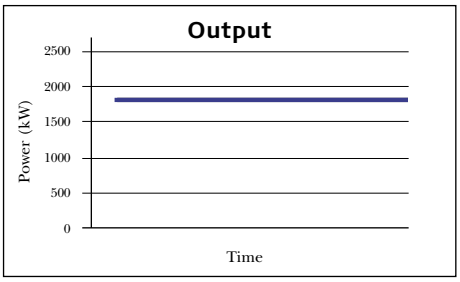

*The figure above illustrates the relationship between wind and sound levels, and that between wind and speeds of revolution for turbines equipped with OptiSpeed®. It clearly shows the sound level advantages of lower speeds of revolution because the beneficial effect on sound levels of lower speeds of revolution is approximately 7 dB(A) lower at 4 m/s than at 8 m/s. For other sound levels, the benefit can be as much as 10 dB(A). Please note that a decrease of 3 dB(A) is a halving of the sound level.*

*The sound output level can be adjusted by varying the revolution speed of the turbine as illustrated in the figure above. In practice, this means that, for example, the sound level recorded at a distance of 340 m (hub height 78 m) can be reduced from 44.5 to 40.4 dB(A) – i.e. by more than half the recorded level.*




*OptiSlip® allows the rotor speed to vary within a range of approximately 10 percent in relation to nominal rpm. This minimizes both unwanted fluctuations in the output to the grid supply and the loads on the vital parts of the construction.*

## Rotor

| | |
|---|---|
| Diameter: | 80 m |
| Area swept: | 5,027 m² |
| Nominal revolutions: | 15.5/16.8 rpm |
| Number of blades: | 3 |
| Power regulation: | Pitch/OptiSlip® |
| Air brake: | Full blade pitch by three separate pitch cylinders |

## Tower

| | |
|---|---|
| Hub height (approx.): | 60 m, 67 m, 78 m |

## Operational data

| | |
|---|---|
| Cut-in wind speed: | 4 m/s |
| Nominal wind speed (1,800 kW): | 15 m/s |
| Cut-out wind speed: | 25 m/s |

## Generator

| | |
|---|---|
| Type: | Asynchronous with OptiSlip® |
| Nominal output: | 1,800 kW |
| Operational data: | 60 Hz<br>690 V |

## Gearbox

| | |
|---|---|
| Type: | Planet/parallel axles |

## Control

| | |
|---|---|
| Type: | Microprocessor-based control of all the turbine functions with the option of remote monitoring. Output regulation and optimization via OptiSlip® and OptiTip® pitch regulation. |

## Weight (IEC IA/IEC IIA)

| Hub height: | 60 m | 67 m | 78 m |
|---|---|---|---|
| Tower: | 140 t/124 t | 158 t/142 t | 203 t/199 t |
| Nacelle: | 67 t | 67 t | 67 t |
| Rotor: | 37 t | 37 t | 37 t |
| Total: | 244 t/234 t | 262 t/252 t | 307 t/309 t |

*t = metric tons*

# Versatile megawattage

In many fields of engineering, flexibility and efficiency are considered almost diametric opposites – i.e. one can only be improved at the expense of the other. At Vestas, we specialize in finding ways to improve both at the same time. To see how we accomplish this, you need look no further than the V80, the cornerstone of our 2 MW class.

The V80 is a pitch-regulated turbine for medium and high winds that features OptiSlip® variable-speed technology. OptiSlip® allows the rotor speed to vary within a range of approximately 10 percent in relation to nominal rpm. OptiSlip® thereby significantly increases productivity and makes it possible to keep sound levels within the limits stipulated by local regulations.

This flexibility, enhanced by a variety of tower heights, makes the V80 particularly well suited to a wide range of sites.

Together with OptiTip®, our pitch-regulation system, OptiSlip® gives the V80 a competitive edge in its megawatt class. This edge, backed by Vestas' reputation for dependability, superior project management and service, has made the V80 one of the best-selling turbines in the world. The popularity of the turbine means that we are able to keep production costs – and hence your cost per kWh – to a minimum. It is just one more way in which the versatility of the V80 leads to increased efficiency.

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