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# PRELIMINARY ENVIRONMENTAL NOISE REPORT

PROPOSED FERGUS GOLF COURSE  
REDEVELOPMENT

WELLINGTON ROAD 19 AND THIRD LINE  
TOWNSHIP OF CENTRE WELLINGTON



PREPARED FOR  
883890 Ontario Limited c/o Fergus Development Inc.

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## SUMMARY

The existing golf course (the “Site”) consists of two (2) parcels; the northwest parcel which is 42.35 ha, situated on the north side of Wellington Road 19, and the southeast parcel which is 39.85 ha, situated on the south side of Wellington Road 19. The proposed residential development is located on the southeast parcel (the “SE Site”) and the communal water and wastewater services are integrated into the existing Golf Course, which will remain, on the northwest parcel (the “NW Site”). The Site is located in the Township of Centre Wellington, County of Wellington and is subject to road traffic noise from Wellington Road 19. It is not affected by rail, aircraft, or industrial noise sources.

The environmental noise guidelines of the community of Fergus, Township of Centre Wellington, County of Wellington and the Ministry of the Environment, Conservation and Parks (MOE) set out sound level limits for both indoor and outdoor space. Sound levels due to the adjacent roads were determined using ORNAMENT, the noise prediction model of the MOE.

Using the road traffic data obtained from the County of Wellington and the traffic consultant (BA Group) retained by the proponent, the sound levels for various locations within the proposed residential redevelopment were determined. It was found that with appropriate mitigative measures, all lots in the development will meet the noise guidelines.

Lots along Wellington Road 19 require provision for adding central air conditioning by the occupant if noise becomes a concern and a warning clause is recommended. Table 3 and Figure 2 show the central air conditioning requirements.

In addition, the lots with rear yards adjacent to Wellington Road 19, will require acoustic barriers up to 2.0 m high to be installed along the rear and side property lines. The mitigated sound levels in the rear yards are predicted to be 55 dBA or less. As per the latest preliminary grading plan, in some cases there are retaining walls proposed along the rear property line of the properties requiring acoustic fences. In these situations, the 2.0 m high acoustic fences are to be installed on top of the proposed retaining wall.

Based on the preliminary analysis, exterior wall, window and exterior door construction above typical building practices will not be necessary. Prior to issuance of building permits, the acoustical requirements should be reviewed to ensure compliance with the applicable guidelines. Prior to final occupancy, the lots should be inspected by an acoustical consultant to ensure the required mitigative measures have been incorporated.

Where minor excesses exist or mitigation is required, future occupants will be advised through the use of warning clauses.

A future sanitary pumping station is identified on the concept plan. A future waste water treatment plant and water treatment plant are proposed on the NW Site. Detailed information regarding noise sources associated with the sanitary pumping station and water treatment plant(s) are not available at this stage of the project. Once specific information is available, a detailed noise analysis should be prepared by the proponent of the sanitary pumping station and water treatment plant(s) to ensure the applicable guidelines are met at the proposed residential dwellings.

A dairy farm is located south of the proposed residential development and with the main building structures setback 200 m from the subject site property line. Existing residential lots are located immediately north and east of the dairy farm, closer than the proposed residential lots. The applicable sound level limits are required to be met at the existing residential dwellings and will therefore consequently be met at the subject site.

It should be noted that the Draft Plan of Condominium prepared by R-PE Surveying Ltd. included part numbers for all the lots. For the purpose of this report, lot and part numbers have been used interchangeably. The lot numbers shown on Figure 2 match the part numbers that are shown on the aforementioned Draft Plan of Condominium.

Purchasers/tenants of Lots 1, 7, 39, 73 and 74 will be advised through a warning clause that the dwelling is in proximity to a future sanitary pumping station or future water treatment plant(s) whose activities may at times be audible.

## 1.0 INTRODUCTION

Jade Acoustics Inc. was retained to prepare a Preliminary Environmental Noise Report to investigate the potential impact of noise on the proposed residential development to the satisfaction of the Township of Centre Wellington and the County of Wellington.

The proposed site is identified as:

NW Site:

Part of Lots 10 and 11

Concession 3 and Part of Road Allowance Between Lots 10 and 11,

Concession 3 (stopped up and closed by by-law No.74)

(Geographic Township of West Garafraxa)

Township of Centre Wellington

County of Wellington

SE Site:

Part of Lots 9 and 10

Concession 3

(Geographic Township of West Garafraxa)

Township of Centre Wellington

County of Wellington

The proposal includes redevelopment of the Fergus Golf Course to construct single detached dwellings within the SE site.

Surrounding land uses include agricultural land to the north and south, an existing residential development to the east, a dairy farm and existing residential to the southeast and the existing Fergus Golf Club on the NW Site, which will remain. The site is bounded by Wellington Road to the west, Third Line to the east as well as open space, existing residential and/or agricultural land to the south and the intersection of Wellington Road and Third Line to the north.

A Key Plan is attached as Figure 1.

The proposed redevelopment is comprised of single detached dwellings, open space blocks, a stormwater pond, a future sanitary pumping station and new internal roads. On the north side of Wellington Road 19 and associated with the proposed development is a future waste water treatment plant and water treatment plant.

The analysis was based on:

- Concept Plan prepared by GSP Group dated December 10, 2021;

- Draft Plan of Condominium prepared by R-PE Suveying Ltd. received February 11, 2022;
- Preliminary grading plan prepared by R.J. Burnside & Associates Limited received January 4, 2022;
- Road traffic information provided by the County of Wellington on February 17, 2021. Draft road traffic turning movement count (TMC) figures (for the year 2031) provided by BA Group on November 25, 2021; and
- A site visit conducted by Jade Acoustics Inc. on February 17, 2021.

Figure 2 shows the plan of the proposed residential development.

All dwellings are expected to be 1 to 2 storey residential buildings.

## **2.0 NOISE SOURCES**

### **2.1 Transportation Sources**

The road traffic on Wellington Road 19 and Third Line is the noise source with a potential impact on the proposed redevelopment. Road traffic information is summarized in Table 1. Correspondence regarding the road traffic information is included in Appendix A.

The ultimate road traffic data for Wellington Road 19 was provided by the traffic consultant (BA Group) in the form of TMC figures for the year 2031. Peak hour road traffic volumes (a.m. and p.m.) for Wellington Road 19 and Third Line (year 2031) were used to determine the average annual daily traffic (AADT) volumes for these two roads. As discussed with BA Group, the future AADT volumes were calculated by multiplying the higher of the a.m. or p.m. peak hour volumes by ten (10) which means that the peak hour volume was assumed to be 10% of the AADT volumes. This has been used in the analysis. The percentage of trucks and day/night split for Wellington Road 19 were determined by assessing existing traffic counts (the most recent from 2018, prior to the COVID-19 pandemic) as provided by the County of Wellington.

Further to above, it was determined that the ultimate AADT for Third Line (year 2031) would be less than one thousand (1,000) vehicles. Due to this low traffic volume, Third Line is acoustically insignificant and, as such, not considered further in this report. The same conclusion is applicable to the new internal roadways of the proposed subject site that will also have low traffic volumes.

The site is not affected by aircraft or rail traffic.

### **2.2 Stationary Sources**

A dairy farm is located south of the proposed residential development and with the main building structures setback 200 m from the subject site property line. Existing residential lots are located immediately north and east of the dairy farm, closer than the proposed residential lots. The applicable sound level limits are required to be met at the existing residential dwellings and will therefore consequently be met at the subject site. The dairy farm was not considered further in this report.

A future sanitary pumping station is proposed near the middle southeast portion of the proposed development. A future waste water treatment plant and water treatment plant are proposed on the NW Site to service the proposed dwellings. Detailed information regarding noise sources associated with the sanitary pumping station and water treatment plant(s) are not available at this stage of the project. The proposed sanitary pumping station and water treatment plant(s) are in proximity to proposed residential dwellings. Once the specific



building and mechanical information is determined and the site plan is available, a detailed noise analysis should be prepared by the proponent of the sanitary pumping station and water treatment plant(s) to ensure the MOE noise guidelines are met at the proposed/existing residential dwellings.

## **3.0 ENVIRONMENTAL NOISE CRITERIA**

The MOE document “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning, Publication NPC-300”, dated August, 2013, released October 21, 2013 (updated final version # 22) was used in the analysis. A brief summary of the NPC-300 guidelines is given in Appendix B.

The Township of Centre Wellington and the County of Wellington follow the MOE environmental noise criteria which are summarized below.

### **3.1 Transportation Sources**

#### **3.1.1 Indoors**

If the nighttime (11:00 p.m. to 7:00 a.m.) sound level in terms of Leq at the exterior face of a bedroom or living/dining room window is greater than 60 dBA and/or if the daytime (7:00 a.m. to 11:00 p.m.) sound level in terms of Leq at the exterior face of a bedroom or living/dining room 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 nighttime sound levels (LeqNight) greater than 50 dBA to less than or equal to 60 dBA on the exterior face of a bedroom or living/dining room window and/or daytime sound levels (LeqDay) greater than 55 dBA to less than or equal to 65 dBA on the exterior face of a bedroom or living/dining room window, there need only be the provision for adding central air conditioning by the occupant at a later date. This typically involves a ducted heating system sized to accommodate the addition of central air conditioning by the occupant at a later date. A warning clause advising the occupant of the potential interference with some activities is also required.

In all cases, air cooled condenser units must not exceed an AHRI sound rating of 7.6 bels. As noted in MOE document NPC-300, the location and installation of the outdoor air conditioning device should comply with the sound level limits of Publication NPC-216 or should comply with other criteria specified by the municipality. The air cooled condenser units must be sited in accordance with the zoning by-laws with respect to setbacks as well as location.

The current Township of Centre Wellington Noise By-law Number 5001-05 which regulates, prohibits and otherwise controls noise, has no sound level limits for the air conditioner condenser units.

As required by the MOE, the indoor noise criteria for road traffic noise is 40 dBA (Leq8hour) for the bedrooms during nighttime hours, 45 dBA (Leq8hour) for the living/dining rooms during nighttime hours and 45 dBA (Leq16hour) for the living/dining rooms and bedrooms during daytime hours. These criteria are used to determine the architectural requirements.

### 3.1.2 Outdoors

Based on the MOE guidelines, for outdoor amenity areas (Outdoor Living Area – OLA) a design goal of 55 dBA daytime (7:00 a.m. to 11:00 p.m.) sound level is used with an excess not greater than 5 dBA considered acceptable in some cases. Where the unmitigated sound level during the day exceeds 55 dBA (LeqDay) but is less than 60 dBA (LeqDay), a warning clause is required and mitigation should be considered. When the unmitigated sound level exceeds 60 dBA, sound barriers and warning clauses are generally required to achieve as close to 55 dBA as is technically, economically and administratively feasible.

The definition of outdoor amenity area as defined by the MOE is given below.

"Outdoor Living Area (OLA)

(applies to impact assessments of transportation sources) means that part of a noise sensitive land use that is:

- intended and designed for the quiet enjoyment of the outdoor environment; and
- readily accessible from the building.

The OLA includes:

- backyards, front yards, gardens, terraces or patios;
- balconies and elevated terraces (e.g. rooftops), with a minimum depth of 4 metres, that are not enclosed, provided they are the only outdoor living area (OLA) for the occupant; or
- common outdoor living areas (OLAs) associated with high-rise multi-unit buildings."

In this case, it is expected that any proposed balconies and/or elevated terraces associated with the single detached dwellings will be less than 4.0 m deep and as such are not considered to be noise sensitive receptors. The rear yards associated with the residential dwellings have been investigated. See Section 4.1 for further discussion.

For both indoor and outdoor conditions, where the acoustic criteria are exceeded, warning clauses must be placed in offers of purchase and sale or lease agreements, condominium documents and in the subdivision agreement.

### 3.2 Stationary Sources

The guidelines of the Ontario Ministry of the Environment, Conservation and Parks (MOE) for stationary sources are to be used for commercial/industrial facilities.

The MOE has recently published the document NPC-300 titled “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”.

The MOE also has vibration guidelines with respect to stationary sources, NPC-207. These guidelines require that the peak vibration velocities not exceed 0.3 mm/s at the point of reception during the day or night.

The MOE recognizes the need for back-up beepers/alarms as safety devices and as such does not have any guidelines or criteria to address these sources.

It should be noted that the MOE guidelines do not require that the source be inaudible, but rather that specific sound level limits be achieved.

With respect to stationary sources of noise in urban areas, the MOE guidelines require that the sound level due to the stationary source at the building façade and outdoor amenity spaces not exceed the sound level due to road traffic and in certain situations due to rail traffic in any hour of source operation, subject to specific exclusions. Tables C-5, C-6, C-7 and C-8 included in Appendix B provide the exclusion limit values of one-hour equivalent sound level (Leq, dBA) and impulsive sound level (L<sub>LM</sub>, dBAI).

In addition, the MOE guidelines require that most industries have a valid Environmental Compliance Approval (ECA) or its precursor, a Certificate of Approval (C of A) to operate.

In general, if the criteria for a stationary source of noise are exceeded, the MOE recommends that control be implemented at the source rather than at the receiver. Alternatively, if the receiver is set back from the source or if a physical barrier is constructed so that the criteria can be met at the receiver, no additional mitigative measures are required. Treatment of the receptor building by the use of suitable wall and window construction and central air conditioning to keep windows closed is not an acceptable solution to the MOE in Class 1 and 2 areas (urban). In addition, a warning clause in offers of purchase and sale and/or lease agreement noting the proximity of dwellings to such a source should be considered.

## **4.0 NOISE IMPACT ASSESSMENT**

### **4.1 Transportation Sources**

For road traffic noise, the sound level in terms of Leq, the energy equivalent continuous sound level for both day (Leq16hour, daytime) and night (Leq8hour, nighttime) was determined using the MOE Traffic Noise Prediction Model (ORNAMENT).

Table 2 provides a summary of the predicted sound levels outdoors due to road traffic at specific locations without any mitigative measures. Appendix C gives sample calculations. The topography between the source and the receiver has been taken into account. Shielding provided by the existing and proposed buildings has also been accounted for in the analysis. The rear yard receiver was assumed to be 3 m from the centre of the rear wall of the house.

Where applicable, the sound levels were calculated using an absorption coefficient of 0.33 to account for the reduced absorption of the ground area across the single loaded roads.

Lot 8 has a rear yard with full exposure to Wellington Road 19 and the unmitigated daytime sound level in the rear yard is predicted to be 61 dBA. The sound level at the rear wall (second storey) is predicted to be 61 dBA (daytime) and 52 dBA (nighttime).

For Lot 65 that is flanking Wellington Road 19, the unmitigated daytime sound level in the rear yard is predicted to be 56 dBA. The unmitigated daytime and nighttime sound levels at the side wall (second storey) are predicted to be 62 dBA and 54 dBA, respectively.

For Lots 71 and 72, the dwelling envelopes are expected to be configured such that the respective exterior side walls are parallel to Wellington Road 19. As such, the rear yards would be back-to-back and have exposure to Wellington Road 19 across Street C. An analysis was completed for the respective rear yards and the unmitigated sound level is predicted to be 55 dBA.

Table 2 provides a summary of the predicted sound levels outdoors due to road traffic at specific locations (the lots listed above as well as others) without any mitigative measures. Appendix C includes sample calculations.

Where the sound level limits are expected to be exceeded, mitigative measures and warning clauses are required.

### **4.2 Stationary Sources**

As discussed in Section 2.2, the existing dairy farm is expected to be acoustically insignificant at the proposed residential lots.

For the future sanitary pumping station and water treatment plant(s), a detailed noise analysis should be prepared by the proponent of these uses to ensure the MOE noise guidelines are met at the proposed/existing residential dwellings.

## 5.0 NOISE ABATEMENT REQUIREMENTS

The noise mitigation requirements for both the indoor and outdoor locations are detailed below. Table 3 and Figure 2 provide a summary of the acoustical mitigative requirements for the lots in this development.

### 5.1 Roads

#### 5.1.1 Indoors

##### Architectural Component Requirements

The indoor sound level criteria for road traffic can be achieved in all cases by using appropriate architectural elements for external walls, windows, exterior doors, and roof construction. The indoor sound level limit for road traffic noise is 40 dBA (Leq8hour) for the bedrooms during nighttime hours, 45 dBA (Leq8hour) for the living/dining rooms during nighttime hours and 45 dBA (Leq16hour) for the living/dining rooms and bedrooms during daytime hours. These criteria have been used in this analysis. The characteristic spectrum for road traffic has been accounted for in the determination of the architectural components. Appendix D contains a sample calculation of the architectural component selection.

Since house plans are not yet available, the final architectural choices cannot be made. Therefore, a preliminary analysis using assumed window and exterior wall percentages has been conducted to provide an indication of the architectural requirements. Once house plans are available, the architectural component requirements should be re-evaluated.

Calculations were completed for the second storey corner bedroom of the worst case location with exposure to Wellington Road 19 (for example, Lot 65 that is directly adjacent to Wellington Road 19). For the bedroom, the wall parallel to Wellington Road 19 (side wall) was assumed to be 55% of the floor area and the wall perpendicular to Wellington Road (rear wall) was also assumed to be 55% of the floor area. The windows were assumed on both the walls and to be 25% of the associated floor area.

Based on the ratios mentioned above, windows and exterior doors need to be up to STC 23 and exterior walls need to be up to STC 31. These STC ratings comply with the minimum structural and safety requirements provided by standard construction practices; therefore, standard window and exterior wall construction is acoustically acceptable for all proposed residential dwellings.

As a general note here, an STC 54 rating for the roof, normally met by most residential roof construction with ventilated attic space, would be acoustically acceptable.

## Ventilation Requirements

Where the sound level from road traffic is greater than 60 dBA (LeqNight) or greater than 65 dBA (LeqDay) on the outside face of a bedroom or living/dining room window, the indoor sound level criteria would not be met with open windows and provisions must be met to permit the windows to remain closed. The MOE guidelines require central air conditioning. Based on the analysis, central air conditioning is not required for any of the proposed lots.

Where the nighttime sound level (Leq8hour) is between 51 dBA and 60 dBA inclusive and daytime sound level (Leq16hour) is between 56 dBA and 65 dBA inclusive, the provision for adding central air conditioning by the occupants must be made. Based on the analysis, lots adjacent to Wellington Road 19 require the provision for adding central air conditioning and a warning clause. See Table 3 and Figure 2 for details.

The outdoor air conditioning condenser units must be sited in accordance with the Township's zoning by-laws. Even though the Township of Centre Wellington does not limit the sound rating for the outdoor air conditioning condenser units, we recommend that an AHRI sound rating of 7.6 bels not be exceeded.

Warning clauses will also be required to be placed in offers of purchase and sale, lease agreements, condominium documents and in the subdivision agreement for all relevant lots to make future occupants aware of the potential noise situation. See Table 3 for details.

### **5.1.2 Outdoors**

The outdoor amenity area is required to be exposed to a sound level of less than 55 dBA during the day. A 5 dBA increase is considered acceptable in certain situations. Typically, if the sound level is above 55 dBA, some form of mitigation is recommended and warning clauses are required. Where the sound levels exceed 60 dBA, mitigation is required.

Further to the discussion in Section 4.1, for Lots 71 and 72, the unmitigated predicted sound level in the rear yards is 55 dBA and therefore acoustic barriers are not required for those respective rear yard amenity spaces.

Sound barrier requirements evaluated using the preliminary grading plan prepared by R J Burnside and Associates Limited received January 4, 2022 are given in Table 3 and discussed below. The sound barrier locations and heights are shown on Figure 2. In all cases, the mitigated sound level in the rear yards is predicted to be 55 dBA or less.

For Lot 54, a 2.0 m high acoustic fence is required to be installed along the rear and side property lines. For the adjacent Lot 55, a 2.0 m high acoustic fence is required to be installed along the rear property line. For Lot 59, the 2.0 m high acoustic fence is required to be installed along the side property line and returned to the side wall of the dwelling.



For Lots 1, 7, 60, 65, 73 and 74 a 2.0 m high acoustic fence is required to be installed along the side property line and returned to the side wall of the respective dwelling.

For Lots 9 to 14, a 2.0 m high acoustic fence is required. The acoustic fence is to be installed along the rear property line of the respective lots, as shown on Figure 2.

The 2.0 m high acoustic fence is also required for Lots 8 and 15 and is to be installed along the rear and side property lines of the respective lots and return to the side wall of the respective dwellings, as shown on Figure 2.

Further to above and as shown on the preliminary grading plan, Lots 1, 7, 13 to 15, 73 and 74 include retaining walls proposed along the rear property line of the respective dwellings (and the proposed acoustic fences are shown on top of the retaining walls).

For the analysis work completed, the base of acoustic barrier elevation has been considered as the “top of wall” retaining wall elevation. Therefore, any potential changes to the preliminary grading plan related to the acoustic fences and/or retaining walls will need to be reviewed by an acoustical consultant to confirm sound level compliance is achieved. In general and to note here, the acoustic fence designs are to be consistent with the locations shown on Figure 2 of this noise report.

No other lots require sound barriers.

Sample calculations of the sound barrier analysis are included as Appendix E.

Generally, if a sound barrier is to be used, the sound barrier may be a fence, made of any one or a combination of various materials, berm, or a berm/fence combination. The sound barrier should be of continuous construction, with no gaps and should have a minimum surface density of 20 kg/m<sup>2</sup> or more. Appropriate treatment of the sound barrier at all discontinuities and points of termination would be required to ensure that the sound barrier is effective. This would involve extending the sound barrier to the front property line; returning to the side wall of the house or extending the sound barrier for a minimum of three times the distance between the side wall and the sound barrier, past the rear wall of the house. An acoustic gate of 20 kg/m<sup>2</sup> is very heavy. Therefore, if a gate is required, provided that it is of continuous construction with no gaps between the boards, it may have a surface density of less than 20 kg/m<sup>2</sup> and more than 10 kg/m<sup>2</sup>. In addition, any gaps at the bottom of the gate should be kept to a minimal height.

Gaps at the bottom of the acoustic fence are discouraged. If drainage gaps are necessary, special design techniques to create interrupted line of sight under the acoustic fence are required.

Where an excess will remain or where mitigation is required, a warning clause should be placed in offers of purchase and sale or lease agreements, condominium documents and in the subdivision agreement.

## **5.2 Stationary Sources**

As discussed in Section 2.2, the existing dairy farm is expected to be acoustically insignificant at the proposed residential lots.

For the future sanitary pumping station and water treatment plant(s), a detailed noise analysis should be prepared by the proponent of these uses to ensure the MOE noise guidelines are met at the proposed/existing residential dwellings.

## 6.0 CONCLUSIONS

With the incorporation of the items discussed (see Table 3, Notes to Table 3 and Figure 2), the sound levels will be within the appropriate MOE, community of Fergus, Township of Centre Wellington, County of Wellington environmental noise criteria. In accordance with Township, County and Ministry implementation guidelines where mitigation is required, future occupants will be advised through the use of warning clauses.

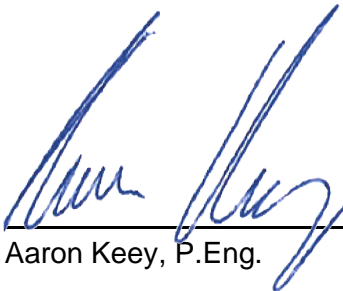
A detailed environmental noise report will need to be prepared once the detailed grading plans are available for the subject lands to ensure the appropriate criteria are achieved.


Prior to the issuance of building permits, the house plans should be reviewed by an acoustical consultant to ensure compliance with the applicable guidelines.

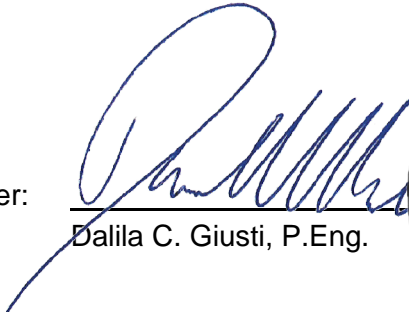
Prior to final occupancy, an acoustical consultant shall confirm that the acoustical requirements are in compliance with the acoustical report.

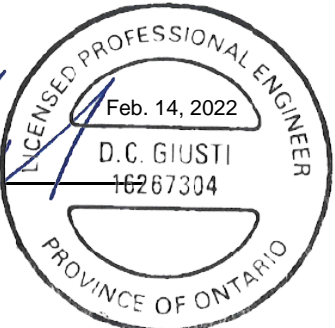
Respectfully submitted,

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## 7.0 REFERENCES

1. “Model Municipal Noise Control By-Law” Final Report, Ontario Ministry of the Environment, August, 1978.
2. “ORNAMENT – Ontario Road Noise Analysis Method for Environment and Transportation”, Ontario Ministry of the Environment, October, 1989.
3. “Building Practice Note No. 56: Controlling Sound Transmission into Buildings”, J.D. Quirt, Division of Building Research, National Research Council of Canada, September, 1985.
4. “Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning”, Ontario Ministry of the Environment, Conservation and Parks, Publication NPC-300, August, 2013, released October 21, 2013 (updated final version # 22).
5. Township of Centre Wellington Noise By-Law Number 5001-05, February 15, 2005.

**TABLE 1**  
**PROPOSED FERGUS GOLD COURSE REDEVELOPMENT**  
**WELLINGTON ROAD 19 AND THIRD LINE**  
**TOWNSHIP OF CENTRE WELLINGTON**

**SUMMARY OF ROAD TRAFFIC DATA**

ROAD	WELLINGTON ROAD 19
Ultimate AADT*	5,000
No. of Lanes	2
Posted Speed (km/h)	80
Trucks (%)	8
Medium/Heavy Split (%)	60/40
Gradient (%)	Up to 2
Day/Night Split (%)	94/6
R.O.W. Width (m)	30

\* AADT: Ultimate Annual Average Daily Traffic (year 2031).

**TABLE 2**  
**PROPOSED FERGUS GOLF COURSE REDEVELOPMENT**  
**WELLINGTON ROAD 19 AND THIRD LINE**  
**TOWNSHIP OF CENTRE WELLINGTON**

**SAMPLE OF PREDICTED UNMITIGATED SOUND LEVELS  
OUTDOORS DUE TO ROAD TRAFFIC**

Lots	Location*	Source	Distance (m)	Leq (dBA)	
				Day	Night
8	Rear Yard	Wellington Road 19	25.5	61	--
	Rear Wall	Wellington Road 19	28.5	61	52
53	Rear Yard	Wellington Road 19	98.0	49	--
	Side Wall	Wellington Road 19	84.5	51	43
54	Rear Yard	Wellington Road 19	44.5	57	--
	Rear Wall	Wellington Road 19	45.5	58	50
59	Rear Yard	Wellington Road 19	41.0	56	--
	Side Wall	Wellington Road 19	25.5	62	54
65	Rear Yard	Wellington Road 19	39.0	56	--
	Side Wall	Wellington Road 19	25.5	62	54
70	Front Wall	Wellington Road 19	41.0	60	52

\* Rear yard location taken 3 m from rear wall and 1.5 m above grade. Wall locations were taken at 4.5 m above ground for both daytime and nighttime hours.

**TABLE 3**  
**PROPOSED FERGUS GOLF COURSE REDEVELOPMENT**  
**WELLINGTON ROAD 19 AND THIRD LINE**  
**TOWNSHIP OF CENTRE WELLINGTON**

**SUMMARY OF MINIMUM NOISE ABATEMENT MEASURES**

Lots	Air Conditioning <sup>(1)</sup>	Exterior Wall <sup>(2)*</sup>	Window STC Rating <sup>(3)*</sup>	Sound Barrier <sup>(4)</sup>	Warning Clause <sup>(5)</sup>
Lots 1, 7, 73 and 74	Provision for Adding	Standard	Standard	2.0 m**	A, B, C, D
Lots 8 to 15, 54, 55, 59, 60 and 65	Provision for Adding	Standard	Standard	2.0 m**	A, B, C
Lots 66 to 70, 71 and 72	Provision for Adding	Standard	Standard	No	A, B
Lot 39	--	Standard	Standard	No	D
All other lots	No Special Requirements				

\* Based on preliminary calculations. See Section 5.1 for details.

\*\* 2.0 m high acoustic fence. See Figure 2 and text for details.

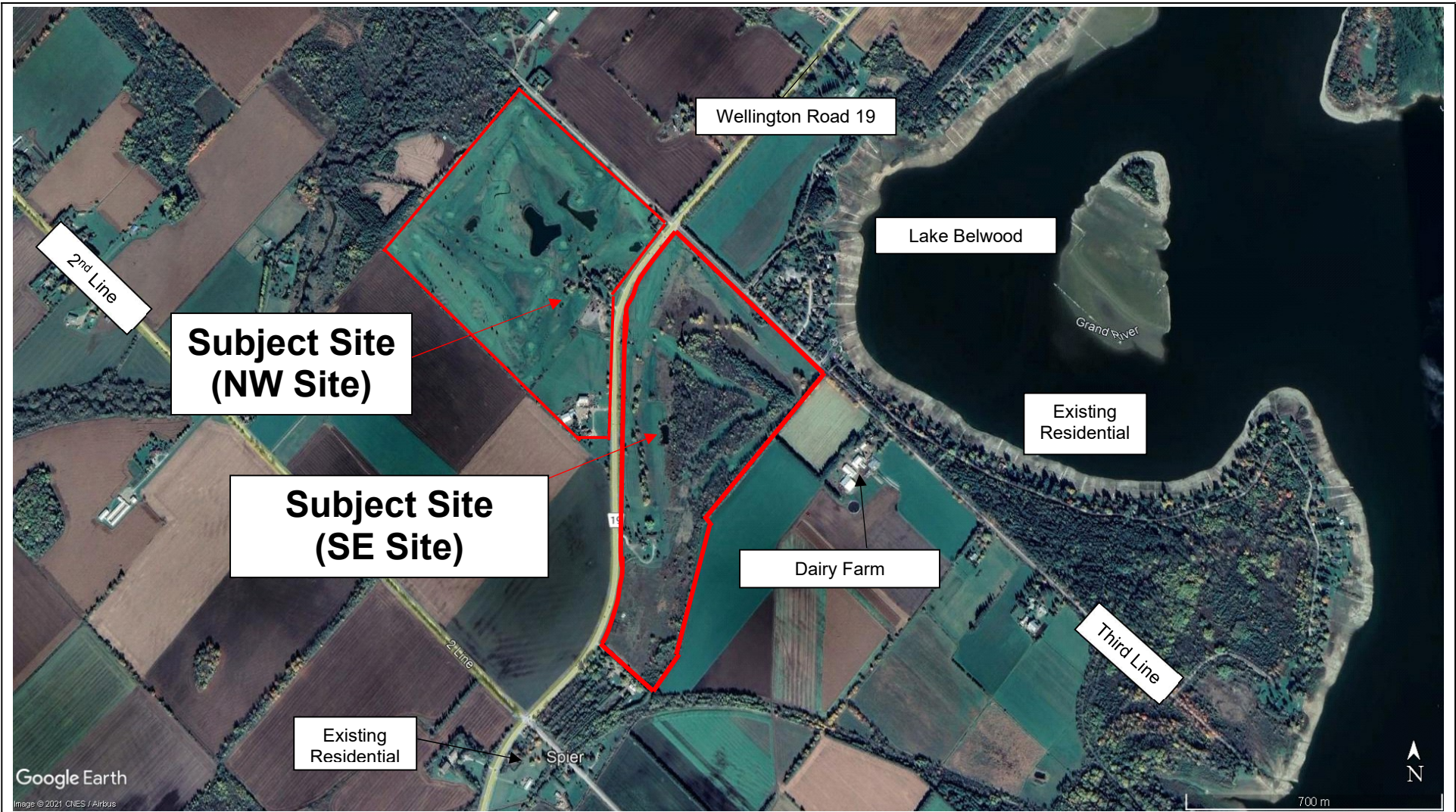
See Notes to Table 3 on following pages.

### NOTES TO TABLE 3

1. Provision for adding central air conditioning would involve a ducted heating system sized to accommodate the addition of central air conditioning by the occupant at a later date. The air cooled condenser unit must be located in compliance with NPC-216 (or other criteria specified by the municipality) and must not exceed on AHRI sound rating of 7.6 bels.
2. STC – Sound Transmission Class Rating (Reference ASTM-E413). Values shown are based on preliminary calculations using standard assumptions. See text for details.
3. STC – Sound Transmission Class Rating (Reference ASTM-E413). Values shown are based on preliminary calculations using standard assumptions. See text for details.
4. Sound barriers must be of solid construction with no gaps and have a minimum surface density of 20 kg/m<sup>2</sup>. Earthen berms, solid walls/fences of adequate density or combinations of berms and walls/fences may be used. See text for details.
5. Warning Clauses to be placed in the subdivision agreement, condominium documents and to be included in offers of purchase and sale or lease agreements on designated lots:
  - A. “Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks.”
  - B. “Purchasers/tenants are advised that this dwelling unit has been designed with the provision for adding central air conditioning at the occupant’s discretion. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks. (Note: locate air cooled condenser unit in a noise insensitive area and ensure that the unit has an AHRI sound rating not exceeding 7.6 bels.)”.
  - C. “Purchasers/tenants are advised that the acoustical berm and/or barrier as installed shall be maintained, repaired or replaced by the owner. Any maintenance, repair or replacement shall be with the same material, to the same standards and having the same colour and appearance of the original.”



- D. “Purchasers/tenants are advised that the dwelling unit is in proximity to a future sanitary pumping station or waste water treatment plant(s), whose activities may at time be audible.”
6. Conventional ventilated attic roof construction meeting typical construction practices is satisfactory in all cases.



N.T.S.

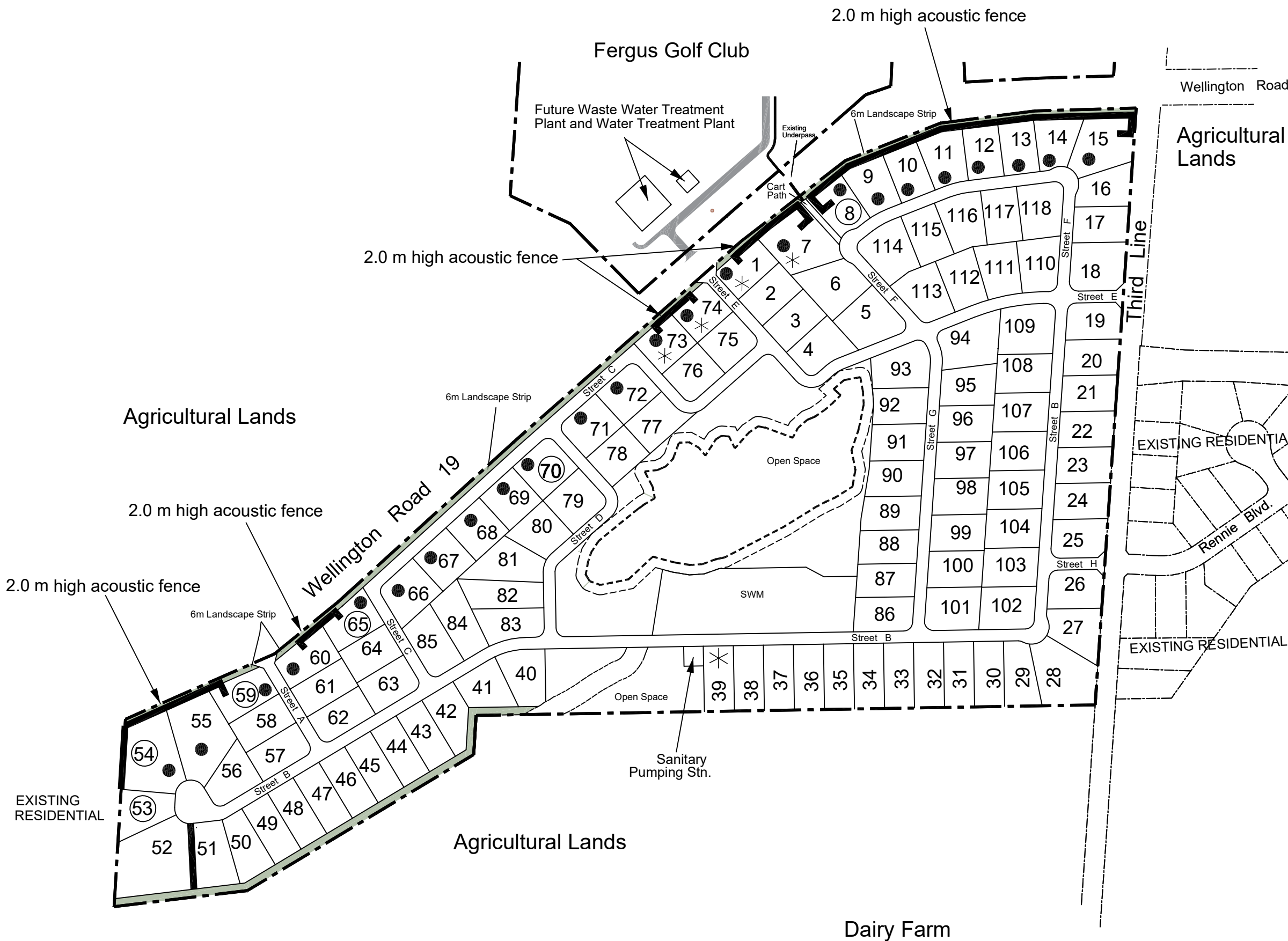
**Proposed Residential Redevelopment  
Fergus Golf Course  
County of Wellington**

**Date: February 2022**

**File: 21-019**

**KEY PLAN  
FIGURE 1**





- Legend:**
- Sound Barrier (See text and Table 3 for details)
  - Provision for Adding Central Air Conditioning and Warning Clause (See text and Table 3 for details)
  - Analyzed Lots
  - Warning Clause D (See text, Table 3 and Notes to Table 3 for details)

N.T.S.

Proposed Residential Redevelopment  
 Fergus Golf course (SE Site)  
 Wellington Road 19 and Third Line  
 Fergus, Ontario

Date: February 2022      Our File: 21-019

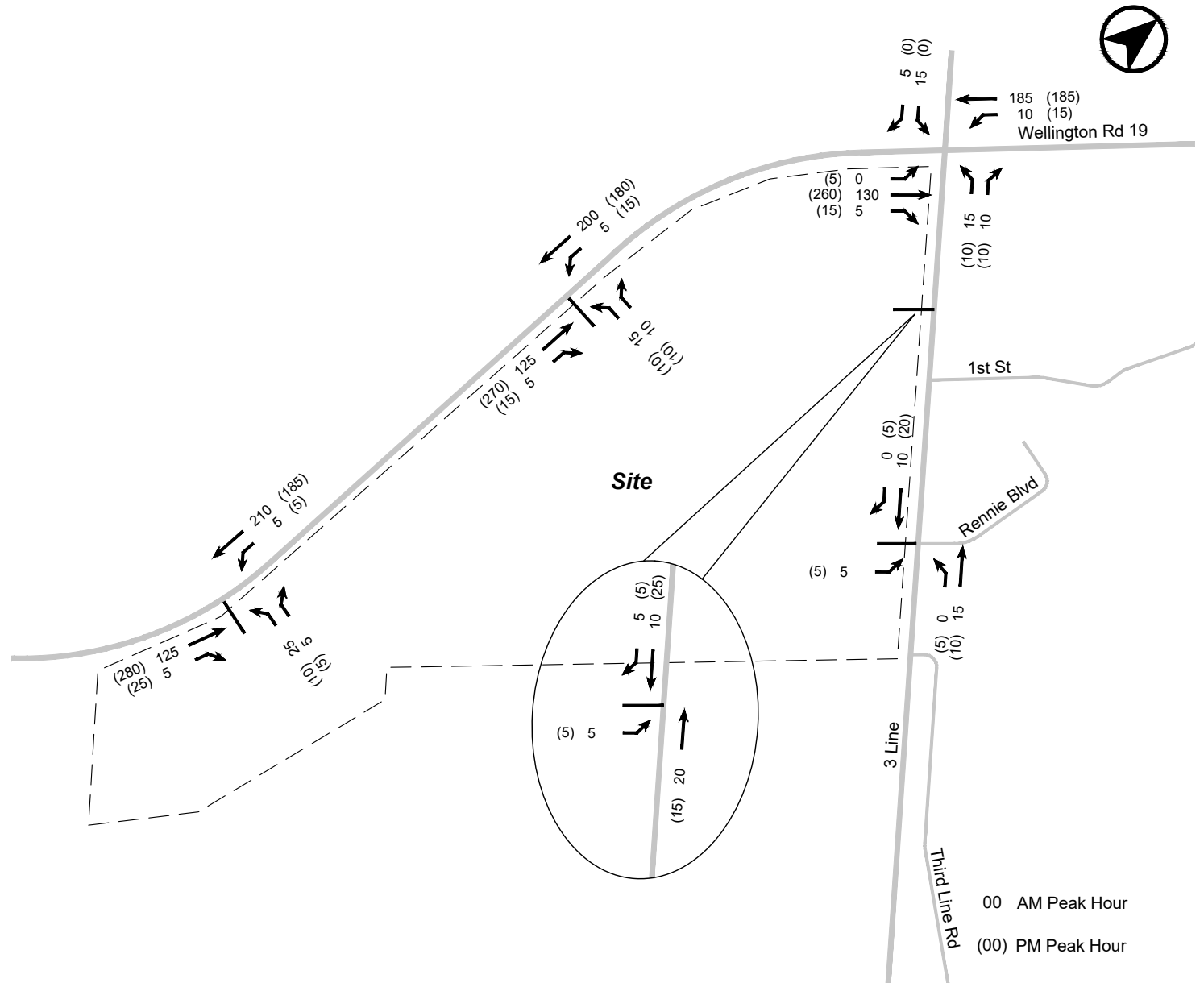


**PLAN OF  
 DEVELOPMENT  
 SHOWING NOISE  
 ABATEMENT  
 MEASURES**

**FIGURE 2**

## APPENDIX A

### CORRESPONDENCE REGARDING ROAD TRAFFIC



**FIGURE 15 2031 FUTURE TOTAL TRAFFIC VOLUMES**

<b>Report-1.3</b>		Location : <b>WC-1901EW</b> <b>WR19 - 0.1 km NorthEast of Second Line ~ Conc.2-3</b>														
		Direction : <b>East + West</b>				Road :										
		Dates : 1      5/24/2018														
Classes ----->		Class-1	Class-2	Class-3	Class-4	Class-5	Class-6	Class-7	Class-8	Class-9	Class-10	Class-11	Class-12	Class-13	Total	
00:00	0:15		4												4	0.1%
0:15	0:30		5			1									6	0.1%
0:30	0:45		4												4	0.1%
00:00	1:00		13			1									14	0.3%
1:00	1:15		2												2	0.0%
1:15	1:30		1				1								2	0.0%
1:30	1:45		1												1	0.0%
1:45	2:00			1		1									2	0.0%
1:00	2:00		4	1		1	1								7	0.1%
2:00	2:15			1											1	0.0%
2:15	2:30															
2:30	2:45		1												1	0.0%
2:45	3:00		1	1											2	0.0%
2:00	3:00		2	2											4	0.1%
3:00	3:15															
3:15	3:30		1												1	0.0%
3:30	3:45															
3:45	4:00															
3:00	4:00		1												1	0.0%
4:00	4:15		3												3	0.1%
4:15	4:30		3	3											6	0.1%
4:30	4:45		2	1											3	0.1%
4:45	5:00		2												2	0.0%
4:00	5:00		10	4											14	0.3%
5:00	5:15		4	8				1							13	0.2%
5:15	5:30		4	3		1									8	0.1%
5:30	5:45		10	10		5								1	26	0.5%
5:45	6:00	1	8	9		2									20	0.4%
5:00	6:00	1	26	30		8		1						1	67	1.2%
6:00	6:15		22	27		2									51	0.9%
6:15	6:30		29	14		1			1						45	0.8%
6:30	6:45		32	17		6	3								58	1.1%
6:45	7:00	1	31	13		11	1	1		1				1	60	1.1%
6:00	7:00	1	114	71		20	4	1	1	1				1	214	3.9%
7:00	7:15	1	40	19	2	1	3		1						67	1.2%
7:15	7:30		52	30	2	3	1		1	3				1	94	1.7%
7:30	7:45	2	54	31	2	2			1					1	93	1.7%
7:45	8:00		79	26	2	2	1		1						111	2.0%
7:00	8:00	3	225	106	8	8	5	1	6		2			1	365	6.7%
8:00	8:15		56	25	4	2								1	88	1.6%
8:15	8:30		68	20	5	4	1			2					100	1.8%
8:30	8:45	3	68	27		3	1								102	1.9%
8:45	9:00		50	26	2	4	3								85	1.6%
8:00	9:00	3	242	98	11	13	5			2	1				375	6.9%
9:00	9:15		51	23	1	7	1		1						85	1.6%
9:15	9:30	3	44	25	1	5	3		1					1	83	1.5%
9:30	9:45		48	16	2	2								1	69	1.3%
9:45	10:00	2	64	19		3	2	1	3						94	1.7%
9:00	10:00	5	207	83	4	17	6	1	5		2			1	331	6.1%
10:00	10:15	2	39	17	1	4	1							1	65	1.2%
10:15	10:30	1	47	12		5			1	1				1	68	1.2%
10:30	10:45	1	54	21	2	5	2		2						87	1.6%
10:45	11:00	1	40	25	2	2								1	71	1.3%
10:00	11:00	5	180	75	5	16	3	1	3		3				291	5.3%
11:00	11:15	3	34	22		3			1						63	1.2%
11:15	11:30	1	46	26	1	3	2								79	1.4%
11:30	11:45	1	48	16	2	7	4	1							79	1.4%
11:45	12:00	3	53	22		2								1	81	1.5%
11:00	12:00	8	181	86	3	15	6	1	1					1	302	5.5%

12:00	12:15		60	19		3		2		1		1	<b>86</b>	1.6%
12:15	12:30	3	46	22	1	2	4	3					<b>81</b>	1.5%
12:30	12:45		45	20		5	1		1				<b>72</b>	1.3%
12:45	13:00		49	31		1	2	2				1	<b>86</b>	1.6%
12:00	13:00	3	200	92	1	11	7	7	1	1		2	<b>325</b>	5.9%
13:00	13:15	2	54	15	1	2	1						<b>75</b>	1.4%
13:15	13:30	2	54	23			2	2		1			<b>84</b>	1.5%
13:30	13:45	1	57	22	1	4		1		1			<b>87</b>	1.6%
13:45	14:00	2	56	27	1	1				1			<b>88</b>	1.6%
13:00	14:00	7	221	87	3	7	3	3	1	2			<b>334</b>	6.1%
14:00	14:15		51	21	3	3	2	1					<b>81</b>	1.5%
14:15	14:30	2	58	23		2	2			1		2	<b>90</b>	1.6%
14:30	14:45	1	50	19		3	1	2				1	<b>77</b>	1.4%
14:45	15:00	1	47	21	2	5		1		1			<b>78</b>	1.4%
14:00	15:00	4	206	84	5	13	5	4		2		3	<b>326</b>	6.0%
15:00	15:15		61	31	1	5	1			1			<b>100</b>	1.8%
15:15	15:30		60	21	1	3		2	1				<b>88</b>	1.6%
15:30	15:45		79	24	7	2	1	1	1	1			<b>116</b>	2.1%
15:45	16:00	1	71	20	1	6	1	1		1			<b>102</b>	1.9%
15:00	16:00	1	271	96	10	16	3	4	3	2			<b>406</b>	7.4%
16:00	16:15	1	72	30		4	2	1					<b>110</b>	2.0%
16:15	16:30	2	77	22	2			1				1	<b>105</b>	1.9%
16:30	16:45	2	81	31		6	1	1					<b>122</b>	2.2%
16:45	17:00	2	82	31	1	5	2	1					<b>124</b>	2.3%
16:00	17:00	7	312	114	3	15	5	4				1	<b>461</b>	8.4%
17:00	17:15	4	92	42		4		1		1			<b>144</b>	2.6%
17:15	17:30	1	88	27	1	6	1	1					<b>125</b>	2.3%
17:30	17:45	4	85	32	1	5	3	1					<b>131</b>	2.4%
17:45	18:00	2	67	22		4	1	1	1				<b>98</b>	1.8%
17:00	18:00	11	332	123	2	19	5	1	3	1	1		<b>498</b>	9.1%
18:00	18:15	1	56	23		1		2		1		1	<b>85</b>	1.6%
18:15	18:30	3	63	25	1	2	1						<b>95</b>	1.7%
18:30	18:45	1	55	26	1	2	2	2					<b>89</b>	1.6%
18:45	19:00	2	63	18		3				1			<b>87</b>	1.6%
18:00	19:00	7	237	92	2	8	3	4		2		1	<b>356</b>	6.5%
19:00	19:15	8	43	14		1							<b>66</b>	1.2%
19:15	19:30	7	44	14									<b>65</b>	1.2%
19:30	19:45	2	43	18		2	1	2					<b>68</b>	1.2%
19:45	20:00	1	49	18								1	<b>69</b>	1.3%
19:00	20:00	18	179	64		3	1	2				1	<b>268</b>	4.9%
20:00	20:15	3	47	17		5	1						<b>73</b>	1.3%
20:15	20:30	1	43	12		1	1						<b>58</b>	1.1%
20:30	20:45	3	29	13		1							<b>46</b>	0.8%
20:45	21:00	2	30	16		2		1					<b>51</b>	0.9%
20:00	21:00	9	149	58		9	2	1					<b>228</b>	4.2%
21:00	21:15	3	30	8		4		2					<b>47</b>	0.9%
21:15	21:30	1	31	13	1			1					<b>47</b>	0.9%
21:30	21:45	2	29	8		1	1	1					<b>42</b>	0.8%
21:45	22:00	1	27	10		1							<b>39</b>	0.7%
21:00	22:00	7	117	39	1	6	1	4					<b>175</b>	3.2%
22:00	22:15		13	6									<b>19</b>	0.3%
22:15	22:30		13	3		1							<b>17</b>	0.3%
22:30	22:45		15	6									<b>21</b>	0.4%
22:45	23:00		13	2		1							<b>16</b>	0.3%
22:00	23:00		54	17		2							<b>73</b>	1.3%
23:00	23:15		10	7									<b>17</b>	0.3%
23:15	23:30		7	1									<b>8</b>	0.1%
23:30	23:45		1	2									<b>3</b>	0.1%
23:45	00:00		4										<b>4</b>	0.1%
23:00	00:00		22	10									<b>32</b>	0.6%
<b>Total</b>			<b>100</b>	<b>3505</b>	<b>1432</b>	<b>58</b>	<b>208</b>	<b>65</b>	<b>7</b>	<b>52</b>	<b>9</b>	<b>18</b>	<b>13</b>	<b>5467</b>
			1.8%	64.1%	26.2%	1.1%	3.8%	1.2%	0.1%	1.0%	0.2%	0.3%	0.2%	
<b>AM PEAK</b>			<b>3</b>	<b>79</b>	<b>31</b>	<b>5</b>	<b>11</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>111</b>
period			8:30	7:45	7:30	8:15	6:45	11:30	5:00	7:15	8:15	7:15	5:30	7:45
% of class			3.0%	2.3%	2.2%	8.6%	5.3%	6.2%	14.3%	5.8%	22.2%	5.6%	7.7%	2.0%
<b>PM PEAK</b>			<b>8</b>	<b>92</b>	<b>42</b>	<b>7</b>	<b>6</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>144</b>
period			19:00	17:00	17:00	15:30	15:45	12:15	17:00	12:15	12:30	12:00	14:15	17:00
% of class			8.0%	2.6%	2.9%	12.1%	2.9%	6.2%	14.3%	5.8%	11.1%	5.6%	15.4%	2.6%

## APPENDIX B

### ENVIRONMENTAL NOISE CRITERIA



**ONTARIO MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MOE)**

Reference: "Environmental Noise Guidelines Stationary and Transportation Sources – Approval and Planning", Publication NPC-300, August, 2013, released October 21, 2013 (updated final version #22).

**SOUND LEVEL CRITERIA FOR ROAD AND RAIL NOISE**

**TABLE C-1**

**Sound Level Limit for Outdoor Living Areas**

**Road and Rail**

<b>Time Period</b>	<b>Leq (16) (dBA)</b>
16 hr., 07:00 - 23:00	55

**TABLE C-2**

**Indoor Sound Level Limits**

**Road and Rail**

<b>Type of Space</b>	<b>Time Period</b>	<b>Leq (dBA)</b>	
		<b>Road</b>	<b>Rail</b>
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	07:00 – 23:00	45	40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	23:00 – 07:00	45	40
Sleeping quarters	07:00 – 23:00	45	40
	23:00 – 07:00	40	35

## SOUND LEVEL CRITERIA FOR AIRCRAFT NOISE

**TABLE C-3**

### Outdoor Aircraft Noise Limit

Time Period	NEF/NEP
24-hour	30

**TABLE C-4**

### Indoor Aircraft Noise Limit (Applicable over 24-hour period)

Type of Space	Indoor NEF/NEP*
Living/dining/den areas of residences, hospitals, nursing/retirement homes, schools, daycare centres, etc.	5
Sleeping Quarters	0

- \* The indoor NEF/NEP values in Table C-4 are used to determine acoustical insulation requirements based on the NEF/NEP contour maps.

## SOUND LEVEL CRITERIA FOR STATIONARY SOURCES

**TABLE C-5**

### Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA) Outdoor Points of Reception

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	55
19:00 – 23:00	50	45	40	55

**TABLE C-6**

**Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA)  
Plane of Window of Noise Sensitive Spaces**

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 19:00	50	50	45	60
19:00 – 23:00	50	50	40	60
23:00 – 07:00	45	45	40	55

**TABLE C-7**

**Exclusion Limit Values for Impulsive Sound Level (L<sub>LM</sub>, dBAI)  
Outdoor Points of Reception**

Time of Day	Actual Number of Impulses in Period of One Hour	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00 – 23:00	9 or more	50	50	45	55
	7 to 8	55	55	50	60
	5 to 6	60	60	55	65
	4	65	65	60	70
	3	70	70	65	75
	2	75	75	70	80
	1	80	80	75	85

**TABLE C-8****Exclusion Limit Values of Impulsive Sound Level ( $L_{LM}$ , dBAI)  
Plane of Window - Noise Sensitive Spaces (Day/Night)**

<b>Actual Number of Impulses in Period of One Hour</b>	<b>Class 1 Area (07:00-23:00)/ (23:00-07:00)</b>	<b>Class 2 Area (07:00-23:00)/ (23:00-07:00)</b>	<b>Class 3 Area (07:00-19:00)/ (19:00-07:00)</b>	<b>Class 4 Area (07:00-23:00)/ (23:00-07:00)</b>
9 or more	50/45	50/45	45/40	60/55
7 to 8	55/50	55/50	50/45	65/60
5 to 6	60/55	60/55	55/50	70/65
4	65/60	65/60	60/55	75/70
3	70/65	70/65	65/60	80/75
2	75/70	75/70	70/65	85/80
1	80/75	80/75	75/70	90/85

**SUPPLEMENTARY SOUND LEVEL LIMITS**

Indoor limits for transportation sources applicable to noise sensitive land uses are specified in Table C-2 and Table C-4. Table C-9 and Table C-10 are expanded versions of Table C-2 and Table C-4, and present guidelines for acceptable indoor sound levels that are extended to land uses and developments which are not normally considered noise sensitive. The specified values are maximum sound levels and apply to the indicated indoor spaces with the windows and doors closed. The sound level limits in Table C-9 and Table C-10 are presented as information, for good-practice design objectives.

**TABLE C-9****Supplementary Indoor Sound Level Limits  
Road and Rail**

Type of Space	Time Period	Leq (Time Period) (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	16 hours between 07:00 – 23:00	50	45
Living/dining areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	16 hours between 07:00 – 23:00	45	40
Sleeping quarters of hotels/motels	8 hours between 23:00 – 07:00	45	40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	8 hours between 23:00 – 07:00	40	35

**TABLE C-10****Supplementary Indoor Aircraft Noise Limit  
(Applicable over 24-hour period)**

Type of Space	Indoor NEF/NEP*
General offices, reception areas, retail stores, etc.	15
Individual or semi-private offices, conference rooms, etc.	10
Living/dining areas of residences, sleeping quarters of hotels/motels, theatres, libraries, schools, daycare centres, places of worship, etc.	5
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	0

\* The indoor NEF/NEP values in Table C-10 are not obtained from NEF/NEP contour maps. The values are representative of the indoor sound levels and are used as assessment criteria for the evaluation of acoustical insulation requirements.

## APPENDIX C

### SAMPLE CALCULATION OF PREDICTED UNMITIGATED SOUND LEVELS

**APPENDIX C-1**  
**SAMPLE CALCULATION OF PREDICTED SOUND LEVELS**

FILE: 21-019  
NAME: Fergus Golf Course Redevelopment  
REFERENCE DRAWINGS: Preliminary Grading Plan  
LOCATION: Lot 65, 4.5 m above grade, side wall, daytime

---

Noise Source: Wellington Road 19

Time Period: 16 hr. (day)

Distance (m): 25.5

---

**CALCULATION OF PREDICTED SOUND LEVELS\***

Reference Leq (dBA)\*: 66.90

Height and/or Distance Correction (dBA): -3.63

Finite Element Correction (dBA): -1.31

Allowance for Screening (dBA): 0.00

Allowance for Future Growth (dBA): incl.

---

LeqDay (dBA): 61.96

\* Leq determined using the computerized model of the Ministry of the Environment, Conservation and Parks Noise Assessment Guidelines, STAMSON Version 5.04 (ORNAMENT). See attached printouts.

**APPENDIX C-2**  
**SAMPLE CALCULATION OF PREDICTED SOUND LEVELS**

FILE: 21-019  
NAME: Fergus Golf Course Redevelopment  
REFERENCE DRAWINGS: Preliminary Grading Plan  
LOCATION: Lot 65, 4.5 m above grade, side wall, nighttime

---

Noise Source:	Wellington Road 19
Time Period:	8 hr. (night)
Distance (m):	25.5

---

**CALCULATION OF PREDICTED SOUND LEVELS\***

Reference Leq (dBA)*:	58.54
Height and/or Distance Correction (dBA):	-3.63
Finite Element Correction (dBA):	-1.31
Allowance for Screening (dBA):	0.00
Allowance for Future Growth (dBA):	incl.

---

LeqNight (dBA):	53.60
-----------------	-------

\* Leq determined using the computerized model of the Ministry of the Environment, Conservation and Parks Noise Assessment Guidelines, STAMSON Version 5.04 (ORNAMENT). See attached printouts.



**Filename:** lot65br.te                      **Time Period:** Day/Night 16/8 hours  
**Description:** Lot 65 building requirement

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

```
-----
Car traffic volume : 4278/322 veh/TimePeriod *
Medium truck volume : 233/17 veh/TimePeriod *
Heavy truck volume : 140/10 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 5000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 3.00
Day (16 hrs) % of Total Volume : 93.00
```

Data for Segment # 1: Wellington (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 : 25.50 / 25.50 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Results segment # 1: Wellington (day)

Source height = 1.32 m

```
ROAD (0.00 + 61.96 + 0.00) = 61.96 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
-----
-90 90 0.58 66.90 0.00 -3.63 -1.31 0.00 0.00 0.00 61.96
-----
```

Segment Leq : 61.96 dBA

Total Leq All Segments: 61.96 dBA

Results segment # 1: Wellington (night)

-----  
Source height = 1.30 m

ROAD (0.00 + 53.60 + 0.00) = 53.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	58.54	0.00	-3.63	-1.31	0.00	0.00	0.00	53.60

-----  
Segment Leq : 53.60 dBA

Total Leq All Segments: 53.60 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.96  
(NIGHT): 53.60

**APPENDIX C-3**  
**SAMPLE CALCULATION OF PREDICTED SOUND LEVELS**

FILE: 21-019  
NAME: The Villages at Fairview Greens  
REFERENCE DRAWINGS: Preliminary Grading Plan  
LOCATION: Lot 8, 1.5 m above grade, rear yard

---

Noise Source:	Wellington Road 19
Time Period:	16 hr. (day)
Distance (m):	25.5

---

**CALCULATION OF PREDICTED SOUND LEVELS\***

Reference Leq (dBA)*:	66.49
Height and/or Distance Correction (dBA):	-3.82
Finite Element Correction (dBA):	-1.46
Allowance for Screening (dBA):	0.00
Allowance for Future Growth (dBA):	incl.

---

LeqDay (dBA):	61.21
---------------	-------

\* Leq determined using the computerized model of the Ministry of the Environment, Conservation and Parks Noise Assessment Guidelines, STAMSON Version 5.04 (ORNAMENT). See attached printouts.

**Filename: lot8ry.te                    Time Period: Day/Night 16/8 hours**  
**Description: Lot 8 rear yard unmitigated**

Road data, segment # 1: Wellington (day)

```
-----
Car traffic volume : 4278            veh/TimePeriod *
Medium truck volume : 233           veh/TimePeriod *
Heavy truck volume : 140            veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient       : 1 %
Road pavement       : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 5000
Percentage of Annual Growth        : 0.00
Number of Years of Growth          : 0.00
Medium Truck % of Total Volume     : 5.00
Heavy Truck % of Total Volume      : 3.00
Day (16 hrs) % of Total Volume     : 93.00
```

Data for Segment # 1: Wellington (day)

```
-----
Angle1    Angle2            : -90.00 deg    90.00 deg
Wood depth                    : 0            (No woods.)
No of house rows              : 0
Surface                        : 1            (Absorptive ground surface)
Receiver source distance       : 25.50 m
Receiver height                : 1.50 m
Topography                     : 2            (Flat/gentle slope; with barrier)
Barrier angle1                 : -90.00 deg    Angle2 : 90.00 deg
Barrier height                 : 0.10 m
Barrier receiver distance      : 5.00 m
Source elevation               : 432.30 m
Receiver elevation              : 432.25 m
Barrier elevation               : 432.45 m
Reference angle                : 0.00
```

Results segment # 1: Wellington (day)

Source height = 1.32 m

Barrier height for grazing incidence

```
-----
Source       ! Receiver    ! Barrier       ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
          1.32 !            1.50 !            1.27 !            433.72
```

ROAD (0.00 + 61.21 + 0.00) = 61.21 dBA

```
-----
Angle1 Angle2    Alpha RefLeq    P.Adj    D.Adj    F.Adj    W.Adj    H.Adj    B.Adj    SubLeq
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----
-90     90     0.66 66.49    0.00 -3.83    -1.46    0.00    0.00    0.00    61.21
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----
```

Segment Leq : 61.21 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.21 dBA

## APPENDIX D

### SAMPLE CALCULATION OF ARCHITECTURAL COMPONENT SELECTION



## APPENDIX E

### SAMPLE CALCULATION OF SOUND BARRIER ANALYSES

**Filename:** lot8ry.te                    **Time Period:** Day/Night 16/8 hours  
**Description:** Lot 8 rear yard - mitigated

Road data, segment # 1: Wellington (day)

```
-----
Car traffic volume : 4278            veh/TimePeriod *
Medium truck volume : 233            veh/TimePeriod *
Heavy truck volume : 140            veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 5000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 5.00
Heavy Truck % of Total Volume : 3.00
Day (16 hrs) % of Total Volume : 93.00
```

Data for Segment # 1: Wellington (day)

```
-----
Angle1    Angle2            : -90.00 deg    90.00 deg
Wood depth                : 0            (No woods.)
No of house rows           : 0
Surface                    : 1            (Absorptive ground surface)
Receiver source distance : 25.50 m
Receiver height            : 1.50 m
Topography                : 2            (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg    Angle2 : 90.00 deg
Barrier height             : 0.10 m
Barrier receiver distance : 5.00 m
Source elevation          : 432.30 m
Receiver elevation        : 432.25 m
Barrier elevation         : 432.45 m
Reference angle            : 0.00
```

Results segment # 1: Wellington (day)

Source height = 1.32 m

Barrier height for grazing incidence

```
-----
Source        ! Receiver        ! Barrier        ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
          1.32 !           1.50 !           1.27 !           433.72
```

ROAD (0.00 + 61.21 + 0.00) = 61.21 dBA

```
-----
Angle1 Angle2    Alpha RefLeq    P.Adj    D.Adj    F.Adj    W.Adj    H.Adj    B.Adj SubLeq
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----
-90     90    0.66 66.49    0.00 -3.83    -1.46    0.00    0.00    0.00 61.21
-----
```

Segment Leq : 61.21 dBA

Total Leq All Segments: 61.21 dBA



Barrier table for segment # 1: Wellington (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
1.80	434.25	55.60	55.60
1.90	434.35	55.27	55.27
2.00	434.45	54.92	54.92
2.10	434.55	54.56	54.56
2.20	434.65	54.19	54.19
2.30	434.75	53.82	53.82
2.40	434.85	53.45	53.45
2.50	434.95	53.09	53.09
2.60	435.05	52.75	52.75
2.70	435.15	52.41	52.41
2.80	435.25	52.09	52.09
2.90	435.35	51.77	51.77
3.00	435.45	51.47	51.47
3.10	435.55	51.18	51.18
3.20	435.65	50.90	50.90
3.30	435.75	50.64	50.64
3.40	435.85	50.38	50.38
3.50	435.95	50.13	50.13
3.60	436.05	49.89	49.89
3.70	436.15	49.66	49.66

The predicted mitigated sound level with a 2.0 m high acoustic fence installed (as shown on Figure 2) is 54.92 dBA.