FINAL REPORT

CORPORATION OF THE CITY OF WINDSOR

WINDSOR, ONTARIO

WYANDOTTE STREET EXTENSION: ENVIRONMENTAL NOISE STUDY

RWDI #1901948

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SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI was retained by the City of Windsor to assess the potential environmental noise impacts of the proposed extension of Wyandotte Street East to Jarvis Avenue. Five different alternatives for the proposed extension have been investigated. Traffic data were based on traffic impact assessment done by WSP and provided by the City of Windsor for 20-year horizon year. Road traffic sound levels were predicted using TNM 2.5.

The predicted sound levels from various scenarios are comparable, and thus, there is no preferred scenario from environmental noise standpoint. Future sound levels at all representative receptors for all scenarios are less than the MTO guideline criteria of 65 dBA. Residences along Jarvis Avenue, close to the Wyandotte Street extension, are predicted to be exposed to a change of the sound levels higher than 5 dBA as a result of Wyandotte Street extension for any of the proposed alternatives. Mitigation analysis is required as per MTO guidelines. However, mitigation would be challenging and not practical given that the residences have driveways along Jarvis Avenue and Dillon Drive, and this study is outside the scope of the current assessment. Moreover, a mitigation study will be more efficient once the city confirms the adopted future scenario.

Construction activities are temporary in nature with sound levels noticeable at times. Methods to minimize construction noise impacts were outlined in this report and suggested to be written into the contract documentation for the contractor.

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1 INTRODUCTION

RWDI was retained by the City of Windsor to conduct an environmental noise assessment for the proposed extension of Wyandotte Street East to Jarvis Avenue. Different alternatives for the proposed extension were assessed. Sound levels at Noise-Sensitive Receivers (NSRs) were predicted for each alternative while comparing the difference in impact between the "Future Build" and "Future No-Build" sound levels (i.e., sound levels with and without the proposed project taking place). Applicable guidelines for construction noise are also outlined in this study while providing recommendations for mitigation to minimize the potential for construction noise impacts. A plain language description of terminology and relationships between everyday sounds to aid the non-technical reader is provided in **Appendix A**.

2 PROJECT DESCRIPTION

Wyandotte Street East is a class-II arterial road that runs east-west through the City of Windsor. The scope of the current study covers the proposed extension of Wyandotte Street East to Jarvis Avenue. Different alternatives are proposed for the undertaking which can be summarized in **Table 1**:

Table 1: Different Scenarios of the Project Undertaking

Scenario	Wyandotte Street East	Beverley Glen Street
Scenario 1 (No-Build)	No Change	No Change
Scenario 2a	Extension of Wyandotte Street to Jarvis Avenue	No Change
Scenario 2b	Extension of Wyandotte Street directly to Dillon Drive	No Change
Scenario 3	Extension of Wyandotte Street to Jarvis Avenue	Extending of Beverly Glen Street to Jarvis Avenue, while ending Jarvis with a cul-de-sac at Riverside with no connection to Riverside Drive East
Scenario 4	Extension of Wyandotte Street to Jarvis Avenue	Extending of Beverly Glen Street to Jarvis Avenue
Scenario 5	Extension of Wyandotte Street to Jarvis Avenue	Extending of Beverly Glen Street to Jarvis Avenue, while extending Jarvis to Little River Blvd

The schematic of all the different five scenarios is provided in **Appendix B** based on the traffic impact assessment done by WSP. Traffic data are based on the same study by WSP for 20-year horizon and provided in **Appendix B** as well.

3 ROAD TRAFFIC SOUND LEVEL ASSESSMENT

3.1 Applicable Guidelines

The applicable guidelines adopted by the City of Windsor, as per the proposal, are the Ministry of Transportation (MTO) highway guidelines. MTO has two applicable guidelines: MTO Environmental Guide for Noise (MTO, 2006), and the MTO Environmental Reference for Highway Design (MTO, 2013). Sound impacts are assessed by comparing the future sound levels with and without the proposed undertaking. Sound levels are evaluated as 24-hour equivalent sound level based on the Average Annual Daily Traffic (AADT). If the predicted changes as a result of the undertaking are equal or greater than 5 dBA or if the future sound levels with the undertaking are equal or greater than 65 dBA, mitigation efforts have to be assessed. Thus, the future sound levels are assessed based on the relative change from the future ambient and on absolute basis regarding the impact level at the receivers. Noise control measures have to be technically, economically and administratively feasible. The MTO guidance assessment criteria is summarized in **Table 2**.

Table 2: Assessment Criteria Based on MTO Guidelines

Change in Noise Level Above Ambient/ Projected Noise Levels with Proposed Developments	Mitigation Efforts Required
< 5 dBA change & < 65 dBA	None
≥ 5 dBA change OR ≥ 65 dBA	• Investigate noise control measures on right-of-way. • Introduce noise control measures within right-of-way and mitigate to ambient if technically, economically and administratively feasible. • Noise control measures, where introduced, should achieve a minimum of 5 dBA attenuation, over first row receivers.

3.2 Traffic Data

Traffic data are based on the traffic impact assessment done by WSP and provided by the City of Windsor. AADT for all the neighbouring roads for the “Future Build” and “Future No-Build” scenarios for 20-year horizon are estimated. The future build traffic data covered all the different proposed alternatives. The traffic data are summarized in **Appendix B**. Based on aerial photography and client feedback, no commercial traffic is expected (i.e., no medium or heavy trucks). The speed limit for the roads in the area of study are 50 km/hr.

3.3 Noise-Sensitive Land Uses

Under the MTO Environmental Guide for Noise (MTO, 2006), Noise Sensitive Areas (NSAs) include the following land uses, provided they have an outdoor living area associated with them:

- Private homes (single family units and townhouses);
- Multiple unit buildings such as apartments, provided they have a communal outdoor living area associated with them;
- Hospitals and nursing homes for the aged, provided they have an outdoor living area for use by patients;
- Schools, educational facilities and daycare centers where there are outdoor living areas for students;
- Campgrounds that provide overnight accommodation; and
- Hotels and motels with outdoor communal outdoor living areas (e.g., swimming pools) for visitors

The following land uses are generally not considered by the MTO to qualify as NSAs:

- Apartment balconies;
- Cemeteries;
- Parks and picnic areas not part of a defined outdoor living area; and
- All commercial.

The proposed undertaking will take place in a low-density residential area. Residential homes are considered NSRs. Only representative receptor locations have been identified and modelled to demonstrate the worst-case sound level. Fifty seven (57) representative NSRs were chosen and modelled for the area of study as shown in **Figure 1**.

3.4 Road Traffic Model

Road traffic sound levels were modelled using TNM 2.5, a software developed by the United States Federal Highway Administration. The following factors were taken into account in the analysis:

- Horizontal and vertical road-receiver geometry;
- Traffic volumes;
- Vehicle speeds; and
- Road alignments and receptor locations based on drawings provided by the City of Windsor and aerial photography.

3.5 Determination of Potential Impacts

All the various “Future Build” scenarios were modelled using TNM 2.5. The predicted sound levels at different receivers resulting from each scenario are summarized in **Appendix C** while comparing with the absolute MTO sound level criteria of 65 dBA and comparing with the future ambient (i.e., “Future No-Build” Scenario).

Figure 1: Noise-Sensitive Receptors in the Area of Study

The absolute sound levels at all the receivers for all the proposed extension scenarios are below the MTO criteria of 65 dBA. The highest impact is at the receivers along Riverside Drive East with highest sound levels of approximately 58 dBA. The high sound levels are mainly attributed to high traffic volume on Riverside Drive East which is not much affected by the proposed extension of Wyandotte Street and is outside the scope of this study. There is almost no change for those impacted receivers whether or not the undertaking would occur. Similar high sound levels are predicted for receivers along Little River Boulevard, which are also outside the scope of this study.

The MTO relative sound level criteria as a result of the undertaking is not met at a number of receivers (R16, R23, R24, R25, R26 and R27) for different future building scenarios. Those receivers are located along Jarvis Avenue and close to the Wyandotte Street proposed extension end. The change in sound levels exceed 5 dB for those receivers. This is mainly attributed to the new traffic along the new Wyandotte Street East extension, which would not exist otherwise. There is not much difference in the predicted sound levels among the various scenarios. Thus, there is no preferred scenario from environmental noise standpoint.

Based on MTO guidance, since the relative sound level criteria is not met for some receivers, mitigation effort has to be done to assess if noise barriers would be technically, administratively and economically feasible. Detailed mitigation analysis is outside the scope of the current assessment. However, it is worth mentioning that technical challenges may face proposed barriers since homes have driveways along Jarvis Avenue and Dillon Drive, which makes noise barriers not a practical solution. Also, homes approximately 300 m away along Riverside Drive East are exposed to higher traffic sound levels with no barrier shielding. Moreover, detailed mitigation analysis will be more efficient once the City of Windsor confirms the proposed extension scenario.

4 CONSTRUCTION SOUND LEVEL ASSESSMENT

Construction activities are temporary in nature, and largely unavoidable. With adequate controls, impacts can be minimized. However, for some periods of time and types of work, construction sound levels will be noticeable. This section of the report provides discusses applicable guidelines and conceptual mitigation measures to minimize any potential impact.

4.1 Construction Noise Guidelines

4.1.1 Local Noise Control By-laws

The proposed project lies within the local jurisdiction of the City of Windsor. The City of Windsor noise By-law 6716, 1980, prohibits the operation of any equipment in connection with construction in residential areas between the hours of 8:00 pm on one day to 6:00 am the next day. The area under investigation is residential and thus, the time constraint on construction activities applies. A copy of the by-law can is provided in **Appendix D**.

4.1.2 Maximum Construction Equipment Sound Level

The Ministry of the Environment, Conservation, and Parks (MECP), previously known as the Ministry of Environment (MOE), stipulates limits on sound level emissions from individual items of equipment, rather than for overall construction noise. In the presence of persistent noise complaints, sound emission standards for the various types of construction equipment used on the project should be checked to ensure that they meet the specified limits contained in MOE Publication NPC 115 "Construction Equipment" (MOE, 1977), as summarized in **Table 3**:

Table 3: NPC-115 Maximum Sound Levels for Typical Construction Equipment

Type of Unit	Maximum Sound Pressure Level [1] (dBA)	Distance from Equipment (m)	Power Rating (kW)
Excavation Equipment[2]	83	15	Less than 75 kW
	85	15	75 kW or Greater
Pneumatic Equipment[3]	85	7	-
Portable Compressors	76	7	-

Notes: [1] Maximum permissible sound pressure level presented here are for equipment manufactured after Jan. 1, 1981.
[2] Excavation equipment includes bulldozers, backhoes, front end loaders, graders, excavators, steam rollers and other equipment capable of being used for similar applications.
[3] Pneumatic equipment includes pavement breakers.

4.2 Conceptual mitigation

The undertaking is occurring in a low-density residential area with homes close to the roadways. Thus, conceptual mitigation measures are provided below to minimize the potential for construction noise impacts. It is suggested that these be written into the contract documentation for the contractor.

- There should be explicit indication that contractors are expected to comply with all applicable requirements of the contract and local noise by-laws. Enforcement of noise control by-laws is the responsibility of the Municipality for all work done by contractors.
- Constructive activities should be prohibited between 8:00 pm and 6:00 am to comply with the City of Windsor noise by-law.
- All equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order.
- Monitor and maintain haul routes to minimize movement over rough ground and potholes which in turn can generate noise.
- All equipment shall be kept in good working order as deterioration may increase equipment sound levels. A documented, regular inspection and maintenance program must be implemented.
- Use of engine retarder braking is prohibited by the contractor.
- Vehicle on-site speed limits must be met and will be enforced.
- Idling vehicles will be kept to a minimum.
- In the presence of persistent noise complaints, all construction equipment should be verified to comply with NPC-115 guidelines.
- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measured may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative and economic feasibility of the various alternatives.

5 CONCLUSIONS

The potential for environmental noise impacts of the proposed extension of Wyandotte Street East to Jarvis Avenue has been assessed. Five different alternatives for the proposed extension have been investigated. Both operational and construction sound levels have been considered.

The predicted sound levels from various scenarios are comparable, and thus, there is no preferred scenario from environmental noise standpoint. Future sound levels at all representative receptors for all scenarios are less than the MTO guideline criteria of 65 dBA. The highest sound levels are predicted to be approximately 58 dBA for residences along Riverside Drive East and would be similar to the sound levels without the undertaking. Residences along Jarvis Avenue, close to the Wyandotte Street extension, are predicted to be exposed to a change of the sound levels higher than 5 dBA for any of the proposed alternatives. Mitigation analysis is required as per MTO guidelines. However, mitigation study is outside the scope of the current assessment, and would be challenging/impractical given the residences having driveways along Jarvis Avenue and Dillon Drive. Moreover, a mitigation study will be more efficient once the city confirms the adopted future scenario.

Construction activities are temporary in nature with sound levels noticeable at times. Methods to minimize construction noise impacts were outlined in this report and suggested to be written into the contract documentation for the contractor.

6 REFERENCES

1. City of Windsor, 1980, A by-law respecting the emission of sounds, By-law No. 6716.
2. Ontario Ministry of Environment (MOE), 1977, NPC-115, Construction Equipment.
3. Ontario Ministry of Transportation (MTO), 2006, Environmental Guide for Noise.
4. Ontario Ministry of Transportation (MTO), 2013, Environmental Reference for Highway Design.

APPENDIX A

TRANSPORTATION SOUND BASICS

Sound Levels

Sound is, in its simplest form, a dynamic, fluctuating pressure, in a fluid medium. That medium can be air, other gases, or liquids such as water. These fluctuations are transmitted by pressure waves through the medium from the source to the receiver. For the majority of transportation engineering purposes, the primary interest is with sound waves in air, with human beings as the receptor. Noise is defined as unwanted sound. The standard practice within the acoustical industry is to use these two terms interchangeably.

Decibels

A decibel (dB) is a logarithmic ratio of a value to a reference level. The general mathematical format is:

$$\text{Level in dB} = 10 \log (\text{Value} / \text{Reference})$$

Any value can be expressed in decibels. Decibels are very useful in performing comparisons where there are huge ranges in levels. For example, an acoustical engineer can expect to deal with acoustical energy values ranging from 0.00001 W to 100 W (sound power), and pressures ranging from 0.002 Pa to 200 Pa (sound pressure).[1] For completeness, decibels should always be stated with their reference level (e.g., 20 dB re: 20 µPa). However, in practice the reference level is often left out.

Sound Pressure Level

Sound pressure level is what humans experience as sound. Sound waves create small fluctuations around the normal atmospheric pressure. These pressure fluctuations come into contact with eardrums and create the sensation of sound. Sound pressure is measured in decibels, according to the following equation:

$$\text{Sound Pressure Level, dB} = 10 \log (p^2 / p_o^2)$$

Where: p = root mean square (r.m.s.) sound pressure, in Pa
p_o = reference sound pressure, 20 µPa

The reference pressure represents the faintest sound that a "typical" human being can hear. The typical abbreviation for sound pressure level is SPL, although L_p is also often used in equations. "Sound level" or "noise level" are also sometimes used.

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[1] Equivalent to Sound Power Levels ranging from 70 to 140 dB and Sound Pressure Levels ranging from 20 dB to 140 dB

Octave Bands

Sounds are composed of varying frequencies or pitches. Human sensitivity to noise varies by frequency, with a greater sensitivity to higher frequency sounds. The propagation of sound also varies by frequency. The unit of frequency is Hertz (Hz), which refers the number of cycles per second (number of wave peaks per second of the propagating sound wave). The typical human hearing response runs from 20 Hz to 20,000 Hz. Frequencies below 20 Hz are generally inaudible, although response is variable, and some individuals may be able to hear or perceive them.

Sound is typically analysed in octave bands or 1/3-octave bands. An octave band is defined as a band or range of sound frequencies where the frequency range doubles for succeeding octave (alternately, the highest frequency in the range is twice the value of the lowest frequency). Octave band and 1/3-octave band frequencies of interest frequencies of interest are shown in the table on the following page. Road and rail transportation noise sources tend to be broadband in nature, having roughly equal sound energy in many octave bands. Heavy rail traffic and heavy truck traffic may produce significant noise in lower frequencies < 200 Hz.

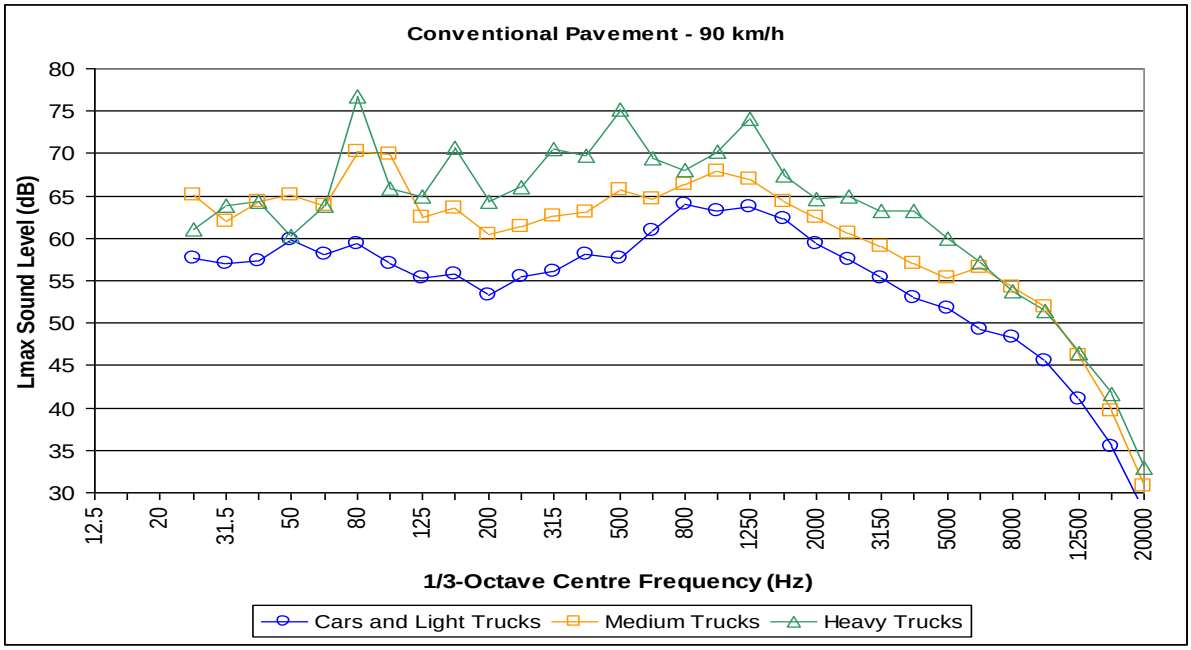
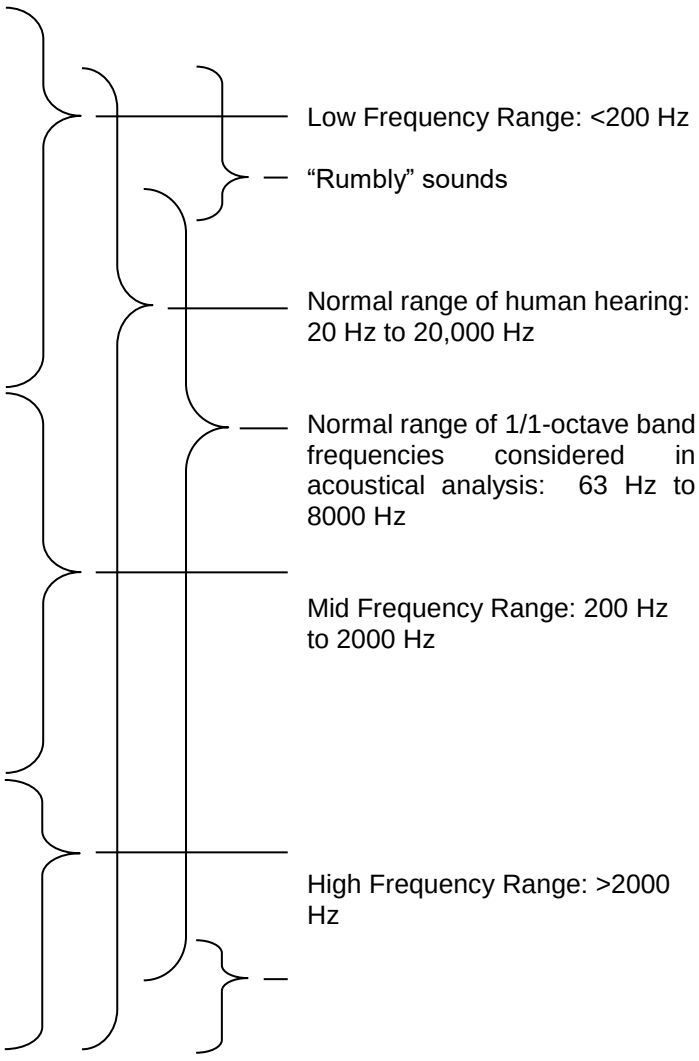


Figure 1: Typical Frequency Spectra of Traffic Noise - Vehicle Pass-bys at 90 km/h

Table 1: Octave Band Frequencies of Interest

Centre-Frequency (Hz)		Band No.	Frequency Range (Hz)
1/3-Octave	1/1-Octave		
12.5	16	N/A	11 to 22
16			
20			
25	31.5	0	22 to 45
31.5			
40			
50	63	1	45 to 89
63			
80			
100	125	2	89 to 177
125			
160			
200	250	3	177 to 345
250			
315			
400	500	4	345 to 707
500			
630			
800	1,000	5	707 to 1,414
1,000			
1,250			
1,600	2,000	6	1,414 to 2,828
2,000			
2,500			
3,150	4,000	7	2,828 to 5,657
4,000			
5,000			
6,300	8,000	8	5,657 to 11,314
8,000			
10,000			
12,500	16,000	N/A	11,314 to 22,627
16,000			
20,000			



Note: Per ISO 266-1975

A-Weighting

When the overall sound pressure level is expressed as a single value (i.e., not expressed in frequency band levels) the variation in human frequency response must be accounted for. People do not hear low frequency noise as well as noise in mid or high frequencies. To account for this, frequency-weighting networks have been developed to better account for human hearing response. The most frequently used networks are the A-Weighting and C-Weighting.

The A-Weighting network was developed to correspond to how humans hear low to medium levels of noise. The A-Weighting is the most frequently used scheme, and the majority of noise guidelines are expressed in A-Weighted decibel values, denoted as "dBA" levels. C-Weighted "dBC" values are sometimes used in assessing low-frequency noise impacts, which are generally not of concern in transportation noise impact assessment. The A-Weighting and C-Weighting values are shown in the following table and figure.

Table 2: A- and C-Weighting Values

1/1-Octave Frequency (Hz)	A-Weighting Value (dB)	C-Weighting Value (dB)
31.5	-39.4	-3.0
63	-26.2	-0.8
125	-16.1	-0.2
250	-8.6	0
500	-3.2	0
1,000	0	0
2,000	1.2	-0.2
4,000	1.0	-0.8
8,000	-1.1	-3.0

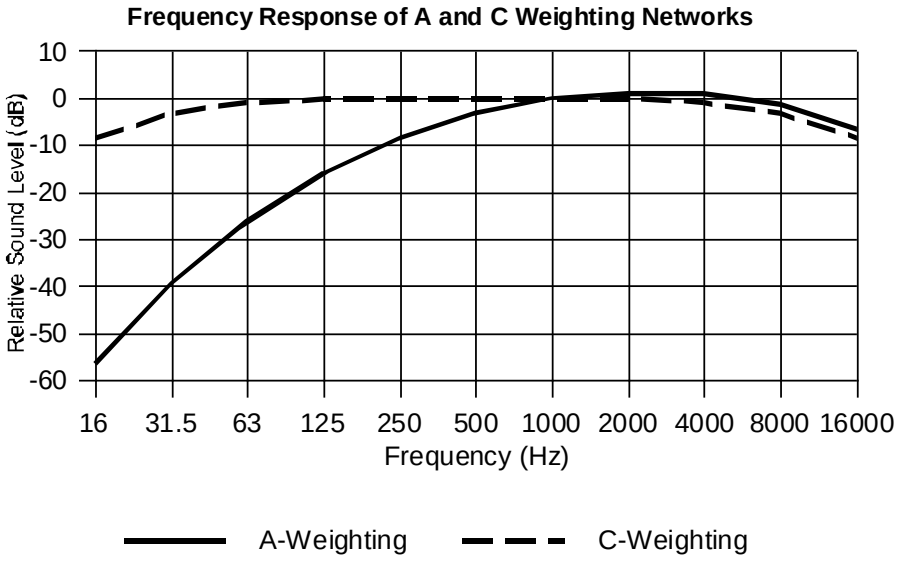


Figure 2: A-Weighting and C-Weighting Networks

Ranges of Sound Levels

People experience a wide range of sound levels in their daily activities. The table below presents a graphical comparison of "typical" noise levels which might be encountered, and the general human perception of the level.

Table 3: Ranges of Sound Levels

Sound Levels		Sources of Noise
Human Perception	**SPL, in dBA**	
Deafening	125	Sonic booms
	120	Threshold of Feeling / Pain
	115	Maximum level, hard rock band concert
	110	Accelerating Motorcycle at a few feet away
Very Loud	105	Loud auto horn at 3 m (10 ft) away
	100	Dance club / maximum human vocal output at 1 m (3 ft) distance
	95	Jack hammer at 15 m (50 ft) distance
	90	Indoors in a noisy factory
Loud	85	Heavy truck pass-by at 15 m (50 ft) distance
	80	School cafeteria / noisy bar; Vacuum Cleaner at 1.5 m (5 ft)
	75	Near edge of major Highway
	70	Inside automobile at 60 km/h
	65	Normal human speech (unraised voice) at 1 m (3 ft) distance
Moderate	60	Typical background noise levels in a large department store
	55	General objective for outdoor sound levels; typical urban sound level
	50	Typical suburban / semi-rural sound level (24h)
	45	Typical noise levels in an office due to HVAC; typical rural levels (24h)
Faint	40	Typical background noise levels in a library
	35	
	30	Broadcast Studio
	25	Average whisper
Very Faint	20	Deep woods on a very calm day
	15	
	10	
	5	Human breathing
	0	Quietest sound that can be heard

Sound levels from 40 to 65 dBA are in the faint to moderate range. The vast majority of the outdoor noise environment, even within the busiest city cores, will lie within this area. Sound levels from 65 to 90 are perceived as loud. This area includes very noisy commercial and industrial spaces. Sound levels greater than 90 dB are very loud to deafening, and may result in hearing damage.

Transportation noise events, which vary with time, can also be considered in terms of their maximum noise level (L_{max}) during a vehicle pass-by, as shown in the following table:

Table 4: Typical Pass-By Noise Levels at 15 m from Noise Source

Event	Range of Noise Levels (dBA) at 15 m
Semi-Trailer Trucks	75 - 85
Aircraft	69 – 85 [1]
Conventional Light Rapid Transit (Streetcars)	72 – 80 [2]
Large Trucks	71 - 78
Street Motorcycle	76
Diesel or Natural Gas Bus	70 - 78
Trolley Bus	69 - 73
Small Motorcycle	67
General Busy Auto Traffic	66 - 70
Individual Automobiles	63 - 69

Notes: Source: BKL Consultants Ltd.

[1] Aircraft flyover not at 15 m distance

[2] Based on data provided for the Calgary, Edmonton and Portland LRT systems.

Noise Descriptors – Leq Values

At this time, the best available research indicates that long-term human responses to noise are best evaluated using energy equivalent sound exposure levels (L_{eq} values), in A-Weighted decibels (L_{eq} values in dBA)[2, 3] including adjustments to account for particularly annoying characteristics of the sounds being analyzed.

Sound levels in the ambient environment vary each instant. In a downtown urban environment, the background noise is formed by an "urban hum", composed of noise from distant road traffic and from commercial sources. As traffic passes near a noise receptor, the instantaneous sound level may increase as a vehicle approaches, and then decrease as it passes and travels farther away. The energy equivalent sound exposure level L_{eq} is the average sound level over the same period of time with same acoustical energy as the actual environment (i.e., it is the average of the sound energy measured over a time period T). As a time-average, all L_{eq} values must have a time period associated with them. This is typically placed in brackets beside the L_{eq} tag. For example, a thirty-minute L_{eq} measurement would be reported as an L_{eq} (30 min) value.

The L_{eq} concept is illustrated in Figure 3, showing noise levels beside a small roadway, over a 100 second time period, with two vehicle pass-bys:

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2 Berglund and Lindvall, Community Noise, 1995.

3 ISO 1996:2003(E), *Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures*.

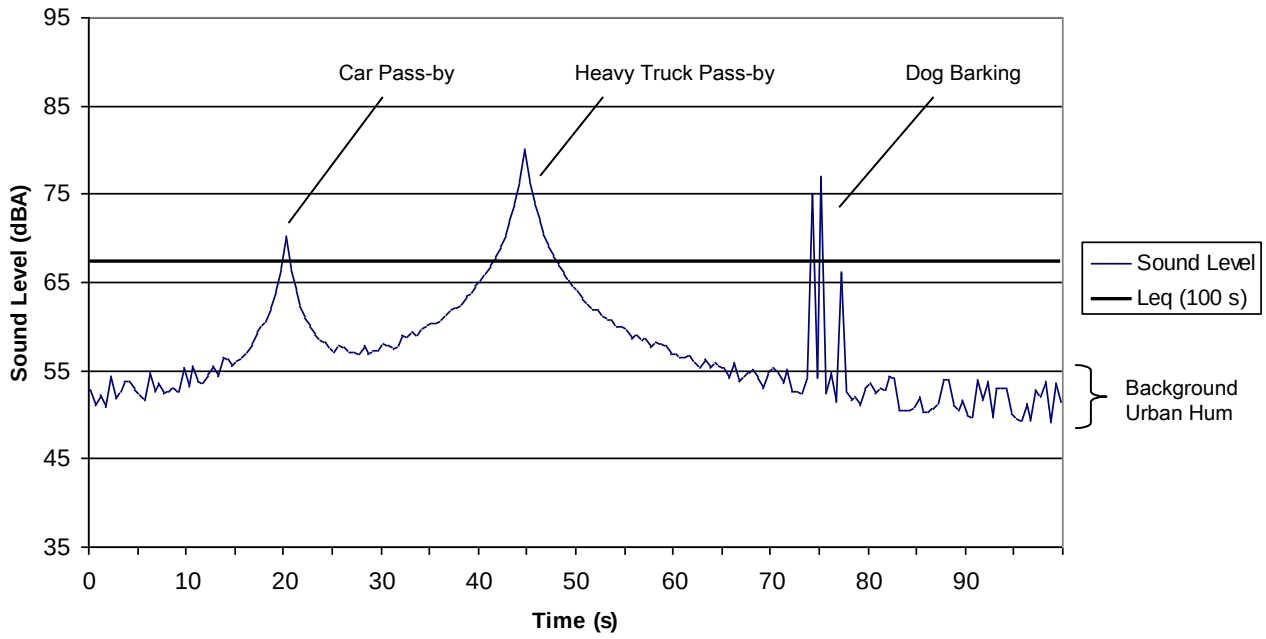

Figure 3: Example of the L_{eq} Concept

In this example, the background "urban hum" is between 47 and 53 dBA. A car passes by at 20 seconds. As it approaches, the noise level increases to a maximum, and then decreases as it speeds away. At 45 seconds, a heavy truck passes by. Near 75 seconds, a dog barks three times. The maximum sound level (L_{max}) over the period is 80 dBA and the minimum is 47 dBA. For almost 50% of the time, the sound level is lower than 55 dBA.

The L_{eq} (100s) for the above example is 67 dBA, which is much higher than the statistical mean sound level of 55 dBA. This illustrates that the L_{eq} value is very sensitive to loud noise events, which contain much more sound energy (as sound is ranked on a logarithmic scale) than the normal background. It is also sensitive to the number of events during the time period, and the duration of those events. If only the truck had passed by during the measurement (no car and no dog barks), the L_{eq} (100s) would be 66 dBA. If only the car and dog barks had occurred, the L_{eq} (100s) would have been 61 dBA. This shows that the truck pass-by is the dominant event in our example, due to its level and duration.

The ability of the L_{eq} metric to account for the three factors of level, duration and frequency of events makes it a robust predictor of human response to noise. It is for this reason that the vast majority of noise standards are based on L_{eq} values.

Typical Durations for Leq Analyses

For transportation noise impact analyses, the following durations are typically used:

L_{eq} (24h) – The sound exposure level over then entire 24-hour day

L_{eq} Day – Either: L_{eq} (15h), from 7am to 10 pm; or
L_{eq} (16h), from 7am to 11 am

L_{eq} Night – Either: L_{eq} (9h), from 10 pm to 7 am; or
L_{eq} (8h), from 11 pm to 7 am

L_{dn} – A special L_{eq} (24h) value with a 10 dB night-time penalty applied to overnight sound levels (10pm to 7am)

L_{eq} (1-h) – The sound exposure over a 1-hour time period

L_{eq} (24h) values are appropriate for examining impacts of transportation noise sources with small changes in sound exposure levels over the 24-hour day. For example, freeway noise levels are generally consistent over the 24-hour day. Therefore, for freeways, there is little difference between L_{eq} (24h) values and the corresponding L_{eq} Day and L_{eq} Night values.

L_{eq} Day values, covering off the AM-peak and PM-peak travel periods, are generally appropriate for examining the impacts of non-freeway highways and municipal arterial roadways. The vast majority of noise associated with these sources is concentrated in the daytime hours, where typically, 85% to 90% of the daily road traffic will occur.[4] Thus, if reasonable sound levels occur during the daytime (and appropriate guideline limits are met), they will also occur (and be met) at night.

To account for increased annoyance with noise overnight in a single value, the U.S. Environmental Protection Agency (U.S. EPA) developed the L_{dn} metric. It is a special form of the L_{eq} (24h) with a +10 dB night-time penalty. L_{dn} values and a related metric, the day-evening-night level (L_{den}) are also used in some European guidelines. L_{dn} values are not used in Canadian Provincial jurisdictions in evaluating transportation noise. Instead, guideline limits for separate L_{eq} Day and L_{eq} Night periods are generally used.

L_{eq} (1-h) values are the average sound levels over a one-hour time period. These tend to fluctuate more over the day, as traffic levels can fluctuate significantly hour to hour. L_{eq} (1-h) values are useful in assessing the impact of transportation sources which also vary hourly, and which may vary in a different manner than the background traffic. These values are often used to assess haul route noise impacts, for example.

[4] Based on research conducted by Ontario Ministry of Transportation, and provided in the *MTO Environmental Office Manual Technical Areas – Noise*. Daytime refers to a 16 hour day from 7am to 11 pm.

Some transportation noise sources may have significant traffic levels occurring over-night. For example, freight rail traffic in heavily used corridors can be shifted to over-night periods, with daytime track use being reserved for freight switcher traffic and passenger traffic. In situations such as this, an assessment of both daytime and night-time noise impacts may be appropriate.

Decibel Addition

Decibels are logarithmic numbers, and therefore have special properties of addition. Decibel values must be added logarithmically. If two sources, each emitting the same amount of sound energy, are placed side-by-side, then the total increase in sound level will only be 3 dB. If the difference in sound energy emitted is greater than 10 dB, then effectively the sound level will be the same as for the loudest unit (i.e., the increase in noise will be less than a decibel). This is shown in Table 5.

Table 5: Decibel Addition Chart

dB Difference Of	dB Value to Add to Highest Number
0	3.0
1	2.5
2	2.1
3	1.8
4	1.5
5	1.2
6	1.0
7	0.8
8	0.6
9	0.5
10	0.4

This affects transportation noise from projects, as noise emission is logarithmically related to traffic volume. Doubling the traffic volume (essentially the same as adding a source with the same sound emission) will only result in a 3 dB increase over the original levels. The decibel increase in noise due to the increase in traffic volume, assuming all other factors remain the same, can be estimated by:

$$\text{dB increase} = 10 \log (\text{new volume} / \text{original volume}).$$

Human Response to Changes in Sound Levels

The human ear does not interpret changes in sound level in a linear manner. The general subjective human perception of changes in sound level is shown in the following table.

Table 6: Subjective Human Perception of Changes in Sound Level [5,6]

Change in Broadband Sound Level (dB)	Human Perception of Change
< 3	Imperceptible change
3	Just-perceptible change
4 to 5	Cleary noticeable change
6 to 9	Substantial change
> 10 and more	Very substantial change (half or twice as loud)
> 20 and more	Very substantial change (much quieter or louder)

Notes: Adapted from Bies and Hansen, p53, and MOE Noise Guidelines for Landfill Sites, 1998. Applies to changes in broadband noise sources only (i.e., increases or decreases in the same noise or same type of noise only). Changes in frequency content or the addition of tonal or temporal changes would affect the perception of the change.

The above table is directly applicable to changes in sound level where the noise sources are of the same general character. For example, existing road traffic noise levels can be directly compared to future road traffic noise levels, using the above relationships. In comparing road traffic noise to road plus rail traffic noise, the different frequency and temporal nature of the noise means that the rail noise may be more noticeable. Adjustments for the nature of the new sound can be applied to better account for temporal and frequency differences.

For transportation noise sources, research conducted by the U.S. Environmental Protection Agency indicates that a 5 dB change in sound levels is required to trigger a change in large-scale community response to noise. This correlates to a clearly noticeable increase in noise levels.

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5 Bies, D.A., and C.H. Hansen 1988. *Engineering Noise Control – Theory and Practice, 2nd Ed.* E & FN Spon, London, p 53.

6 Ontario Ministry of the Environment 1998. Noise Guidelines for Landfill Sites. Queen's Printer for Ontario.

Decay of Noise with Distance

Noise levels decrease with increasing distance from a source of noise. The rate of decay is partially dependent on the nature of the ground between the source: whether it is hard (acoustically reflective) or soft (acoustically absorptive). Transportation noise sources in general act as *line sources* of sound. For line sources, the rate of decay is approximately:

- Hard ground: 3 dB for each doubling of distance from the source
- Soft ground: 5 dB for each doubling of distance from the source

This is shown graphically in Figure 6, based on a reference distance of 15 m from the source:

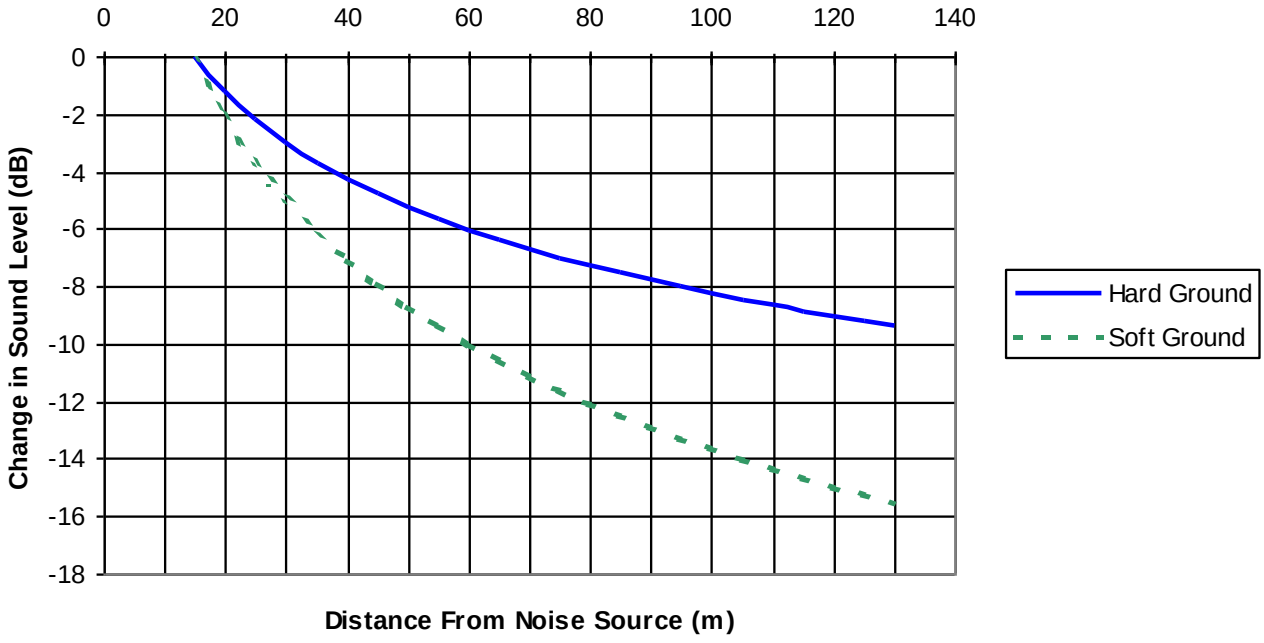
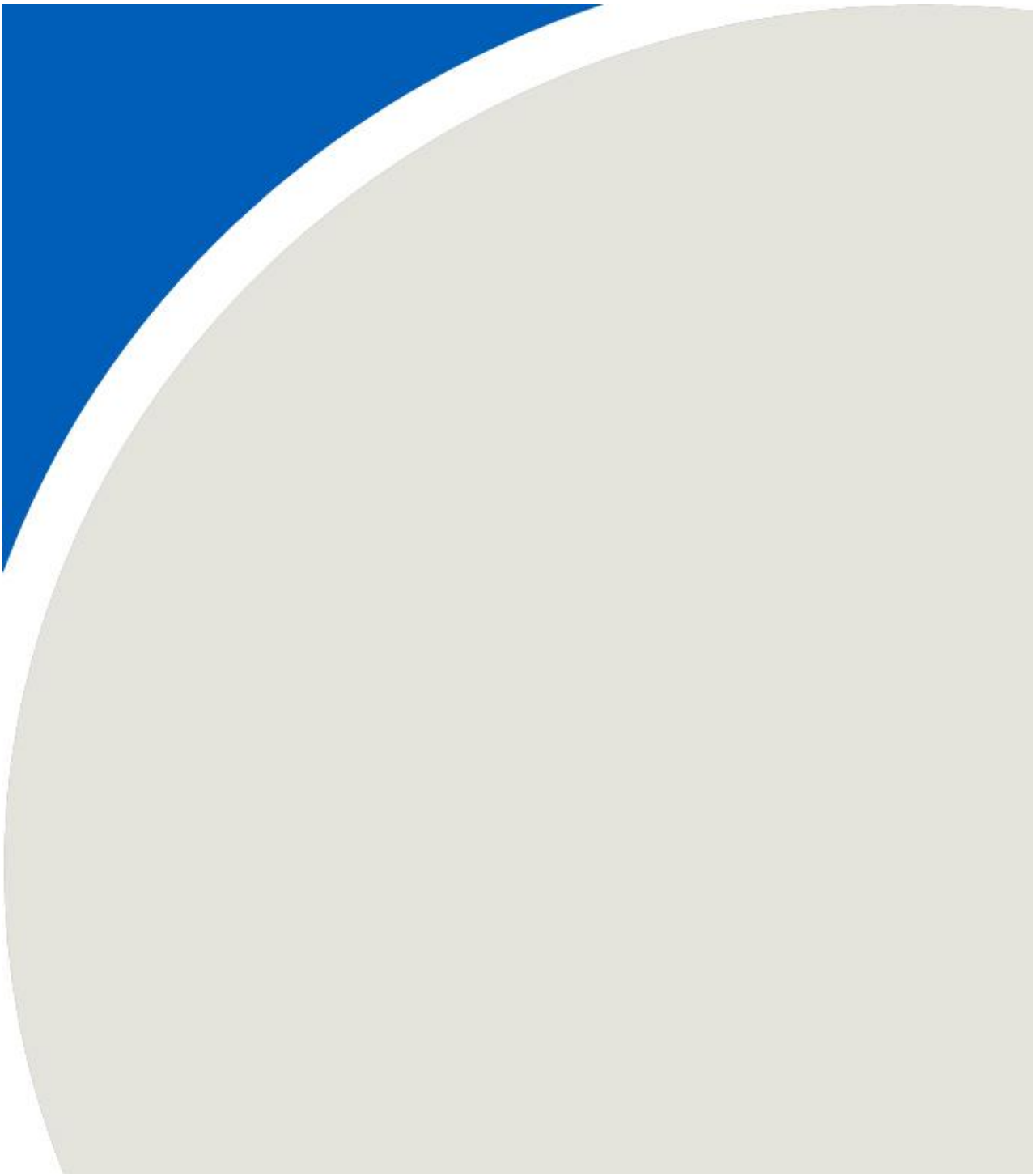
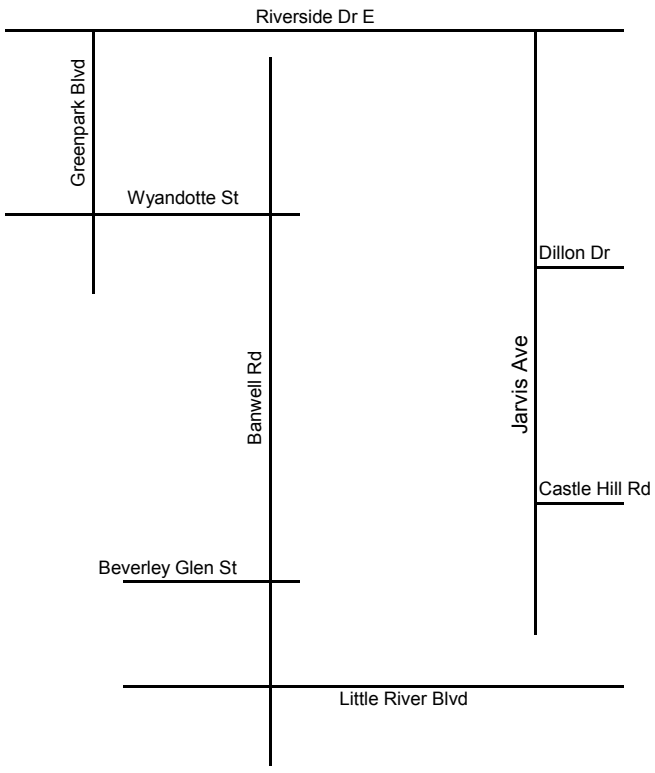


Figure 4: Decay of Noise Versus Distance for Line Sources

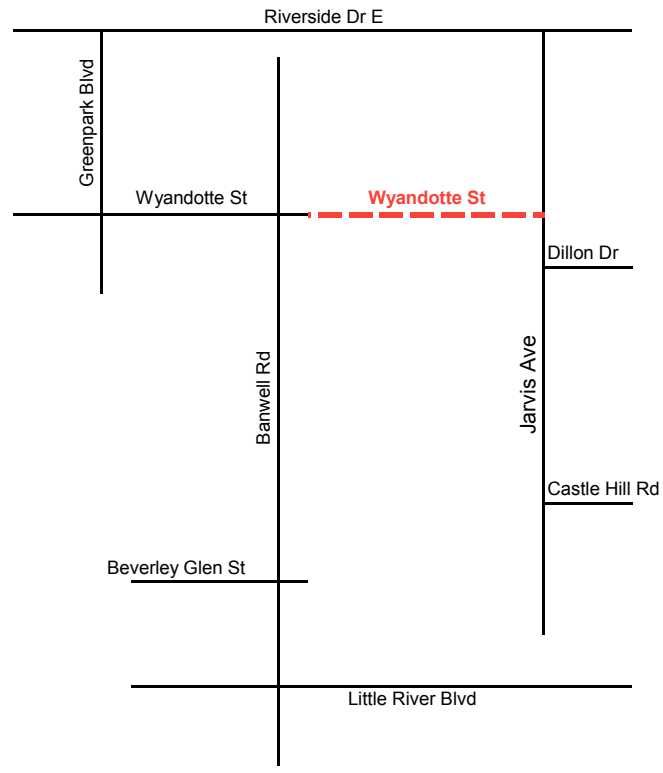
APPENDIX B



SCENARIO 1
Base (Do nothing)



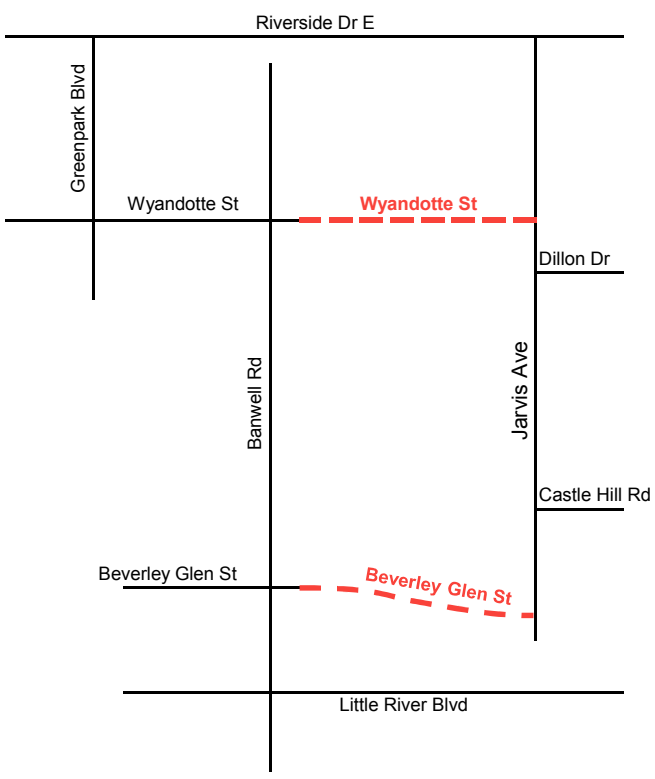
SCENARIO 2a
Extension of Wyandotte Street, offset at Jarvis Avenue



SCENARIO 2b
Extension of Wyandotte Street, continuous alignment of Wyandotte Street

SCENARIO 3
Extension of Wyandotte Street East and closure of Jarvis Avenue at Riverside Drive East, and Beverly Glen Extension

SCENARIO 4
Extension of Wyandotte Street East and Beverly Glen Street



SCENARIO 5
Extension of Wyandotte Street East and Beverly Glen Street, and extension of Jarvis Avenue to Little River Boulevard

wsp

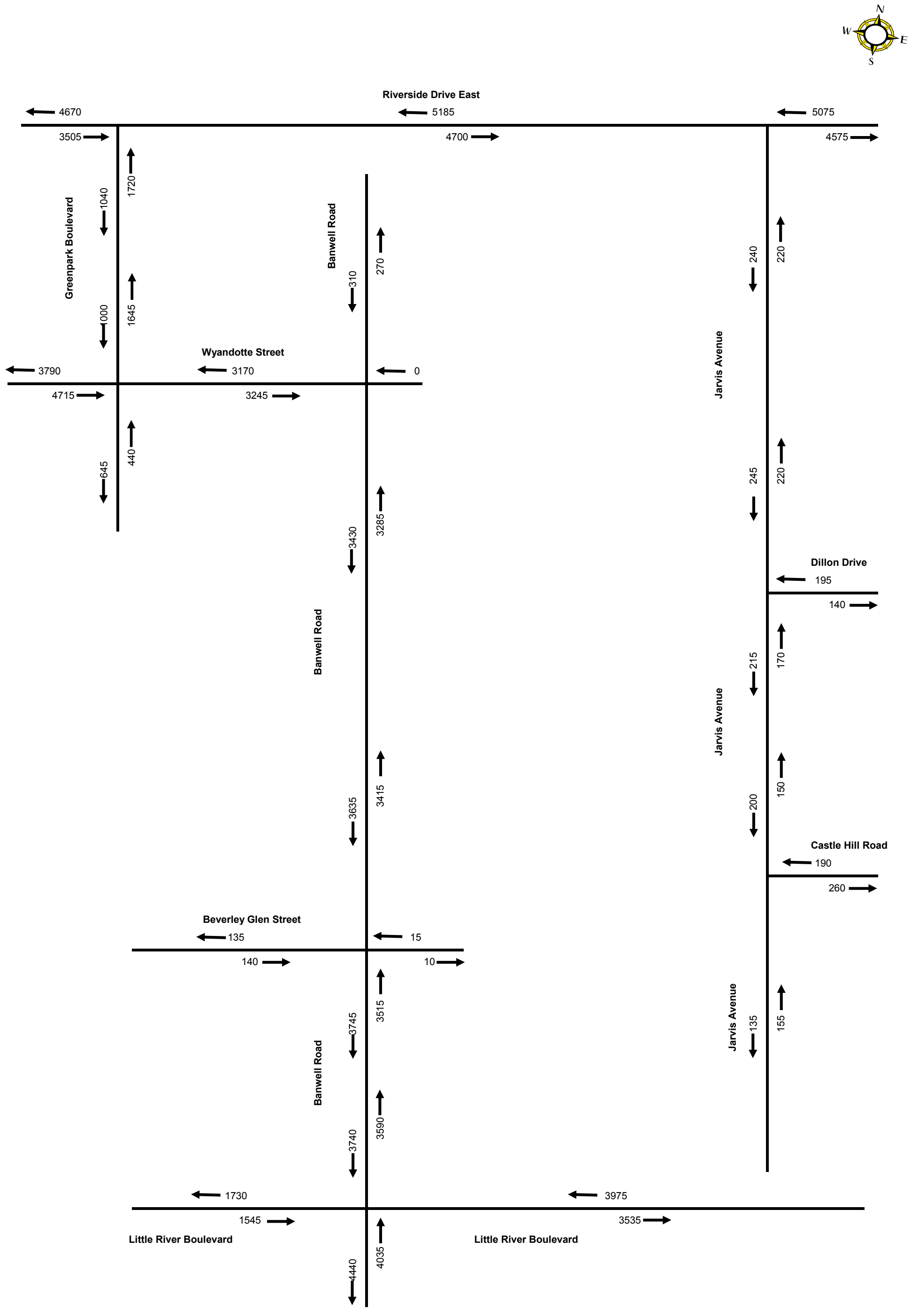
Legend

Existing Road Network

Proposed Network Changes

Figure 3-1

Network Scenarios



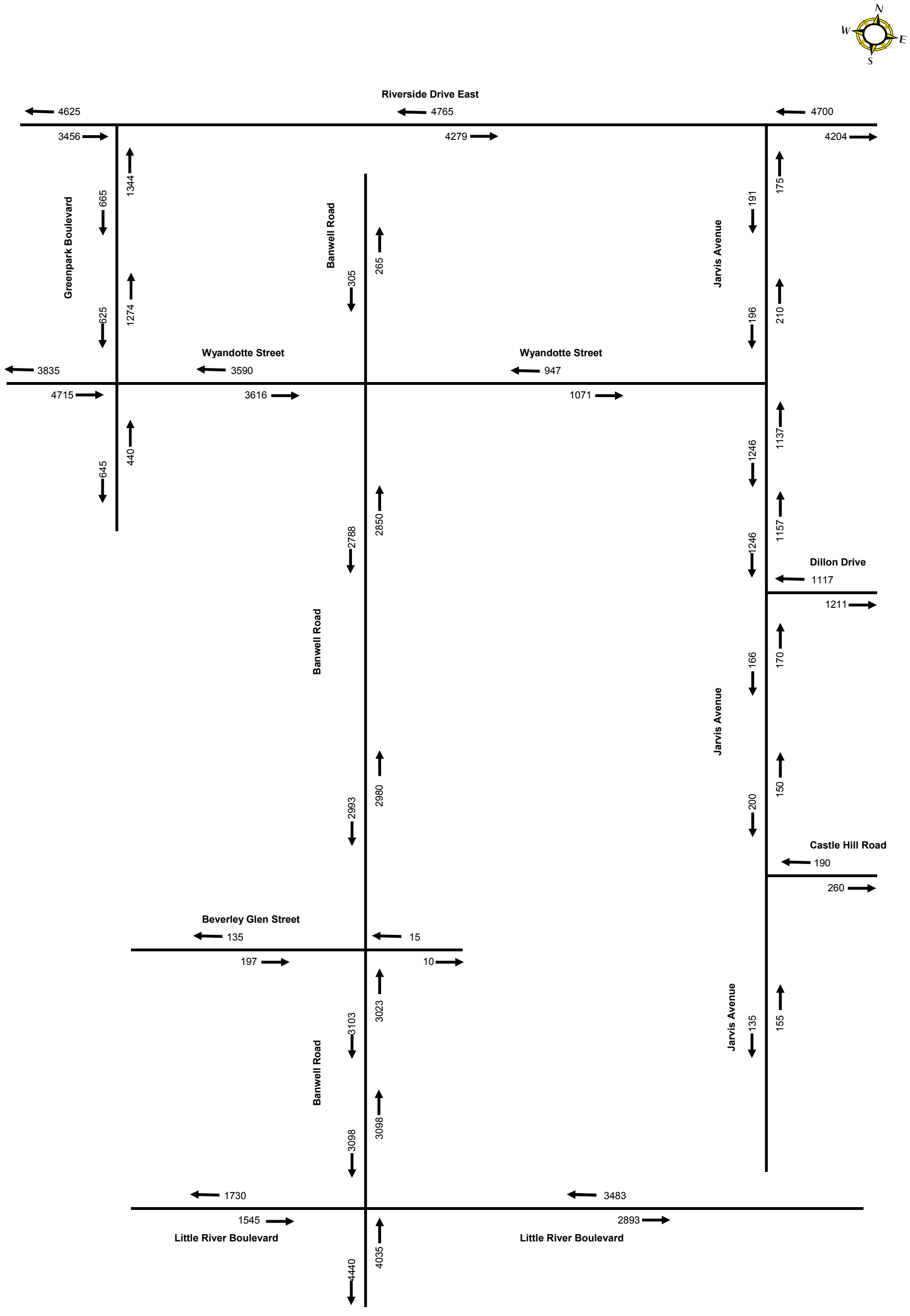
wsp

Legend

xx A.M. Peak Hour Link AADT

(xx) P.M. Peak Hour Link AADT

Figure D 2-1
Scenario 1
Link Annual Average Daily Traffic (AADT)
20-year Horizon

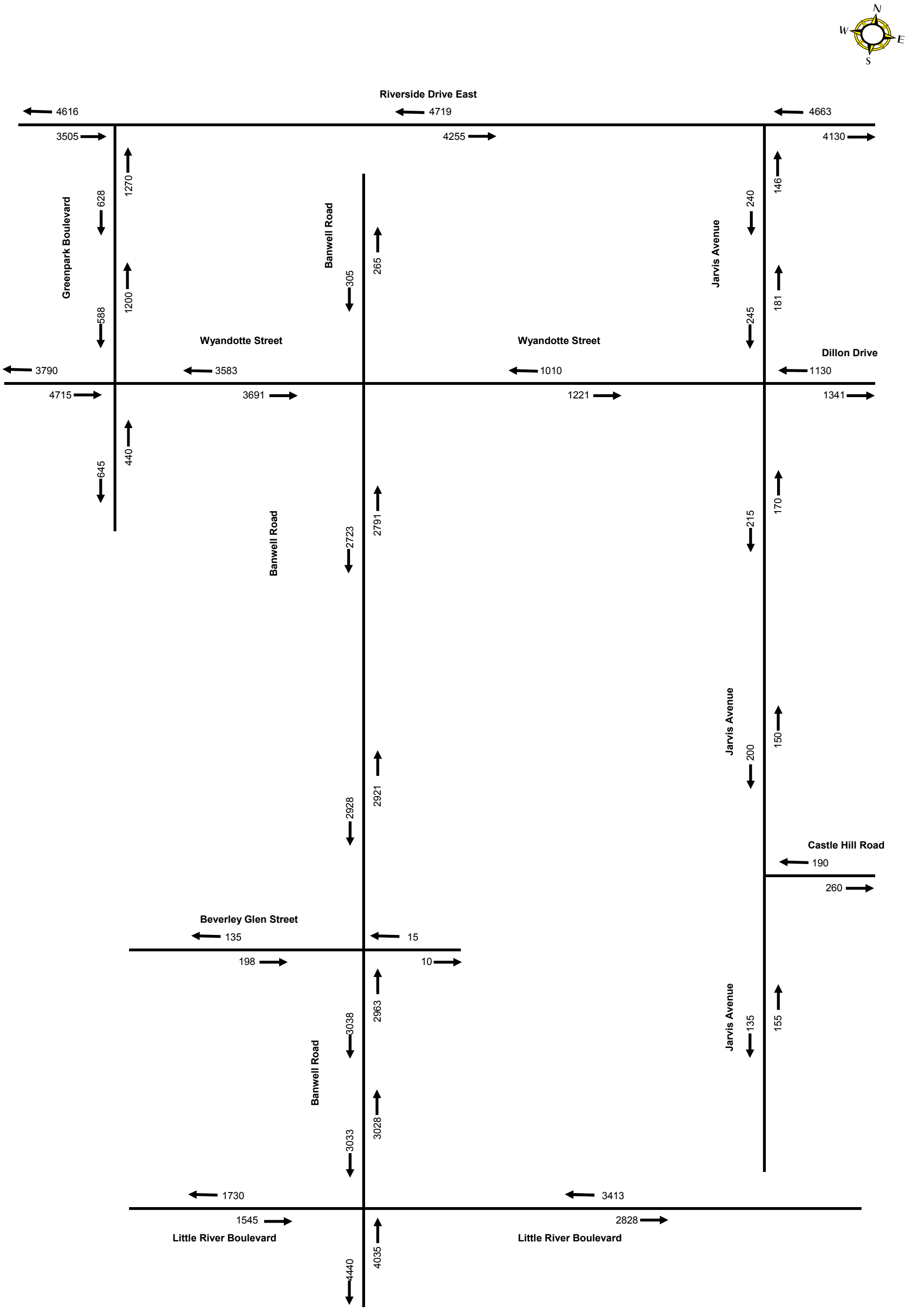


Legend

xx A.M. Peak Hour Link AADT

(xx) P.M. Peak Hour Link AADT

Figure D 2-2
Scenario 2a
Link Annual Average Daily Traffic (AADT)
20-year Horizon

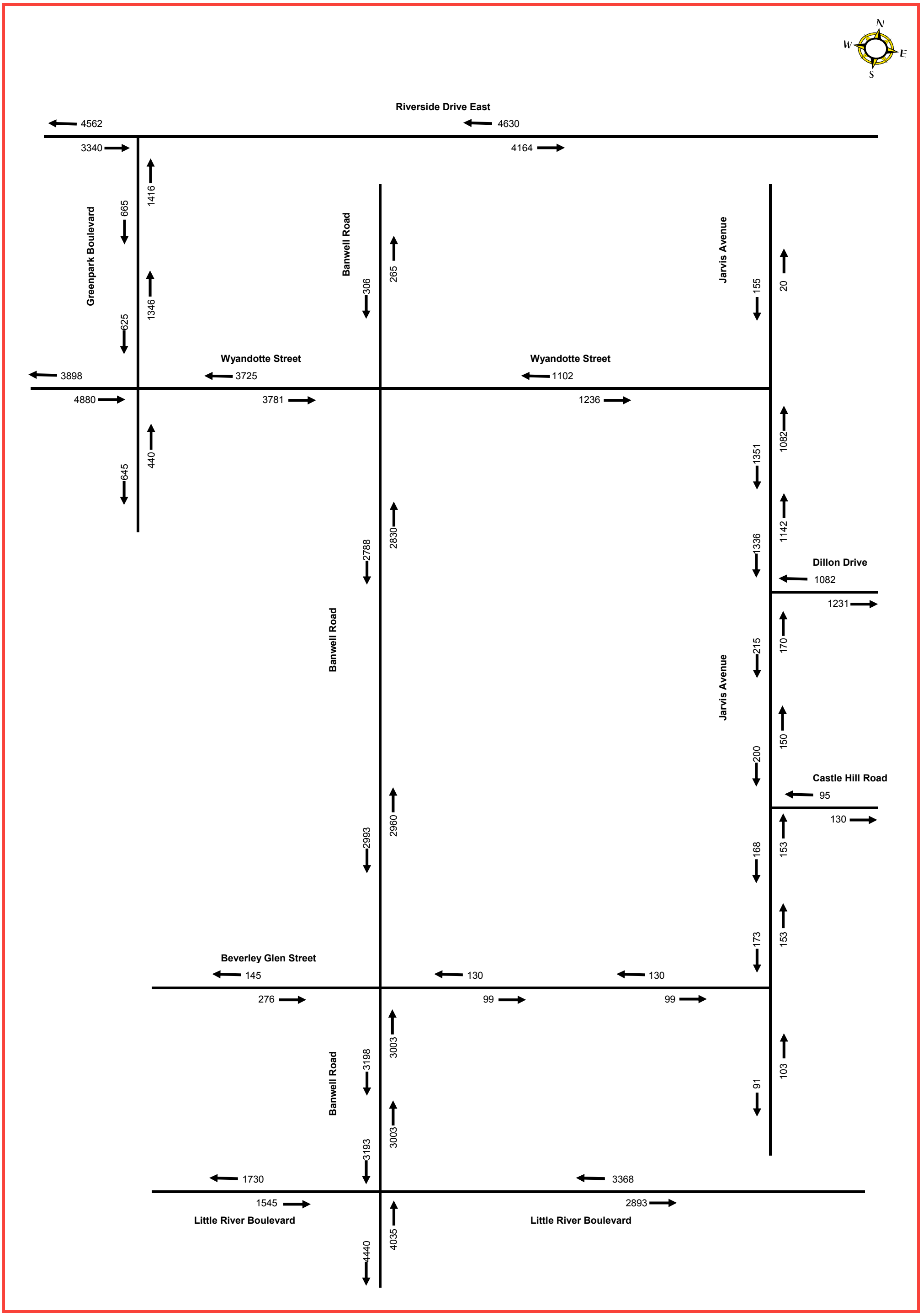


Legend

xx A.M. Peak Hour Link AADT

(xx) P.M. Peak Hour Link AADT

Figure D 2-3
Scenario 2b
Link Annual Average Daily Traffic (AADT)
20-year Horizon

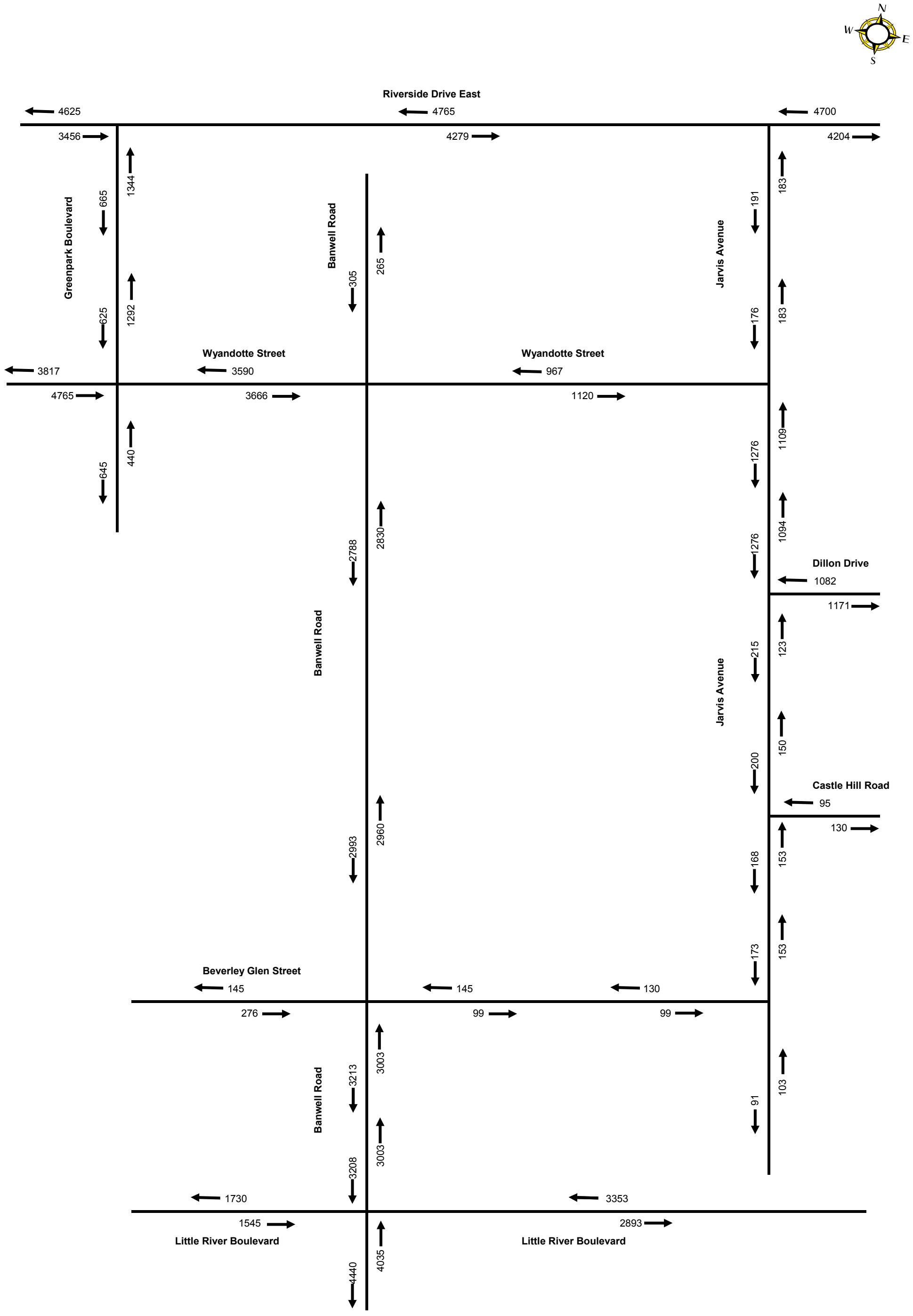


Legend

xx A.M. Peak Hour Link AADT

(xx) P.M. Peak Hour Link AADT

Figure D 2-4
Scenario 3
Link Annual Average Daily Traffic (AADT)
20-year Horizon

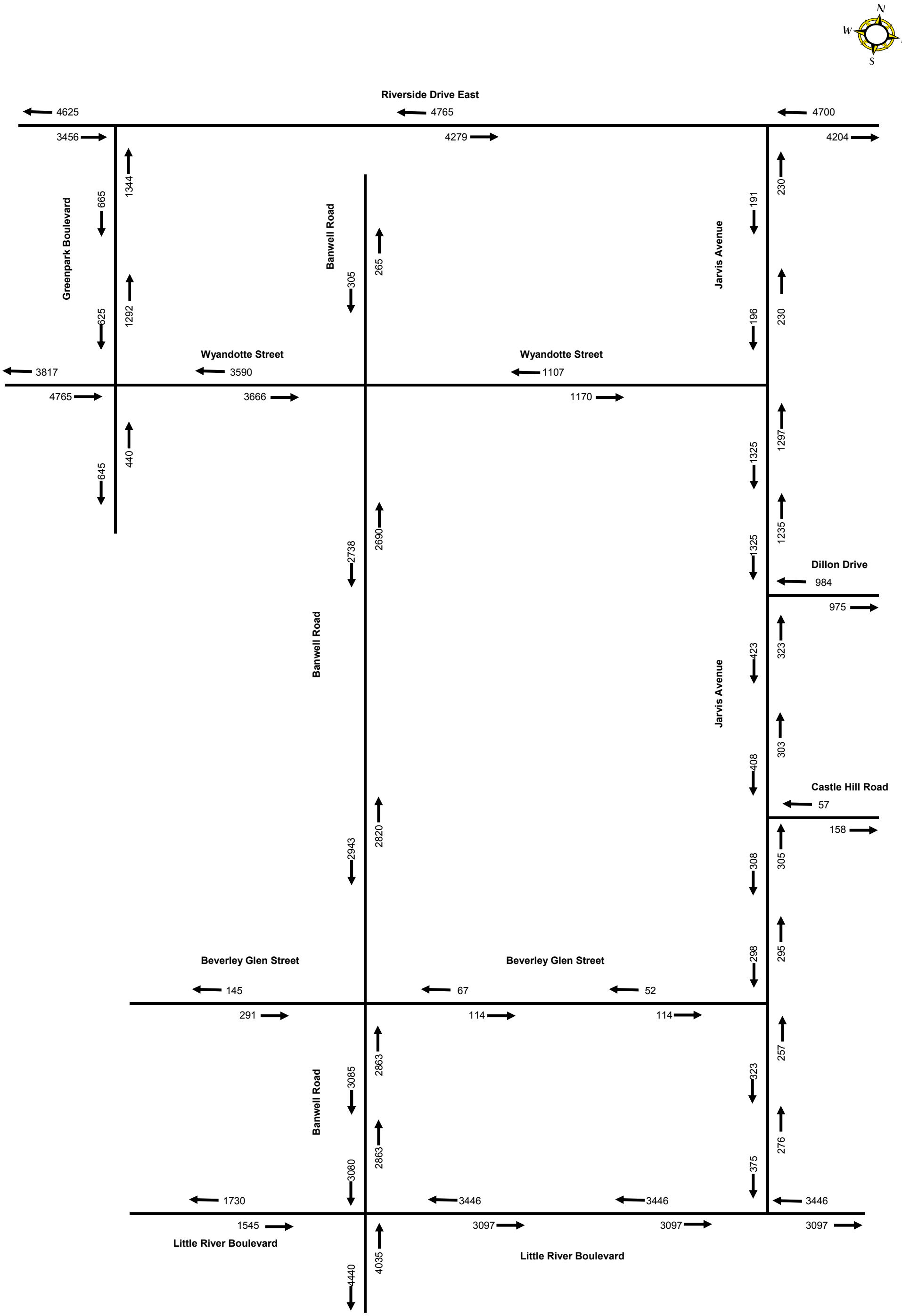


Legend

xx A.M. Peak Hour Link AADT

(xx) P.M. Peak Hour Link AADT

Figure D 2-5
Scenario 4
Link Annual Average Daily Traffic (AADT)
20-year Horizon



wsp

Legend

xx A.M. Peak Hour Link AADT

(xx) P.M. Peak Hour Link AADT

Figure D 2-6
Scenario 5
Link Annual Average Daily Traffic (AADT)
20-year Horizon

APPENDIX C

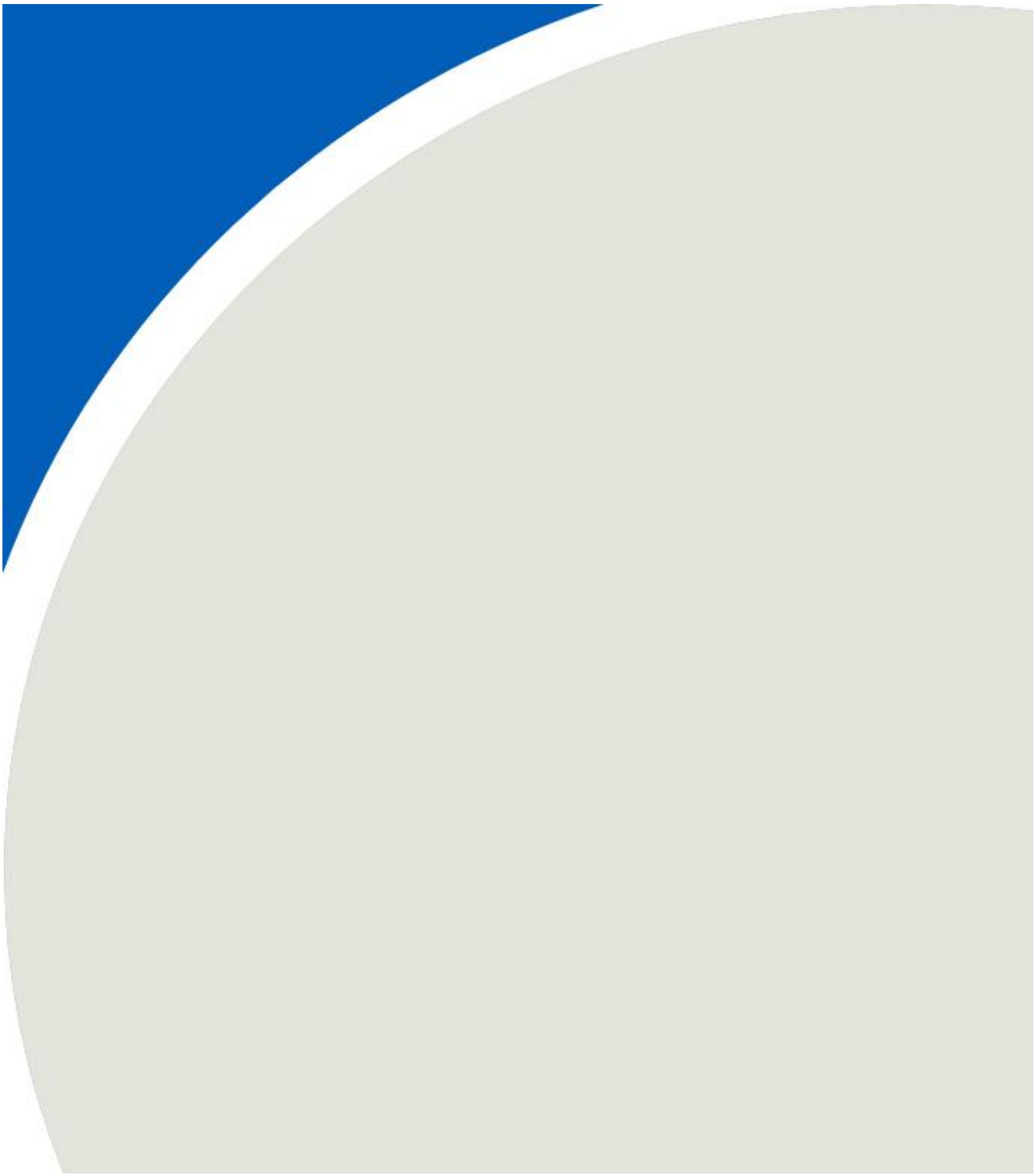


Table 1: Predicted Sound Levels using TNM 2.5 for Scenario 2a

Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R01	55	55	No	-0.1	No
R02	56	56	No	-0.2	No
R03	58	58	No	-0.3	No
R04	55	55	No	-0.3	No
R05	44	44	No	-0.3	No
R06	52	51	No	-1.1	No
R07	53	52	No	-1.2	No
R08	49	49	No	-0.3	No
R09	49	49	No	-0.3	No
R10	50	50	No	-0.4	No
R11	56	56	No	0.0	No
R12	56	56	No	-0.3	No
R13	55	55	No	0.0	No
R14	54	54	No	0.3	No
R15	54	55	No	0.7	No
R16	45	51	No	5.7	Yes
R17	46	49	No	3.4	No
R18	56	56	No	0.0	No
R19	57	57	No	0.0	No
R20	56	56	No	0.3	No
R21	57	57	No	0.2	No
R22	56	56	No	0.3	No
R23	45	53	No	8.3	Yes
R24	44	50	No	6.1	Yes
R25	47	54	No	6.6	Yes
R26	44	48	No	3.9	No
R27	47	54	No	6.2	Yes
R28	40	40	No	-0.2	No
R29	50	50	No	-0.2	No
R30	50	50	No	-0.2	No

Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R31	54	54	No	-0.6	No
R32	43	43	No	0.0	No
R33	46	46	No	0.0	No
R34	47	47	No	-0.1	No
R35	43	44	No	0.6	No
R36	50	50	No	0.1	No
R37	51	50	No	-0.1	No
R38	55	55	No	-0.6	No
R39	55	54	No	-0.7	No
R40	43	42	No	-0.1	No
R41	44	44	No	0.5	No
R42	50	50	No	0.0	No
R43	51	51	No	-0.1	No
R44	55	55	No	-0.5	No
R45	55	55	No	-0.6	No
R46	42	42	No	-0.1	No
R47	44	43	No	-0.1	No
R48	56	55	No	-0.7	No
R49	43	43	No	-0.3	No
R50	45	45	No	-0.2	No
R51	53	53	No	-0.1	No
R52	54	54	No	-0.3	No
R53	56	55	No	-0.5	No
R54	58	57	No	-0.6	No
R55	58	58	No	-0.6	No
R56	50	50	No	-0.7	No
R57	52	52	No	-0.6	No

Table 2: Predicted Sound Levels using TNM 2.5 for Scenario 2b

Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R01	55	55	No	-0.1	No
R02	56	56	No	-0.3	No
R03	58	58	No	-0.4	No
R04	55	55	No	-0.4	No
R05	44	44	No	-0.3	No
R06	52	51	No	-1.3	No
R07	53	52	No	-1.4	No
R08	49	49	No	-0.3	No
R09	49	49	No	-0.3	No
R10	50	50	No	-0.4	No
R11	56	56	No	0.0	No
R12	56	56	No	-0.4	No
R13	55	55	No	-0.1	No
R14	54	54	No	0.3	No
R15	54	55	No	0.8	No
R16	45	46	No	1.0	No
R17	46	47	No	1.1	No
R18	56	56	No	-0.1	No
R19	57	57	No	0.0	No
R20	56	56	No	0.2	No
R21	57	57	No	0.1	No
R22	56	56	No	0.3	No
R23	45	48	No	3.4	No
R24	44	52	No	7.6	Yes
R25	47	52	No	4.6	No
R26	44	51	No	7.7	Yes
R27	47	54	No	6.3	Yes
R28	40	40	No	-0.2	No
R29	50	50	No	-0.2	No
R30	50	50	No	-0.3	No

Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R31	54	53	No	-0.7	No
R32	43	43	No	0.2	No
R33	46	46	No	0.1	No
R34	47	47	No	-0.1	No
R35	43	43	No	0.5	No
R36	50	50	No	0.0	No
R37	51	50	No	-0.1	No
R38	55	55	No	-0.7	No
R39	55	54	No	-0.7	No
R40	43	42	No	-0.1	No
R41	44	44	No	0.5	No
R42	50	50	No	0.0	No
R43	51	51	No	-0.1	No
R44	55	55	No	-0.6	No
R45	55	55	No	-0.7	No
R46	42	42	No	-0.1	No
R47	44	43	No	-0.1	No
R48	56	55	No	-0.8	No
R49	43	43	No	-0.3	No
R50	45	45	No	-0.2	No
R51	53	53	No	-0.1	No
R52	54	54	No	-0.3	No
R53	56	55	No	-0.5	No
R54	58	57	No	-0.7	No
R55	58	58	No	-0.7	No
R56	50	50	No	-0.8	No
R57	52	52	No	-0.7	No

Table 3: Predicted Sound Levels using TNM 2.5 for Scenario 3

Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R01	55	54	No	-0.2	No
R02	56	55	No	-0.4	No
R03	58	58	No	-0.4	No
R04	55	55	No	-0.5	No
R05	44	44	No	-0.3	No
R06	52	51	No	-1.0	No
R07	53	52	No	-1.1	No
R08	49	49	No	-0.3	No
R09	49	48	No	-1.1	No
R10	50	49	No	-1.0	No
R11	56	56	No	0.1	No
R12	56	56	No	-0.2	No
R13	55	55	No	0.1	No
R14	54	54	No	0.5	No
R15	54	55	No	0.9	No
R16	45	51	No	5.8	Yes
R17	46	49	No	3.0	No
R18	56	56	No	0.1	No
R19	57	57	No	0.1	No
R20	56	56	No	0.4	No
R21	57	57	No	0.4	No
R22	56	56	No	0.4	No
R23	45	53	No	8.5	Yes
R24	44	50	No	6.2	Yes
R25	47	54	No	6.7	Yes
R26	44	48	No	4.0	No
R27	47	54	No	6.2	Yes
R28	40	40	No	-0.1	No
R29	50	50	No	-0.2	No
R30	50	50	No	-0.2	No

Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R31	54	53	No	-0.7	No
R32	43	43	No	0.2	No
R33	46	45	No	-1.0	No
R34	47	46	No	-1.3	No
R35	43	44	No	1.3	No
R36	50	50	No	0.3	No
R37	51	51	No	0.1	No
R38	55	55	No	-0.6	No
R39	55	54	No	-0.5	No
R40	43	44	No	1.9	No
R41	44	45	No	1.3	No
R42	50	50	No	0.3	No
R43	51	51	No	0.1	No
R44	55	55	No	-0.4	No
R45	55	55	No	-0.5	No
R46	42	45	No	2.4	No
R47	44	43	No	-0.2	No
R48	56	55	No	-0.7	No
R49	43	42	No	-0.9	No
R50	45	44	No	-1.1	No
R51	53	53	No	-0.1	No
R52	54	54	No	-0.3	No
R53	56	55	No	-0.5	No
R54	58	57	No	-0.6	No
R55	58	58	No	-0.6	No
R56	50	50	No	-0.8	No
R57	52	51	No	-0.8	No

Table 4: Predicted Sound Levels using TNM 2.5 for Scenario 4

Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R01	55	55	No	-0.1	No
R02	56	56	No	-0.2	No
R03	58	58	No	-0.3	No
R04	55	55	No	-0.3	No
R05	44	44	No	-0.3	No
R06	52	51	No	-1.1	No
R07	53	52	No	-1.2	No
R08	49	49	No	-0.3	No
R09	49	49	No	-0.3	No
R10	50	50	No	-0.5	No
R11	56	56	No	0.0	No
R12	56	56	No	-0.3	No
R13	55	55	No	0.0	No
R14	54	54	No	0.4	No
R15	54	55	No	0.8	No
R16	45	51	No	5.8	Yes
R17	46	49	No	3.4	No
R18	56	56	No	0.0	No
R19	57	57	No	0.0	No
R20	56	56	No	0.3	No
R21	57	57	No	0.2	No
R22	56	56	No	0.3	No
R23	45	53	No	8.3	Yes
R24	44	50	No	6.1	Yes
R25	47	54	No	6.6	Yes
R26	44	47	No	3.8	No
R27	47	54	No	6.1	Yes
R28	40	40	No	-0.2	No
R29	50	50	No	-0.2	No
R30	50	50	No	-0.2	No

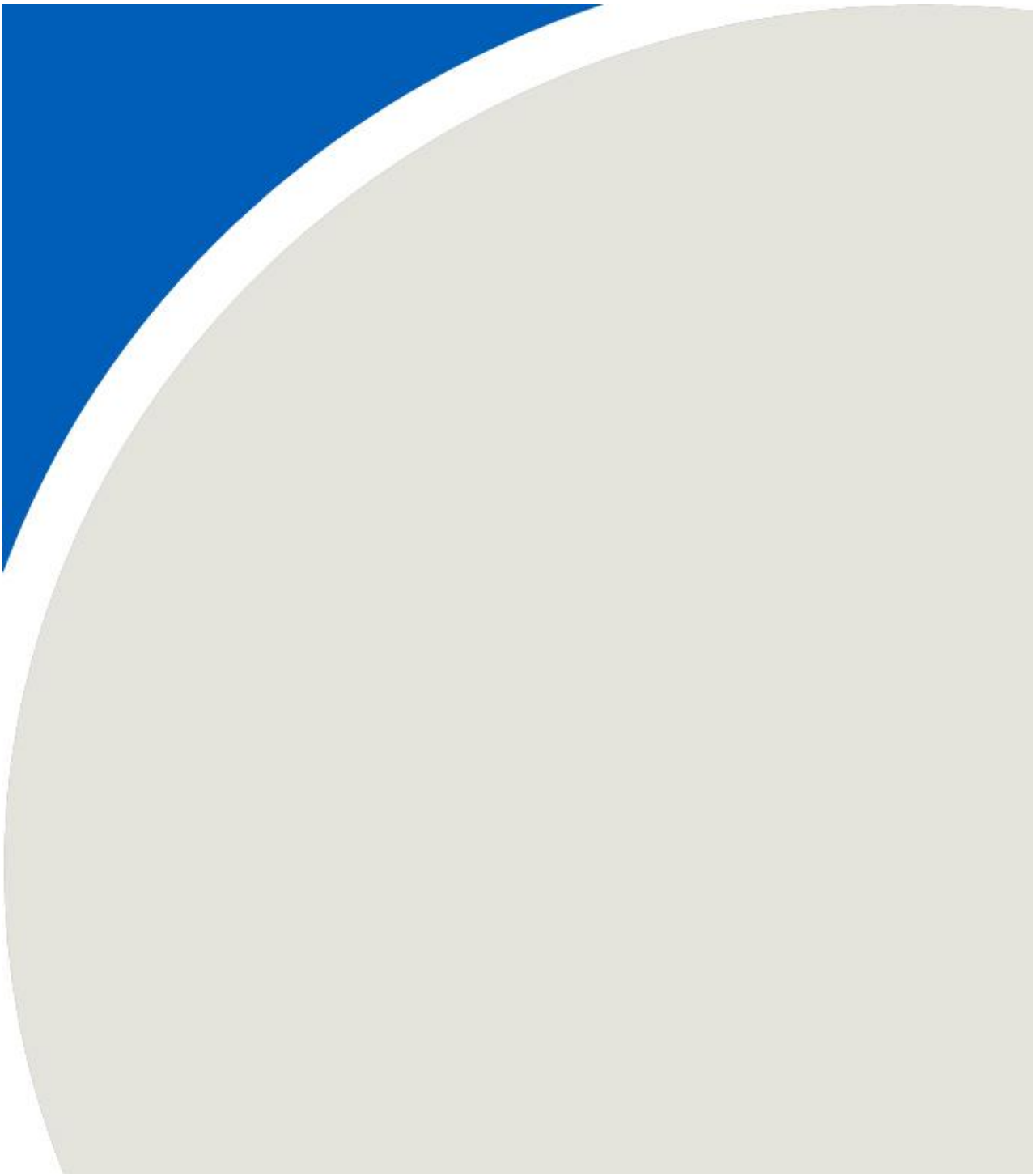
Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R31	54	53	No	-0.7	No
R32	43	43	No	0.0	No
R33	46	45	No	-1.1	No
R34	47	46	No	-1.3	No
R35	43	44	No	1.3	No
R36	50	50	No	0.3	No
R37	51	51	No	0.1	No
R38	55	55	No	-0.6	No
R39	55	54	No	-0.5	No
R40	43	45	No	2.0	No
R41	44	45	No	1.3	No
R42	50	50	No	0.3	No
R43	51	51	No	0.1	No
R44	55	55	No	-0.4	No
R45	55	55	No	-0.5	No
R46	42	45	No	2.4	No
R47	44	43	No	-0.2	No
R48	56	55	No	-0.7	No
R49	43	42	No	-0.9	No
R50	45	44	No	-1.1	No
R51	53	53	No	-0.1	No
R52	54	54	No	-0.3	No
R53	56	55	No	-0.5	No
R54	58	57	No	-0.6	No
R55	58	58	No	-0.6	No
R56	50	50	No	-0.8	No
R57	52	51	No	-0.8	No

Table 5: Predicted Sound Levels using TNM 2.5 for Scenario 5

Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R01	55	55	No	-0.1	No
R02	56	56	No	-0.2	No
R03	58	58	No	-0.3	No
R04	55	55	No	-0.3	No
R05	44	44	No	-0.3	No
R06	52	51	No	-1.1	No
R07	53	52	No	-1.2	No
R08	49	49	No	-0.3	No
R09	49	49	No	-0.2	No
R10	50	50	No	-0.3	No
R11	56	56	No	0.0	No
R12	56	56	No	-0.3	No
R13	55	55	No	0.0	No
R14	54	54	No	0.4	No
R15	54	55	No	0.8	No
R16	45	52	No	6.2	Yes
R17	46	50	No	3.8	No
R18	56	56	No	0.0	No
R19	57	57	No	0.0	No
R20	56	56	No	0.3	No
R21	57	57	No	0.2	No
R22	56	56	No	0.3	No
R23	45	53	No	8.6	Yes
R24	44	50	No	6.4	Yes
R25	47	54	No	6.8	Yes
R26	44	48	No	4.5	No
R27	47	54	No	6.1	Yes
R28	40	40	No	-0.2	No
R29	50	50	No	-0.2	No
R30	50	50	No	-0.3	No

Receiver	Predicted Sound Levels (dBA)				
	Future No-Build	Future Build	≥ 65 dBA	Change due to Undertaking	Change ≥ 5 dBA
R31	54	53	No	-0.8	No
R32	43	45	No	2.3	No
R33	46	47	No	0.9	No
R34	47	48	No	0.4	No
R35	43	44	No	1.3	No
R36	50	50	No	0.3	No
R37	51	51	No	0.1	No
R38	55	55	No	-0.7	No
R39	55	54	No	-0.7	No
R40	43	46	No	3.4	No
R41	44	45	No	1.3	No
R42	50	50	No	0.2	No
R43	51	51	No	0.1	No
R44	55	55	No	-0.6	No
R45	55	55	No	-0.7	No
R46	42	46	No	3.8	No
R47	44	46	No	2.8	No
R48	56	55	No	-0.9	No
R49	43	45	No	1.9	No
R50	45	47	No	2.3	No
R51	53	53	No	-0.1	No
R52	54	54	No	-0.2	No
R53	56	55	No	-0.4	No
R54	58	57	No	-0.6	No
R55	58	58	No	-0.6	No
R56	50	51	No	0.2	No
R57	52	53	No	0.3	No

APPENDIX D



AMENDED BY:
By-law 8952, dated April 21, 1987 (approved by Minister of Environment Aug. 24/87)
By-law 10277, dated May 22, 1990
By-law 11621, dated Nov. 1, 1993(approved by Minister of Environment June 16/94)
By-law 178-1998, June 8, 1998 (approved by Minister of Environment July 30/98)
By-law 191-1998, June 15, 1998 (approved by Minister of Environment July 30/98)
By-law 272-1998, August 31, 1998 (approved by Minister of Environment Jan. 26/99)
By-law 113-1999, April 26, 1999 (approved by Minister of Environment May 28, 1999)
By-law 344-1999, Nov. 15, 1999 (approved by Minister of Environment Feb. 2, 2000)
By-law No. 445-2001, December 3, 2001 (approval not needed – per George Wilkki legal opinion att'd)
By-law No. 182-2004, June 14, 2004 (new Municipal Act – Minister approval no longer necessary)
By-law No. 173-2006, Sept. 11/06
By-law No. 7-2008, Jan. 14/08
By-law No. 161-2010, Oct. 4/10
By-law 34-2013, March 4, 2013

B I L L
No. 279
1 9 8 0

B Y - L A W N U M B E R 6716

A BY-LAW RESPECTING THE EMISSION OF SOUNDS

Passed the 22nd day of September, 1980.

WHEREAS Section 129 of the Municipal Act, 2001, as amended, provides that the councils of local municipalities may pass by-laws for regulating or prohibiting with respect to noise**; (amended By-law 182, 2004, June 14, 2004)**

AND WHEREAS it is deemed expedient to reduce and control such sound or vibration;

NOW THEREFORE the Council of The Corporation of the City of Windsor enacts as follows:

1. INTERPRETATION

(1) In this by-law,

(a) "Construction" includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, moving, land clearing, earth moving, grading, excavating, the laying of pipe and conduit whether above or below ground level, street and highway building, concreting, equipment installation and alteration and the structural installation of construction components and materials in any form or for any purpose, and includes any work in connection therewith;

(b) "Construction Equipment" means any equipment or device designed and intended for use in construction or material handling, including but not limited to, air tools, bulldozers, tractors, excavators, trenchers, cranes, derricks, loaders, scrapers, pavers, generators, off-highway haulers or trucks, ditchers, compactors and rollers, pumps, concrete mixers, graders or other material handling equipment;

(c) "Conveyance" includes a vehicle and any other device employed to transport a person or persons or goods from place to place but does not include any such device or vehicle if operated only within the premises of a person;

(d) "Corporation" means The Corporation of the City of Windsor;

(e) "Council" means the Council of The Corporation of the City of Windsor;

(f) "Highway" includes a common and public highway, street, avenue, parkway, driveway, square, place, bridge, viaduct or trestle designed and intended for, or used by, the general public for the passage of vehicles;

(g) "Minister" means Minister of the Environment;

(h) "Ministry" means Ministry of the Environment;

(i) "Motor Vehicle" includes an automobile, motorcycle, and any other vehicle propelled or driven otherwise than by muscular power; but does not include the cars of electric or steam railways, or other motor vehicles running only upon rails, or a motorized snow machine, traction engine, farm tractor, self-propelled implement of husbandry or road-building machine within the meaning of the Highway Traffic Act;

(j) "Motorized Conveyance" means a conveyance propelled or driven otherwise than by muscular, gravitational or wind power;

(k) "Municipality" means the land within the geographic limit of the City of Windsor;

(l) "Noise" means unwanted sound;

(m) "Noise Control Officer" means a Police Officer of the City of Windsor or any person designated by Council as responsible for the administration of this by-law from time to time;

(n) "Point of Reception" means any point on the premises of a person where sound or vibration originating from other than those premises is received.

(2) Zones

In this by-law,

(a) "Residential Area" means those areas of the Municipality designated as residential in By-law Number 8600 and designated as residential and planned development in By-law Number 3072 of the Corporation as may be amended from time to time. (**B/L 8952, eff. Aug. 24/87)**

(b) "Commercial Area" means those areas of the municipality designated as commercial in By-law Numbers 8600 and 3072 of the Corporation as may be amended from time to time. (**B/L 8952, eff. Aug. 24/87)**

2. GENERAL PROHIBITIONS

No person within the boundary of the municipality shall emit or cause or permit the emission of sound resulting from an act listed herein, and which sound is clearly audible at a point of reception:

(1) Racing of any motorized conveyance other than in a racing event regulated by law;

(2) The operation of a motor vehicle in such a way that the tires squeal;

(3) The operation of any combustion engine or pneumatic device without an effective exhaust or intake muffling device in good working order and in constant operation;

(4) The operation of a vehicle or a vehicle with a trailer resulting in banging, clanking, squealing or other like sounds due to improperly secured load or equipment, or inadequate maintenance;

(5) The operation of an engine or motor in, or on, any motor vehicle or item of attached auxiliary equipment for a continuous period exceeding five minutes, while such vehicle is stationary in a residential area unless,

(i) the original equipment manufacturer specifically recommends a longer idling period for normal and efficient operation of the motor vehicle in which case such recommended period shall not be exceeded; or,

(ii) operation of such engine or motor is essential to a basic function of the vehicle or equipment, including but not limited to, operation of ready-mixed concrete trucks, lift platforms and refuse compactors; or

(iii) weather conditions justify the use of heating or refrigerating systems powered by the motor or engine for the safety and welfare of the operator, passengers or animals, or the preservation of perishable cargo, and the vehicle is stationary for purposes of delivery or loading; or

(iv) prevailing low temperatures make longer idling periods necessary immediately after starting the motor or engine; or,

(v) the idling is for the purpose of cleaning and flushing the radiator and associated circulation system for seasonal change of antifreeze, cleaning of the fuel system, carburettor or the like, when such work is performed other than for profit.

(6) The operation of a motor vehicle horn or other warning device except where required or authorized by law or in accordance with good safety practices;

(7) The operation of any item of construction equipment in a residential area without effective muffling devices in good working order and in constant operation.

(8) *Dynamic braking or engine braking or engine retarding of a motor vehicle.* **(added By-law 182-2004, June 14, 2004)**

2.1 AREA PROHIBITION

No person shall idle, or permit the idling of, a bus, for a continuous period exceeding 15 minutes, if the idling sound of the bus is clearly audible at a point of reception within the boundaries of the City Centre Business Improvement Area, as described in Schedule "A" attached hereto. **(added B/L 178-1998, June 8/98, eff. July 30/98)**

2.2 MOTOR VEHICLES – STEREOS/ELECTRONIC DEVICES

No person within the municipality shall emit or cause or permit the emission of sound resulting from the operation of any stereo or other electronic device designed to create, transmit, reproduce or amplify sound in or on a motor vehicle, which is audible at a distance of 8 metres (26 feet) from such motor vehicle. **(section added B/L 173-2006, Sept. 11/06)**

3. PROHIBITIONS BY TIME AND PLACE

No person within the municipality shall emit or cause or permit the emission of sound resulting from any act listed in Table 3.1, hereinafter set out, if clearly audible at a point of reception located in an area of the municipality indicated within a prohibited time shown for such an area.

TABLE 3-1

		PROHIBITED PERIOD OF TIME	
		Commercial Area	Residential Area
1.	The operation of a combustion engine which, (i) is, or (ii) is used in, or (iii) is intended for use in, a toy, or a model or replica of any device, which model or replica has no function other than amusement and which is not a conveyance.	Midnight to 7:00 A.M.	At all times
2.	The sound from or created by any radio, phonograph, tape player, television, public address system, sound equipment, loud speaker, or any musical or sound producing instrument of whatever kind when the same is played or operated in such manner or with such volume as to disturb the peace, quiet, comfort or repose of any individual in any office, dwelling house, apartment, hotel, hospital, or any other type of residence **(B/L 11621, eff. June 16/94)**	At all times	At all times
3.	The operation of any auditory signalling device, including but not limited to the ringing of bells or gongs and the blowing of horns or sirens or whistles, or the production, reproduction or amplification of any similar sounds by electronic means, except where required or authorized by law or in accordance with good safety practices.	Midnight to 7:00 A.M.	At all times
4.	The operation of any powered rail car including but not limited to refrigeration cars, locomotives or self-propelled passenger cars, while stationary on property not owned or controlled by a railway governed by the Canada Railway Act.	Midnight to 7:00 A.M.	At all times
5.	The operation of any motorized conveyance other than on a highway or other place intended for its operation	Midnight to 7:00 A.M.	At all times

6.	The venting, release or pressure relief of air, steam or other gaseous material, product or compound from any autoclave, boiler, pressure vessel, pipe, valve, machine, device or system.	Midnight to 7:00 A.M.	9:00 P.M. to 8:00 A.M.
7.	The operation of a commercial car wash with air drying equipment	Midnight to 7:00 A.M.	11:00 P.M. to 8:00 A.M.
8.	Yelling, shouting, hooting, whistling or singing.	Midnight to 7:00 A.M.	At all times
9.	The operation of a power assisted hang glider or parafoil	Midnight to 7:00 A.M.	At all times
10.	The operation of any item of snow making equipment.	Midnight to 7:00 A.M.	At all times
11.	All selling or advertising by shouting or outcry of amplified sound.	Midnight to 7:00 A.M.	At all times
12.	Loading, unloading, delivering, packing, unpacking, or otherwise handling any containers, products, materials, or refuse, whatsoever, unless necessary for the maintenance of essential services or the moving of private household effects.		8:00 P.M. to 6:00 A.M.
13.	The operation of any equipment in connection with construction.		8:00 P.M. to 6:00 A.M.
14.	The operation or use of any tool for domestic purposes other than snow removal	Midnight to 7:00 A.M.	9:00 P.M. to 8:00 A.M.
15.	The operation of solid waste bulk lift or refuse compacting equipment.		8:00 P.M. to 6:00 A.M.
16.	The operation of a commercial car wash of a type other than mentioned in Item 7.	Midnight to 7:00 A.M.	11:00 P.M. to 8:00 A.M.
17.	Persistent barking, calling or whining or other similar persistent noise making by any domestic pet or any other animal kept or used for any purpose other than agricultural. **(added B/L 113-1999, Apr.26/99, eff. May 28/99)**	At all times	At all times

3.1 EXEMPTION (added B/L 445-2001, Dec.3/2001)

Table 3-1, paragraph 17, of section 3 shall not apply to:

(a) A veterinary hospital, clinic, office or veterinary service lawfully operated and supervised by a veterinarian licensed to practice in Ontario;

(b) An animal shelter operated by the Windsor-Essex County Humane Society, Erie Wildlife Rescue Inc., or a shelter lawfully operated by the Ontario Humane Society;

(c) Premises registered as a research facility in accordance with the *Animals For Research Act*, as amended;

(d) Kennels licensed by The Corporation of the City of Windsor;

(e) Pet shops licensed by The Corporation of the City of Windsor;

(f) Any person in charge of a traveling circus, exhibition, or road show, or any employee thereof, lawfully displaying animals within the City of Windsor;

(g) Any person licensed or exempted as an operator of an animal supply facility in accordance with the *Animals For Research Act*, as amended, or the employees of such facility, during the course of their duties;

(h) Any person who operates an elementary school, secondary school, college, university or provincial institution that contains a research facility exempted from registration under the *Animals For Research Act*, as amended;

(i) Any person who operates, or who is employed by, an establishment which lawfully carries on the business of supplying animals to elementary schools, secondary schools, colleges, universities or provincial institutions;

(j) Dogs maintained in a zoo, fair, exhibition, carnival, menagerie or circus operated or licensed by The Corporation of the City of Windsor or other governmental agency;

(k) The Corporation of the City of Windsor or other governmental authority while lawfully operating a public park, exhibit, or zoological garden, and maintaining animals therein; and

(l) Any dog owned, possessed or harboured by the Windsor Police Service, Ontario Provincial Police, Royal Canadian Mounted Police or any other local police or other government enforcement agency."

4. **EXCEPTION**

Notwithstanding any other provision of this by-law, it shall be lawful to emit or cause or permit the emission of sound or vibration in connection with:

(1) Emergency measures undertaken,

(a) for the immediate health, safety or welfare or the inhabitants or any of them; or,

(b) for the preservation or restoration of property; unless such sound or vibration is clearly of a longer duration or nature more disturbing than is reasonably necessary for the accomplishment of such emergency purpose.

(2) Garbage and recycling collection carried out by, or on behalf of, The Corporation of the City of Windsor or its authorized agent. **(added by By-law 161-2010, Oct. 4, 2010)**

5. **GRANT OF EXCEPTION BY COUNCIL**

(1) Application to Council

Notwithstanding anything contained in this By-law, any person may make application to Council to be granted an exemption from any of the provisions of this By-law with respect to any source of sound or vibration for which he might be prosecuted and Council, by resolution, may refuse to grant any exemption or may grant the exemption applied for or any exemption of lesser effect, and any exemption granted shall specify the time period, not in excess of six (6) months, during which it is effective and may contain such terms and conditions as Council sees fit.

(2) Decision

In deciding whether to grant the exemption, Council shall give the applicant and any person opposed to the application, an opportunity to be heard and may consider such other matters as it sees fit.

(3) Breach

Breach by the applicant of any of the terms or conditions of any exemption granted by Council shall render the exemption null and void.

6. ~~**EXEMPTION OF TRADITIONAL, FESTIVE OR RELIGIOUS ACTIVITIES**~~

~~Notwithstanding any other provision of this by-law, this by-law does not apply to a person who emits or causes or permits the emission of sound or vibration in connection with any of the hereinafter listed traditional, festive, religious and other activities, namely:~~

~~(a) International Freedom Festival;~~

~~(b) Emancipation Day;~~

~~(c) Firemen's Field Day;~~

~~(d) Carrousel of the Nations;~~

~~(e) Ringing of church bells or chimes.~~ ~~**(amended B/L 11621, eff. June 16/94)**~~

~~(f) Festival Epicure~~ ~~**(added B/L 191-1998, June 15/98, eff. July 30/98)**~~

~~(f) Challenge Cup, provided however that same is held on the grounds of the St. Clair College of Applied Arts and Technology, 2000 Talbot Road West~~ ~~**(added B/L 272-1998, eff. Jan. 26/99)**~~

(Section 6 REPEALED AND SUBSTITUTED – SEE BELOW – By-law 7-2008, Jan. 14//08)

6.1 **EXEMPT ACTIVITIES**

Notwithstanding any other provisions of this by-law, this by-law does not apply to a person who emits or causes or permits the emission of sound or vibration in connection with any of the hereinafter listed activities, namely:

(a) Ringing of church bells or chimes

(b) Ringing of school bells. (**Added B/L 34-2013, March 4, 2013)**

6.2 **TEMPORARY NOISE BY-LAW EXEMPTION PERMITS**

Despite any other provisions of this by-law, this by-law does not apply to a person who emits or causes or permits the emission of sound, if the Corporation's General Manager of Client and Protective Services, or his or her designate, has issue to such person a Temporary Noise By-law Exemption Permit, and such person complies with the terms and conditions in the said Temporary Noise By-law Exemption Permit."
(Section 6 SUBSTITUTED – B/L 7-2008, Jan.14/08)

7. **SEVERABILITY**

If a Court of competent jurisdiction should declare any section or part of a section of this by-law to be invalid, such section or part of a section shall not be construed as having persuaded or influenced Council to pass the remainder of the by-law and it is hereby declared that the remainder of the by-law shall be valid and shall remain in force.

8. **PENALTY**

Every person who contravenes any of the provisions of this by-law is guilty of an offence and shall, upon conviction thereof, forfeit and pay a penalty of not more than Five Thousand Dollars ($5,000), exclusive of costs and every such fine is recoverable under the Provincial Offences Act. **(amended B/L 10277, May 22/90; B/L 344-1999, Nov.15/99)**

9. That By-law Number 137, as amended, is repealed.

10. This by-law shall come into full force and take effect upon the day following the final passing thereof upon which it is approved by the Minister of the Environment.

(SIGNED) "A. H. WEEKS"

MAYOR

(SIGNED) "J. B. ADAMAC"

CLERK

First Reading - September 22, 1980
Second Reading - September 22, 1980
Third Reading - September 22, 1980

NOTE: By-law No. 6716 is approved pursuant to the provisions of The Environmental Protection Act, 1971, as amended, at Toronto, this 17th day of February, 1981. (original certificate attached to book copy of By-law 6716)

(SIGNED) "HARRY PARROTT"
MINISTER OF THE ENVIRONMENT

(added B/L 178-1998, June 8/98, eff, July 30/98)

SCHEDULE "A"
TO BY-LAW NUMBER 178-1998

The Downtown Area of the City of Windsor bounded,

a) on the north, by the Detroit River;

b) on the east, by a line down the middle of Glengarry Avenue from the Detroit River to the middle of Chatham Street; thence westerly along the middle of Chatham Street to the middle of McDougall Street; thence southerly along the middle of McDougall Street to the middle of Tuscarora Street; thence westerly along the middle of Tuscarora Street to the middle of Windsor Avenue; thence southerly along the middle of Windsor Avenue to the middle of Elliott Street;

c) on the south, by a line down the middle of Elliott Street from the middle of Windsor Avenue westerly to Victoria Avenue; thence northerly along the middle of Victoria Avenue to the middle of Elliott Street; thence westerly along the middle of Elliott Street to the alley between Victoria Avenue and Dougall Avenue; and

d) on the west, by a line down the middle of the alley between Victoria Avenue and Dougall Avenue from Elliott Street to the middle of Park Street; thence westerly along the middle of Park Street to the middle of Church Street; thence northerly along the middle of Church Street to the middle of Pitt Street; thence westerly along the middle of Pitt Street to the middle of Bruce Avenue; thence northerly along the middle of Bruce Avenue to the Detroit River.

Re: amending BL 445-2001

I am of the opinion that we do not need Ministerial approval for the amendment of the noise bylaw to delete police dogs from its purview.

Should we be increasing the effect of the bylaw we would need approval. Reducing its effect is in my opinion different. As another example of this, for every event we hold where breach of the noise bylaw is a concern, we pass a temporary waiver of the noise bylaw. These waivers are not submitted to the Ministry for approval before taking effect.

In my opinion, the bylaw is valid as is and can be acted upon immediately.

George A. Wilkki
Director of Legal Services